

# 2014 Newark Bicycle Plan

Developed by the Newark Bicycle Committee, City of Newark, and WILMAPCO

A plan to make bicycling a more safe and convenient choice for transportation and recreation for people of all ages and abilities



Approved by Newark City Council on February 24, 2014

Endorsed by WILMAPCO on May 8, 2014



*Developed by:*



*Newark Bicycle Committee*

Robert Bennett  
Thomas Coleman  
Angela Cunneely  
Mark Deshon  
Heather Dunigan  
Charlie Emerson  
Jillian Farley  
Michael Fortner

William Hargrove  
Steven Hegedus  
Gerald Kauffman  
Dan LaCombe  
Lelia Perkins  
Jeff Riegner  
Richard Rind

Karen Rosenberg  
Christine Schultz  
Linda Smith  
Nicole Suto  
Frank Warnock  
William Wentz  
James Wilson

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Photo: Frank Warnock





## INTRODUCTION

The City of Newark, Delaware, has a long history of planning for bicycle transportation and recreation. Beginning with the 1973 *Urban Route Bicycle System Master Plan*, the City has recognized the need to plan a bicycling network to accommodate students, recreational riders, adults, and children. The *Newark Area Bicycle Interim Report* was completed in 1996 by the City of Newark, University of Delaware, Delaware Department of Transportation (DelDOT) and the Wilmington Area Planning Council (WILMAPCO) as a supplementary report to the *Newark/Elkton Intermodal Transportation Plan*. The report provided information about existing conditions and a preliminary inventory of bicycle facilities in the City of Newark and surrounding area, proposed preliminary recommendations for improving bicycling infrastructure, and raised issues that needed to be resolved before developing a final Bicycle Facility Needs Plan. The 2002 *Newark Bicycle Plan* provided updated recommendations, and an updated network of facilities was included in the 2011 *Newark Transportation Plan*.

Since the 2002 plan, accomplishments include completion of the Hall and Pomeroy Trails, installation of bike racks on Main Street, implementation of a bicycle safety-checkpoint program, birth of the Newark Bike Project, addition of bike racks to most DART and University buses, and improved bike lanes on Elkton and Paper Mill Roads. In recognition of this progress, in 2010 Newark was designated a “Bronze” Bicycle Friendly Community by the League of American Bicyclists through a process that provided feedback on what we are doing well and areas for improvement.

The 2014 *Newark Bicycle Plan* (hereafter referred to as “the Plan”) expands upon the recent *Newark Transportation Plan* bicycling recommendations to encompass a more detailed prioritization of infrastructure improvements, as well as programs and policies for education, enforcement, and encouragement. Recommendations were developed based on community participation, implementing agency input, and best practices.

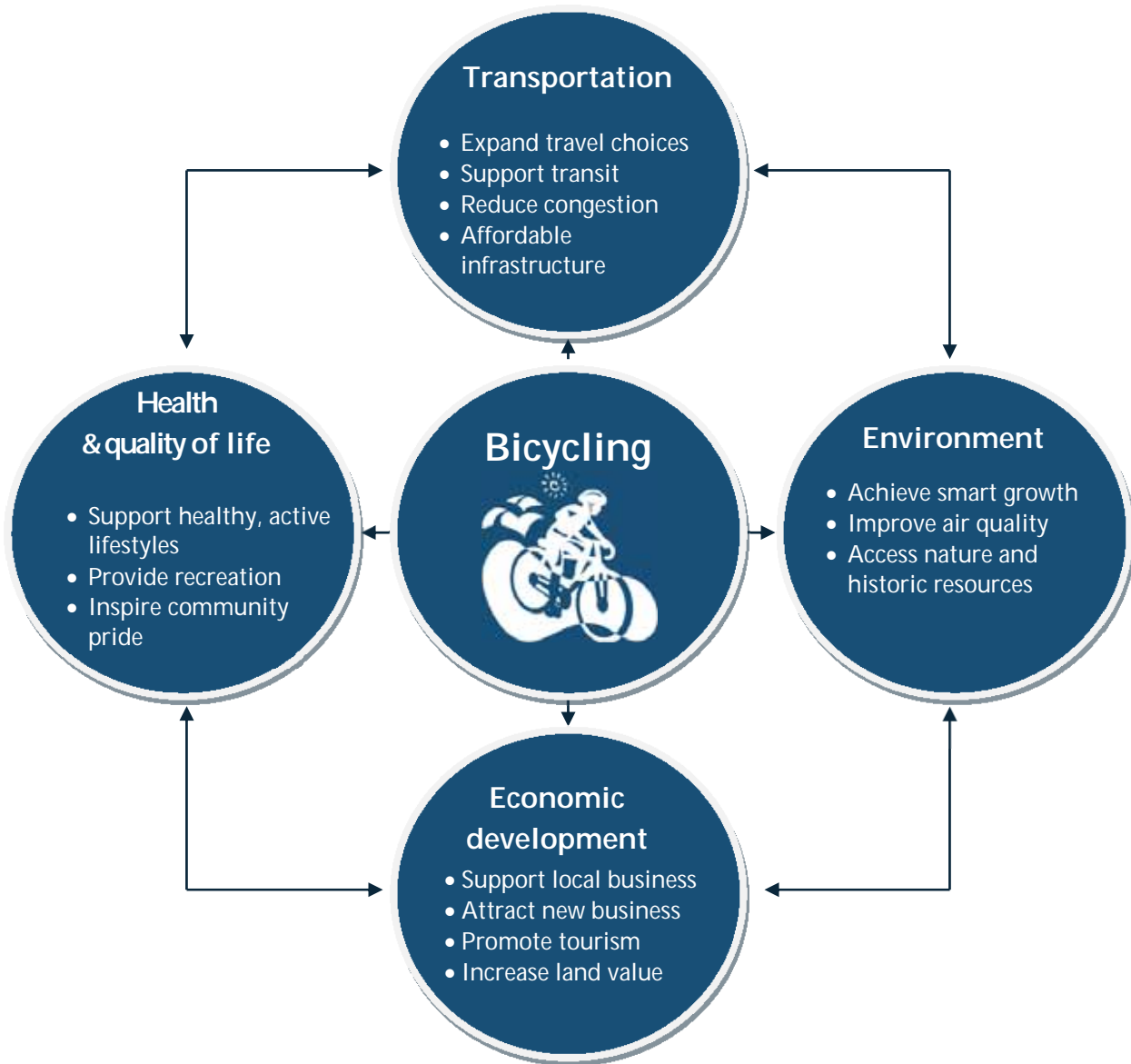
The Plan focuses on developing a bicycle network, policies, and programs within the City of Newark but also identifies desired links with destinations outside the City including Elkton, Pike Creek, White Clay Creek State Park, Churchmans Crossing, Brookside, and Old Baltimore Pike.

Those who live, work, and play in Newark are interested in bicycling for a variety of purposes and have a variety of levels of comfort with riding on streets. Promoting bicycling to a wider audience has a variety of benefits for all of Newark. Bicycling is an affordable, environmentally friendly means of active transportation. Further, bicycling for recreation can be a source of community pride and promote economic development and tourism within the community. Finally, shifting trips to bicycling from driving can help alleviate congestion on Newark’s busy streets.

*Why Develop a Bicycle Plan?*

*More and improved bicycling contributes to state, regional, and local goals*

Bicycling is an important part of Newark’s community, serving not only as a low-cost means of transportation, but providing economic, environmental, health, and quality-of-life benefits.



Source: Adapted from 2009 Maryland Trails: Strategic Implementation Plan

## Goals and Objectives

### *Improve bicycle transportation network.*

- Provide access within ¼ miles of network for all residents.
- Identify and address key gaps and areas of safety concern.
- Consider needs of all user groups.
- Identify links needed to connect low-traffic, low-stress routes.



### *Improve bicycle access to transit.*

- Provide adequate and secure bicycle parking at identified transit locations.
- Identify safe and convenient bicycle routes to and from transit stations and stops.

### *Encourage adequate and secure bicycle parking at all major trip destinations.*

- Review bicycle parking requirements in zoning codes and recommend revisions as needed.
- Identify locations where bicycle parking should be provided.

### *Improve safety for bicycling through design, maintenance, and enforcement practices.*

- Recommend safe design and maintenance best practices for all bikeways and shared-use facilities, including lighting and signage.
- Recommend measures to support enforcement of the rights and responsibilities of bicyclists, targeting violations that cause the most injuries and fatalities for selective enforcement.
- Identify possible resources for training to local enforcement agencies.
- Develop signage and promotional programs aimed at motor-vehicle drivers to improve awareness of the needs and rights of bicyclists.

### *Incorporate bicycle elements into land-use and development planning.*

- Consider bicycle accommodations in local development review procedures, and encourage incentives for bicycle accommodations.
- Integrate the consideration of non-motorized facilities into all planning, design, construction, and maintenance activities of transportation or public works departments.

### *Develop implementation plan.*

- Prioritize recommended infrastructure projects, programs, and policies for implementation.
- Identify funding programs for implementation.
- Continue to expand community and agency involvement in the Newark Bicycle Committee.

## Target Audience

This Plan recognizes that only a small portion of potential users of the bicycle network have the skill level and confidence to ride with traffic on busier streets. Significant potential untapped demand for bicycling comes from the portion of the population considered “interested, but concerned,” a view expressed in surveys done elsewhere as well as expressed in the 2011-2012 University of Delaware commuter survey.

## The Four Types of Bicyclists

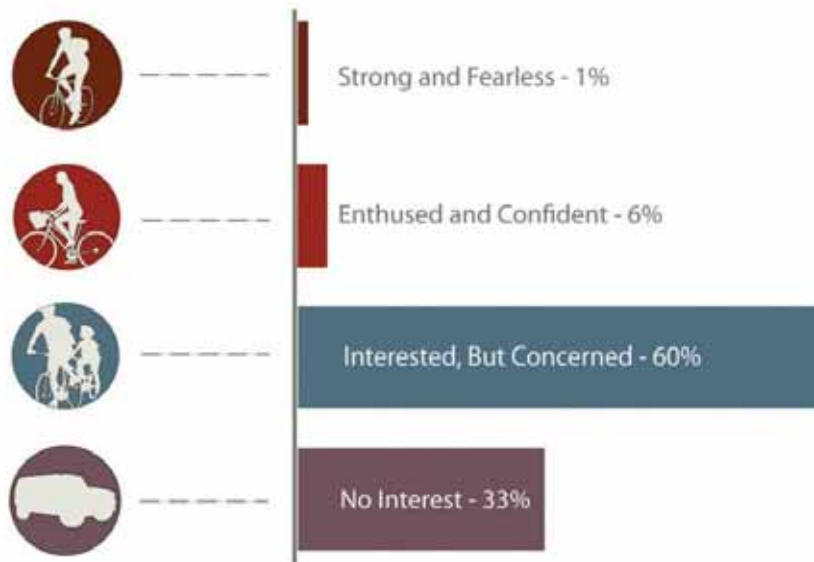


Chart: Roger Geller, “Four Types of Cyclists,” [www.portlandonline.com/transportation](http://www.portlandonline.com/transportation) via bikemiamibeach.org

Bicycle facilities are not “one size fits all.” Rather, a variety of bicycle facilities and programs are needed to provide for the very skilled rider who may need high-security bicycle parking and a shower after a long bicycle commute to the family who wishes to take a short ride for fitness and fun in a protected environment. Indeed, almost anyone can bicycle, regardless of income, age, or athletic ability, making it an easy way for many to travel and stay fit. Outlined in this Plan are measures meant to overcome the physical constraints and limited skills that make many reluctant to bicycle more often.



## Planning Process

This Plan was developed by WILMAPCO in partnership with the City of Newark and the Newark Bicycle Committee—a body comprising City, University, DeIDOT, bicycle advocacy, and resident representatives. Feedback from the greater Newark community was sought throughout the development of the Plan. Details are provided in Appendix A.



Outreach has included:

- Displays and surveys at 2012 Newark Day and Newark Community Day
- University Employee Commute Survey conducted 11/2011- 1/2012 by the University of Delaware's HealthyU Employee Wellness Program and the Newark Bicycle Committee, with 613 responses
- December 2012 Public Workshop
- Presentation at the April 2013 Comprehensive Plan Public Meeting
- Release of the draft document at the Newark Bike to Work Day event in May 2013
- Spring 2013 "virtual workshop" that included an online survey and interactive maps
- June 26 public meeting with Newark Bike Project

### *Feedback from December 6, 2012, Public Workshop*

This kick-off public workshop was held as an open house with a variety of interactive displays including SWAT Analysis, sticker surveys and maps for commenting.

**SWOT Analysis** (Strengths, Weaknesses, Opportunities, and Threats): Numbers in parenthesis indicate number of responses

- What are the *Qualities* that make Newark a Bicycle Friendly Community?
  - Existing bike routes (3)
  - Designated bike lanes on Del. Ave. and now Elkton Road (2)
  - Many destinations/stores accessible by bike (3)
  - The increased consciousness and acceptance of motorists to bicyclers as a result of the large number of bicyclist on the city roads
  - UD off-street pathways and parking lots
  - Hall and Pomeroy Trails (5)
  - Bike racks on Main Street
  - University of Delaware, students who bike (2)
  - Quiet, low-traffic neighborhoods.
  - Not popular as cut through for E-W or N-S thru-traffic, mostly local drivers

- Not strict w/stop sign/red light “violations”
- What are *Aspects* that make Newark *less bicycle-friendly*?
  - Narrow streets with lots of cars (e.g., Nottingham Rd., West Main Street) (1)
  - Few bike racks (2)
  - Construction projects that do not take cyclists into account, specifically signage in the shoulder that blocks bicycles
  - Least favorite intersection: where Pomeroy Trail crosses Cleveland Ave.
  - Approach to Newark from Maryland – debris on shoulder and dangerous intersections at State Rt. (SR) 4 and Otts Chapel.
  - Uneducated motorists, bicyclists, and pedestrians (1)
  - Speeding on Hall Trail
  - Potential development of Country Club site – more congestion on SR 273 and SR 896
  - Chapel Street is difficult to bike (narrow roadway) (1)
  - Not enough bike parking: especially in shopping centers (1)
  - Leaf piles in bike lane (1)
  - Vehicle speed in general
  - Cleveland Ave. (1)
  - Main Street lacks bike lane (3)
  - UD needs safe indoor or covered parking so students will be willing to bring bikes
  - Aggressive drivers, especially on Main Street. Drivers think bikes should be on sidewalk.
  - Insufficient roadway lighting
  - Roadway construction, e.g., SR 2, SR 273, SR 72, Christina Parkway (1)
  - No bicycle treatment at intersections (1)
  - Road trash, gravel, potholes (1)
- What are *Opportunities* to improve bicycling in Newark?
  - I like the proposed bike lane plans (1)
  - We need a bike lane on Main Street. Take a look at U. Wisconsin at Madison, Wis. (2)
  - The following features would be great: dedicated bike lanes (i.e., not turning into turning lanes!) – Physical separation might help keep cars out of bike lanes.
  - Bike lanes at key railroad crossing, such as Apple Rd. and Main Street
  - Bike lanes on popular biking roads, like Park Place
  - A specific problem location is the Casho Mill underpass, especially for cyclists who are south bound and whose lane just runs into a guardrail. Northbound the bike lane is frequently blocked by cars extending the right-hand lane at the light all the way back to the underpass.
  - Delaware Ave. cycle track (2)
  - Redevelopment of the Chrysler property w/trails
  - Extension of Hall Trail/Pomeroy Trail off-road network – east and west

- Wayfinding signage
  - More bike parking
  - Another specific suggestion is to connect the bridge across the Christina at the end of Timberline Drive to some path to the street (Casho Mill)
  - East-west travel on Main Street – allow bikes on sidewalks E of Newark Shopping Center.
  - Access to Redd Park and Reservoir w/o going up Papermill – i.e., cross Cleveland Ave. and Creek
  - Green paint bike lanes at heavily trafficked intersections
  - Lighting
  - Connectivity bike lanes and trails
  - Paving the path/trail from Fremont Road to Creek Road (to provide access to the Pomeroy from residents in the NW portion of Newark – without riding on 896)
  - Safely cross Cleveland/Chapel St. Intersection – very intimidating intersection for the casual rider (1)
  - Extend lighting to end of Pomeroy Trail (north end)
- What are *Threats* to improving Bicycling in Newark?
    - Lack of funds and agreements
    - Opposition from car dealers on Cleveland Ave. plans
    - People throwing beer cans at bikers
    - More development – too many cars
    - Focus on vehicular traffic during road design (2)
    - Available space is limited in existing corridors (1)
    - General speeding by motorists on all streets – need to calm traffic on selected routes.
    - Assumption that cars are and will be sole transportation. PRIORITY = AUTOs
    - Continuing to encourage traffic flow for more cars moving faster
    - Businesses not perceiving bicycle traffic as adding to their business quality/value
    - Bump-outs for pedestrians on Main Street – hard for bicyclists
    - No good bike lanes on Main St. or Cleveland Ave./good in opposite direction on Del. Ave.





## Sticker Survey Results

*Bicycle Education and Safety Programs*

Child Bicyclists	Safe Routes to School	5
	Safetytown	0
	Bicycle Rodeos	1
	Helmet distribution program	0
	Recycle a bike program - kids fix up bikes and keep them or Earn-a-bike program through community service	3
	Bicycle trips for kids programs	1
	Educate parent groups and adult groups that supervise children, e.g., PTAs	2
	Other: Recycle bikes for older folks too—not just kids	
Adult Bicyclists	Bicycle Safety Checkpoints	0
	Public awareness campaign on responsible behavior directed to bicyclists and drivers	11
	Work with bicycle shops to provide incentives for purchase of helmets and lights	0
	Develop materials and programs addressing the cycling needs of seniors, e.g., a tricycle program	1
	Work with/encourage UD to educate students about proper, effective cycling and distribute bike safety pamphlets to students as part of registration packets	7
	Effective Cycling course by the League of American Bicyclists (LAB)	0
	UD effective cycling as a physical education course	0
	Offer classes through the Senior Center and Parks and Recreation	0
	Provide articles in community publications, newsletters	0
	Encourage the medical industry to recommend cycling as a means of exercise	3
Other: UD Wellness education of staff about safe cycling opportunities (many don't cycle because of safety perceptions). Education might open doors. Encourage projects such as Newark Bike Project.		
Motorists	Campaigns to educate motorists on how to safely share the road with bicyclists and overall awareness of bicyclists' rights and responsibilities	8
	Use public service space from newspapers, television, radio, bus advertising, posters and flyers mailed in utility bills and with parking permits	2
	Signage on roadways, such as "Share the road" or "Bikes may use full lane"	8
Law Enforcement Officials	Training for Newark and UD police on bicyclists' rights/responsibilities, how best to approach the bicyclist offender, and on what bicycling and motor vehicle offenses pose the greatest risk to cyclists	8
	City should develop its own bicycle fine structure so that bicycle fines will not be excessive and officers will be more willing to impose them.	3
	Citation alternative program--attend education program, similar to auto traffic school, would allow fees to be waived.	0
	Posted speed limits should be enforced. High auto speeds make bicyclists feel unsafe, discourage people from cycling, and increase the severity of collisions.	7
	Bike registration program and bike shops to register bikes when they are sold	1

### Programs to Encourage Bicycling

Promoting more bicycling	Promote Bike-to-Work Day	5
	Community events such as charity bike rides, costume rides, bike fairs, and bicycle rodeos	0
	Workplace promotion of bike commuting such as contests, rewards to bike commuters, and provision of lockers, bike parking, and showers.	5
	Public awareness campaign emphasizing the individual and community benefits of using a bicycle for daily trips, e.g., a city-wide contest for most miles bicycled, oldest bicyclist, farthest commute, etc.	1
	Offer easy social rides and family fun rides.	2
	Promote existing facilities and programs.	3
	Bike share program	2
	Business promotions through Downtown Newark Partnership	1
	Changes to development code for bicycle parking and facilities	3
	Covered/indoor bicycle parking for commuters	0
	Other: Need covered bike parking area at the University and bike racks at the Senior Center. Design safety enhancement for major approaches into town from major residential centers (e.g. SRs 72, 896, 2)	

### Maintenance Plan

Maintenance	Street sweeping priority to bike routes	4
	Publicize road maintenance reporting	1
	Pothole repair priority to bike routes	2
	Include improved bicycle facilities when paving and improving roadways	10

### How did you learn about today's workshop?

Outreach	Newspaper	0
	Radio	0
	City email	2
	City website	2
	Newark Bike Project	0
	Bike Delaware	1
	WILMAPCO newsletter	5
	University of Delaware	4
	Other: Newark Bicycle Committee	

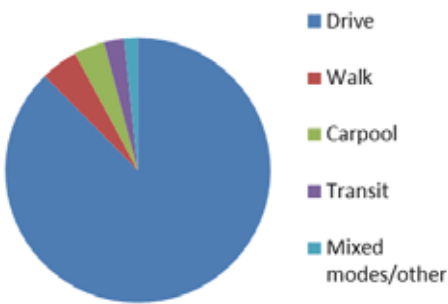


### UD Bike Commuting Survey

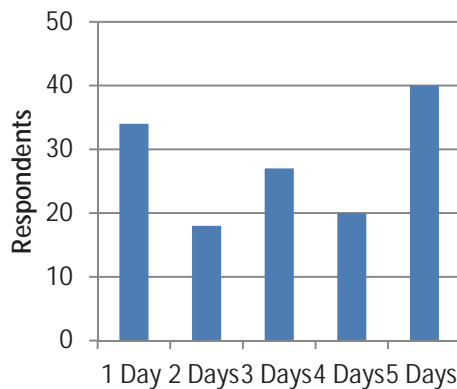
The UD Bike Commuting Survey was conducted between November 17, 2011, and January 14, 2012, with 613 responses received. Survey was conducted through a partnership between the University of Delaware's HealthyU Employee Wellness Program and the Newark Bicycle Committee to gauge current commuting patterns and gain a better understanding of why people bicycle to campus or uses other forms of transportation. What we learned:



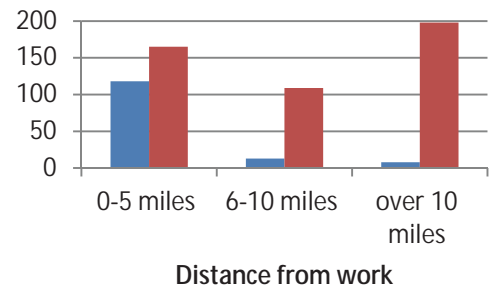
#### Most non-cyclists drive to work



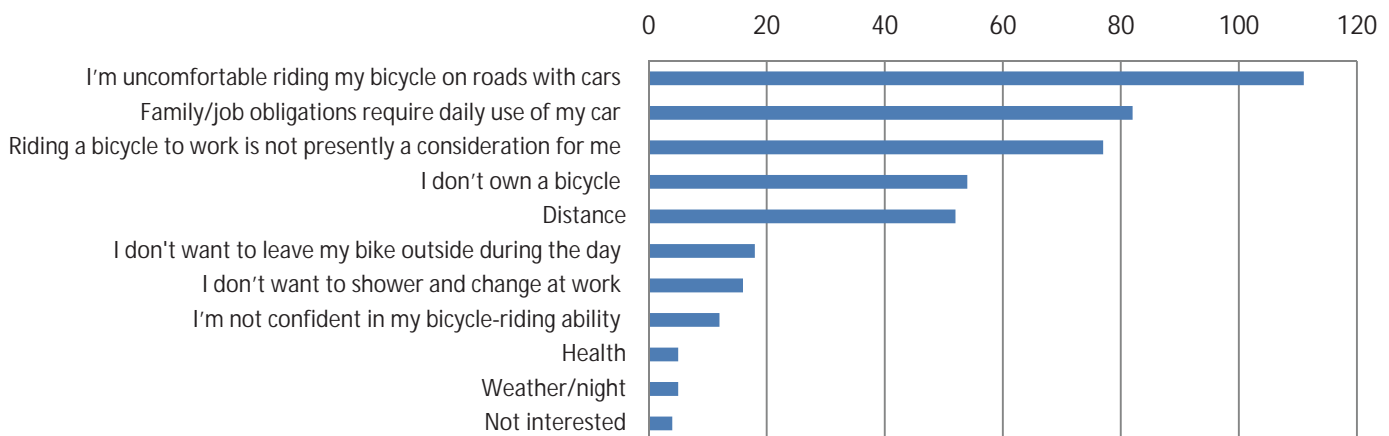
#### 29% of bicycle commuters bike every day



#### 42% of respondents within 5 miles bicycle to work



#### Why people do not bicycle





### *June 2012 Public Meeting*

On June 26, the community gathered at the Newark Bike Project to share ideas for bicycling in Newark.

Suggestions that were discussed included:

- Conduct additional public outreach for the Plan, including coordination with the Trailspinners and White Clay Bike Club.
- Coordinate bicycle education with drivers education classes at Newark High School. Drivers education improvement is a current project of the Delaware Bicycle Council, and Newark High School could serve as a pilot location.
- Challenging location where discussed, particularly access to Newark from points east along SR 273 and Kirkwood Highway. DeIDOT planning for a Newark-to-Wilmington bicycle route is currently underway, but feasible routes and timing for implementation is still not known.
- Cleveland Avenue/Paper Mill/Pomeroy Trail intersection is a significant challenge and makes the Pomeroy less suitable for children. Suggestions included wayfinding signs to guide people across the intersection and working with DeIDOT and the City on signal and crosswalk improvements. A mountable curb was also suggested to ease the transition for cyclists who wish to take the lane.
- The poor condition of roads near University construction sites was discussed, including Lovett, Academy, and Wyoming. Around these locations it was also noted that crossing Chapel Street at Wyoming and Lovett streets is challenging.
- Delaware Avenue has an issue with vehicles parking on the bicycle lane.
- Signs should indicate continuation of Pomeroy Trail onto Creek Road.
- Concerns exist about the proposed South Main Street Wawa's potential impact on bicycle safety. It was noted that a Traffic Impact Study is required and will examine the impacts.
- South Main Street should have additional bicycle racks installed at existing residential and commercial sites.



*Photo: Frank Warnock*

Top priority projects identified included:

- Go after low-hanging fruit—project done along with paving and rehabilitation, land use development, etc.
- Prioritize connecting gaps to create low-stress routes where people feel safe.
- Leverage low cost connections to complete the network.
- Complete Frazer Field connections and permanently retain link added during Carpenter Sports Building construction.
- Address safety and convenience of Papermill/Cleveland/Pomeroy intersection.
- Expand youth education, including greater promotion of Bike to School Day.
- Provide information for drivers with signs and other means to improve bicycle/driver cooperation.
- Provide sharrow information to overall community using brochures, posters, and variable-message signs.

### Virtual Public Workshop

The Virtual Public Workshop used interactive online maps and survey, provided with assistance from Wikimapping. Respondents provided recommendations and comments about barriers and dangerous areas, problem areas, suggested bike routes, favorite bike routes, and locations where bicycle racks are needed.



The Newark Bicycle Committee and Wilmington Area Planning Council would like to know your concerns and ideas to help in improving conditions for biking in and around Newark. Comment or find additional information about the Newark Bicycle Plan at [www.wilmapco.org/bikene Newark](http://www.wilmapco.org/bikene Newark)

**To use:**  
**First time users**, click **Welcome** to register  
**Once logged in**, click **About** for more instructions and options  
 Click **Routes** to add a problem area or suggest a bike route on the map  
 Click **Points** to show where a bike rack needed or a barrier / dangerous area

**Legend**

Routes	Points
<span style="color: yellow;">—</span> Favorite bike route	Barrier / Dangerous Area
<span style="color: red;">—</span> Problem area	Bike rack needed
<span style="color: blue;">—</span> Suggested bike route	

**Google**

- Bike lane (solid) and bike route (dashed)
- Bike Path

## EXISTING CONDITIONS

### *Issues and Opportunities*

#### *Major Issues*

Major issues were identified through analysis of data and stakeholder feedback and are summarized below.

- Greater concentrations of bicycle crashes occur in Newark. While no fatal crashes occurred between 2005–2010, there were:
  - 106 bicycle crashes, many along College Ave. (17), Elkton Road/South Main Street (16), Delaware Avenue (15), East Main Street (13), Chapel Street (9), Park Place (9), and Academy St. (8).
  - Many (44) intersection crashes, with clusters of three or more around Elkton/Casho Mill Road, South Main/Apple Road, South College/Park Place, Delaware Ave./Academy, Delaware/Haines, Chapel/Main, and Marrows Rd./Brookside Blvd.
- Gaps in connectivity make it challenging to reach major destinations and also result in wrong-way riding and riding on the sidewalks. Primary gaps include:
  - No bicycle facilities along Main Street.
  - For travel to/from south of Newark on SR 896, I-95 ramps are a barrier.
  - Right turn lanes interrupt bicycle lane on SR 72 and College Avenue, and bicycle lane on Delaware Ave. ends prior to intersection.
  - Bridge on S. College Avenue has narrow bike lanes, and pathway is too narrow to be safely shared by bicycles and pedestrians, and parking interrupts lanes north of the bridge.
  - Paper Mill Road bicycle lanes are interrupted at the bridge over White Clay Creek.
  - Kirkwood Highway has no bicycle lanes, heavy volumes of traffic at higher speeds, and an alternative route using connected, low-traffic streets is needed.
- Maintenance of existing facilities is an ongoing concern:
  - Many streets have deteriorated pavement with potholes and open seams that are hazardous to cyclists and costly to maintain in a piecemeal manor.
  - For travel to/from south of Newark on SR 72, bicycle path and lane not maintained
  - SR 4 bicycle path poorly maintained.
  - Striping for bicycle lanes quickly becomes faded.
- Enforcement of driver and cyclist behavior needs greater attention:
  - Wrong-way riding prevalent, particularly on Delaware Ave.
  - Right-turning traffic on Delaware Avenue uses bicycle lane as turn lane.
  - Drivers block bicycle lane on S. Main Street and Delaware Avenue.
  - Rules of road pertaining to bicyclists difficult to enforce.
  - Speeding traffic on area streets makes conditions more dangerous for cyclists.
- Supply of bicycle parking has expanded but shortages remain:
  - No bicycle racks at bus stops except at the transit hub, park & ride and Septa station.
  - Many Main Street bicycle racks are filled by long-term resident parking.
  - Older ribbon and post/loop style racks are still in use, and many new developments are still installing ribbon racks.
  - Little secure long-term parking available.



### *Major Opportunities*

- The City of Newark is a compact area (8.9 square miles) with a mix of land use types, including abundant parks, open space and recreation areas, a vibrant mixed-use Main Street, and the University of Delaware. Residential areas are a mix of single-family homes and higher-density apartments, townhouses, and condominiums. All residential areas are within a 2½-mile bicycle ride to Main Street or the University, making bicycling a practical option for local trips.
- Open space within Newark consists of more than 1,200 acres of city parks, stream corridors, and open space at schools and the University. Beyond municipal boundaries, White Clay Creek State Park to the north, Iron Hill County Park, and Fair Hill Natural Resources Area (Maryland) offer miles of trails for mountain biking and attract users from throughout the region.
- Many low-volume and -speed residential streets link neighborhoods with the University and downtown, providing useful, low-stress connections.
- According to the Census (2007-2011 American Community Survey 3-Year Estimates) 3.9% of Newark residents commute by bicycle.
- According to the 2011 survey conducted as part Delaware's 2013 Statewide Comprehensive Outdoor Recreation Plan, 65 percent in Newark households engage in bicycling for recreation.
- DelDOT, Newark City Council, and WILMAPCO have expressed an interest in making Newark a model for bicycle facilities in Delaware and the region.
- East Coast Greenway alignment would link Newark to Elkton, Churchmans Crossing, and points beyond.
- Newark Bicycle Committee and Newark Bike Project represent substantial commitment and partnerships toward improving conditions for bicycling and encouraging riding.
- White Clay Bicycle Club and Delaware Trail Spinners offer frequent Newark-area rides (both on-road and mountain biking) as well as training opportunities.



*Photo: Frank Warnock*

## Plans and Policies Related to Bicycling

This section summarizes existing and past regional, state, and local plans and policies related to bicycle facility planning and development.

### *Newark Urban Route Bicycle System - Master Plan (1973)*

The Urban Route Bicycle System Master Plan identified the need for a network of bicycling routes for students, recreational riders, adult commuters, and children. According to this plan, “although [a bicycle network] would require very few concessions from motorists and the general public, the opportunity it will bring to cyclists in greater Newark will many times exceed any temporary inconvenience.”

This plan goes on to say “since urban development has traditionally been centered around the automobile, which has provided greater mobility to our society, we have not tended to consider very seriously other solutions to serve the needs of our total community. Consequently, bicycling with its indispensable role, must be emphasized as it never has before.”

Two classifications of users are identified. Utilitarian or activity-centered—commuting, school, errands, etc.—require predominantly direct routes along collector and arterial corridors. Recreational users bicycle for sightseeing, touring, racing, or exercise and may prefer scenic, less direct routes and loop routes.

Four criteria were used for identifying a prioritized bicycle route system. These included:

- Travel patterns around city
- Routes used by UD and public school students from home to school
- Existing streets which can accommodate bikes safely
- Other issues such as on-street parking, congested areas

Using these criteria, the plan included an implementation plan to complete the system over five years.

- Stage 1, a total of 6.7 miles, was completed in 1973. This included minor improvements such as sidewalks, signs, and painted bicycle lanes.
- Stage 2, which was to include 3.3 miles and be completed in 1974, included striped bicycle lanes on West Park, Academy Street, McKees Lane and New London Road. With the exception of New London Road, none of this has been implemented.



Newark Police register bicycles, circa 1940

- Stage 3, also to be completed in 1974 with 3 miles of bicycle facilities, called for bicycle lanes on South Chapel, East Park, South College Avenue connecting to Rittenhouse Park. With the exception of South Chapel Street, these facilities have not been completed.
- Stage 4, to be completed in 1975 with 2.3 miles, was to have included striped bicycle lanes on Main Street, Paper Mill Road, Cleveland Avenue, and North College Avenue. Except for Paper Mill Road, these routes are simply “Share the Road” today.
- Stage 5 was completed with the realignment of South Chapel Street and construction of Wyoming Road.

### *Newark Area Bicycle Interim Report (1996)*

The Newark Area Bicycle Interim Report was developed by Newark, University of Delaware, WILMAPCO, and DeIDOT. The report details existing conditions, inventories bicycle facilities, proposes preliminary recommendations, and raises issues that must be resolved to develop a Bicycle Facility Needs Plan.

Engineering and non-infrastructure recommendations included:

- Barrier and hazard removal
  - Replace or retrofit drainage grates to bicycle-safe grates.
  - Retrofit railroad crossing with flangeway filler strips.
  - Selectively restrict and/or remove on-street parking.
- Signing and pavement marking
  - Install new signage and pavement marking to accommodate through-movement of bicycles where there are designated right-turn lanes for vehicles.
  - Install new signage communicating rights-of-way, speed limits, etc. (especially on campus), installing additional signs and signals at crosswalks.
  - Install new or upgraded signs and pavement markings indicating dedicated bicycle facility space on the street.
- Maintenance
  - Improve routing maintenance practices as part of existing programs aimed at clearing shoulders, gutters, and bridge decks and maintaining off-road facilities, railroad crossings, and consistent shoulder pavement quality.
- Non-infrastructure recommendations
  - Establish a comprehensive education program about the benefits of safe cycling, enforce motor vehicle and bicycle laws, and promote bicycle transportation as a travel option in Newark.

**Goal:** To develop a complete bicycle system that recognizes bicycling as an important transportation mode and provides for safe and efficient bicycle access throughout the community emphasizing those community areas that have the greatest potential to generate bicycle trips.

Objectives:

- Promote a sustainable transportation system by encouraging bicycling as an alternative to single-occupant vehicles.

- Provide bicycle access between residential, commercial, employment, recreational, and University locations.
- Provide safe bicycle facilities that meet or exceed accepted design practices.
- Provide connections between bicycling and other transportation modes such as buses, carpools, vanpools, and trains.
- Include encouragement, education (both motorist and bicyclist), and licensing/registration programs as part of the overall plan and recommendations.
- Provide bicycle-facility maintenance, particularly by removing debris and overgrown vegetation.
- Provide for traffic-law enforcement affecting bicycle transportation.

#### Newark bicycle planning problem statement

- A University town with bicycling provides practical and economical transportation for students.
- The community realizes the benefits of bicycling—reduced congestion, air pollution, and auto parking needs.
- In encouraging bicycling, new problems are created regarding roadway safety and the compatibility of bicycles with motor vehicles and pedestrians.
- Bicycle facilities do not always provide direct connections to desired destinations.
- Mix of facility types exist in Newark, and current design and designation creates confusion and inappropriate or unsafe behavior.

(Note: items that have been addressed are shown in *bold italics*.)

#### Existing conditions:

- Bicycle on shoulder/shared use are predominant facilities.
- Signage is inadequate and inconsistent.
- Marking on pavement and shoulders is inadequate and inconsistent.
- Bicycle lane widths are inadequate and inconsistent.
- Parking conflicts impede travel for cyclists.
- Debris/vegetation encroaches on shoulders.
- ***Grates are not bicycle-safe.***
- Numerous curb cuts, signalized intersections, and right-turn lanes pose hazards for cyclists.
- Crosswalks provide minimal protection for pedestrians and cyclists.
- Inadequate maintenance and/or design of shoulders, curbs, gutter pans, ditches, and grates pose hazards.
- Overpass on S. College Avenue over Amtrak rail line is too narrow to accommodate cyclists.
- Parking conflicts on S. College Avenue cause bicycle lane to abruptly end on the northbound side.
- ***Underpass on Casho Mill Road is too narrow, and cars do not yield to cyclists.***
- ***Underpass on North Chapel is narrow, and bicycles are forced to stay in street very close to traffic.***
- ***Separated facility on Christina Parkway dips behind roadway, out of sight, creating a security problem.***



### Existing conditions on University campus:

- Numerous types of bicycle racks exist, although policy recommends ribbon racks for new installations.
- Over 1,700 bicycle rack spaces exist.
- Racks overflow and cyclist use fences and other posts.
- Mall is wide and accommodates 2-way traffic without directional signage.
- Crosswalks provide minimal safety.
- Paths are wide and numerous
- Intersections of multiple pedestrian/bike paths lack directional signage or other design features to indicate proper movement.
- Damaged and/or vandalized bicycles remain on racks.



Casho Mill Road underpass before bike/pedestrian tunnel was implemented based on the 1996 plan

### Off-road facilities:

- One existing (SR 4) and four proposed off-road facilities
- Proposed facilities:
  - ***Pomeroy Branch***
    - *Amtrak – Wyoming*
    - *Wyoming – Delaware Ave.*
    - *Delaware Ave. – North campus*
  - Iron Hill Bikeway – Iron Hill Park to College Avenue
  - Gender Road Connector
  - Windy Hill Park connector

### ***Newark Bikeway Proposal (1997)***

- ***Amtrak Corridor Pathway***
- East and West from Park & Shop shopping center along Winslow or Sunset to campus
  - Stripe bicycle lanes
- East and West from UD central campus
  - Dallam and Radcliffe (Nottingham Green) – Amstel/Elkton Road – stripe lane
    - Forest Lane – parallel bikeway on UD land to Elkton Road
  - Amstel from Elkton Road to campus
    - 2-way bikeway with one-way traffic/2 side parking or two-way traffic/1 side parking
  - Amstel/College to Lovett/Chapel – strip or sign Lovett
  - Chapel/Lovett to Newark Library
    - Follow perimeter of DelChapel to cut through to Pomeroy
- East and West from North College to Nonatum Mills

- *Delayed due to public concerns, continued public outreach is now taking place to address issues*
- North-south between Suburban Plaza and Winslow/Sunset or Amstel – stripe bike lane
  - Elkton Road from Suburban Plaza to Gravenor or Casho Mill Road
- North-south along Orchard from its south end to Amstel – stripe or sign lane
  - Phillips – Ritter – Orchard – Amstel – Delaware Ave.
- North-south between Laird Campus and Amstel
  - Existing paths to North College
  - Stripe/sign North College to Main St.
  - Existing bike path adjacent to Trabant Center
  - Pave bikeway on College from Delaware to Amstel
- North-south between downtown and trail station
  - Academy from Main Street to Train Station stripe and sign
- ***Pomeroy Line***
  - *Complete between Wyoming and Delaware Avenue*
  - *Delaware Ave. to Main Street being designed as part of transit hub*
- Main UD campus and downtown to new train station and the Ag campus
  - NEC pathway to NEC tracks – install bridge or tunnel
  - SEPTA station to Bob Carpenter Center – existing path/stripe through parking lots

### ***A City of Newark Off-road Bicycle Trail (2001)***

- ***Hall Trail – complete***
- ***Pomeroy line – complete***
- UD Experimental Watershed – planned
- ***White Clay Creek State Park connection – Creek Road – Closed to traffic***
- White Clay Creek – MBNA Connector – needs further study
- ***Jenny's Run – in construction***
- ***Reservoir loop – complete***

### ***Newark Bicycle Plan (2002)***

The 2002 Newark Bicycle Plan sought to make bicycling a safe, attractive alternative to driving in Newark. The plan proposed a coordinated network of bicycle facilities, accessible for all Newark residents. Objectives included developing a coordinated network of bicycle facilities, planning for the development of bicycle facilities and programs as a viable alternative to the automobile to provide high-quality and safe opportunities for all people in Newark to bike to work, school, or play, enhancing access to network, improving bicycle access to transit and bike parking, and better coordination and community involvement.

Highlights of accomplishments since 2002 include completed the Hall and Pomeroy Trails, installed bike racks on Main Street, implemented bicycle safety-checkpoint program, Newark Bike Project formed, bike racks added to most DART and University buses, and bike lanes improved on Elkton and Paper Mill roads.

### *Newark Transportation Plan (2011)*

The Newark Transportation Plan included a wide range of initiatives, including signal optimization, capacity enhancements, access management, parking strategies, and mobility improvements that address walking, biking, and transit accessibility.

Short-term bicycle recommendations included:

- Stripe bike lanes – When street width allows, restripe pavement markings to include travel lanes and ride-able bike lane/shoulders (5 ft. preferred, min. 4 ft.)
  - W. Main St., west of Hillside
  - Cleveland Avenue, College to Paper Mill - bike lane WB, Sharrows in the EB direction.
  - Hillside Rd. – bike lanes
  - S. Chapel St., Academy St., and N. College Ave. – restripe where existing width allows.
- Implement shared-pavement markings (Sharrows) - Where sufficient width does not exist for bike lanes, provide “sharrows” in areas where vehicular and bike traffic share the street.
  - East Main Street: Library Ave. to South Main Street
  - New London Rd. – Main to Cleveland
  - North Chapel St.
  - Cleveland Ave. – West of College Ave.
  - Casho Mill Rd. – SB through underpass
  - Apple Rd. – Park Place to Elkton
  - County Club, Windsor, Delrem
- Maintain existing facilities
  - Establish schedule and funding for sweeping and maintenance of existing on-road pavement markings.
  - Establish schedule for maintenance of off-road facilities.

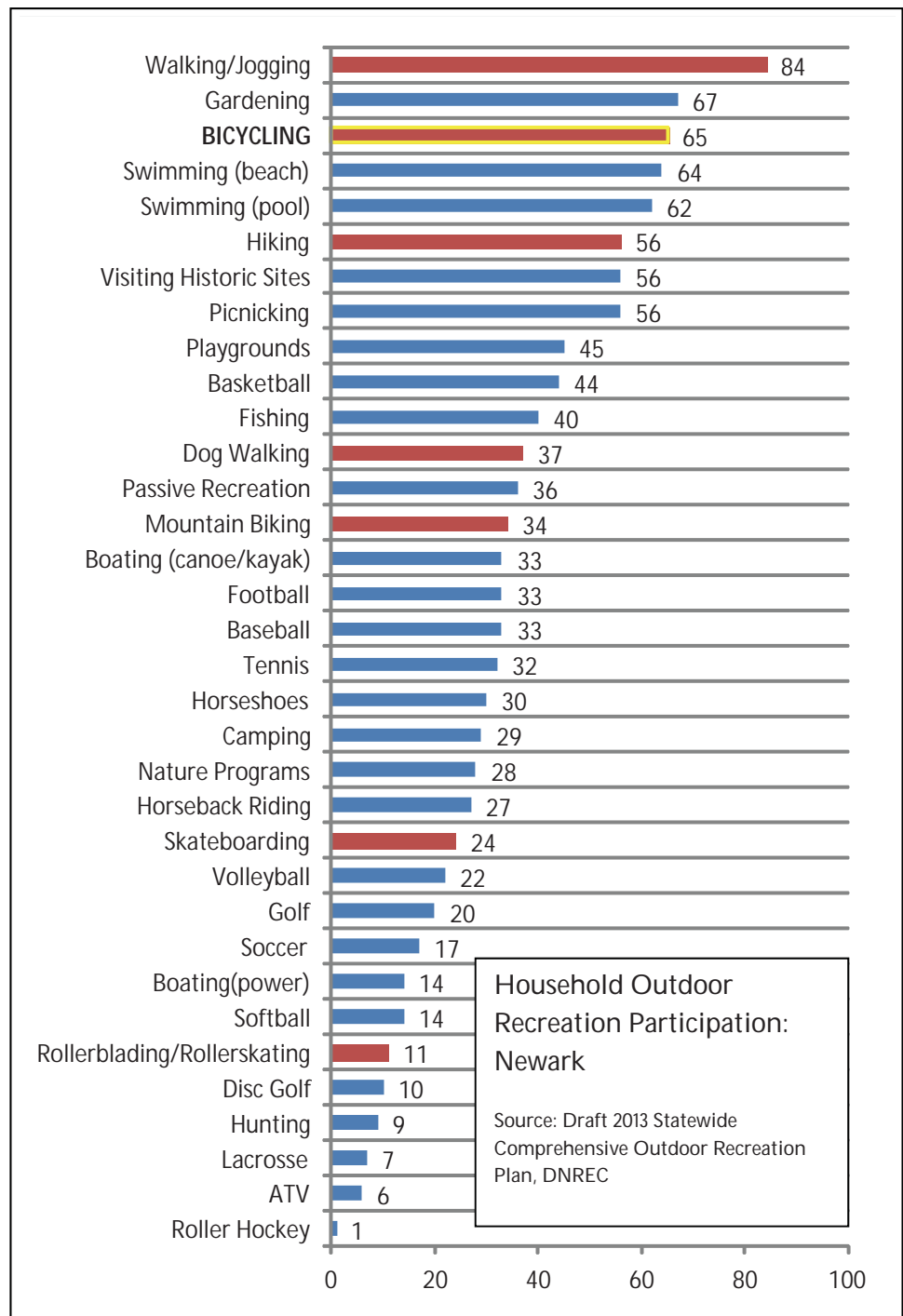
Long-range bicycle recommendations included:

- Delaware Ave. East/West Bicycle Linkage - includes providing a separated cycle track between Orchard Rd. and Tyre Ave.
  - Delaware Avenue signals would be modified to accommodate westbound bike traffic.
  - The westbound bike lane would terminate at Orchard Rd. Cyclists would then be directed left onto Orchard Rd. to Amstel Ave.
  - Marked “Bike Boxes” are proposed at eastbound signalized locations.
- Bicycle signal detection improvements
  - Standard loop detectors are effective, but the sensitivity must be adjusted so that bicyclists are detected, and the loops must be placed in a location where a bicyclist’s movements can be registered.
  - Implement newer technologies. Continue the increased use of above-ground video detection as a replacement for traditional inductive loop detectors.

### Household Outdoor Recreation Participation: Newark

To better understand participation and trends in outdoor recreation by Delaware residents, a telephone survey was conducted by the Delaware Division of Parks and Recreation in 2011 as part of the development of the 2013 Statewide Outdoor Recreation Plan. Regarding Newark household participation rates in various activities, 65% of households indicate that they participate in bicycling.

This makes bicycling the third most popular recreational activity, after walking/jogging (84%) and gardening (67%). Other household participation in activities that utilize pedestrian and bicycle infrastructure includes hiking (56%), dog walking (37%), mountain biking (34%), skateboarding (24%) and rollerblading/ skating (11%).





**Existing Facilities and Constraints**

Many already bicycle in Newark for commuting to work and class, recreation and fun, and shopping and errands. Also, because of the extensive planning that has been done in past studies, many bicycling facilities already exist. Newark has partial network of on-road and off-road routes (*Map 1*). On-road, there are nearly 20 miles of marked bicycle lanes in or connected to Newark. In addition, the grid street network in some residential areas provides low-volume streets well suited for bicycling. Off-road, Newark has almost 13 miles of sidepaths and 12 miles of paved or hardened surfaces shared use pathways—most notably the Pomeroy and Newark Rail Trail and James F. Hall Trail. Many more miles of natural surface trails are located in White Clay Creek State Park and Redd Park to the north, Iron Hill County Park to the south, Middle Run Natural Area to the east, and Fair Hill Natural Resource Management Area to the west. The Mason-Dixon Trail runs through Newark, connecting White Clay Creek to Iron Hill on a natural-surface trail.



Quiet, residential streets are safe and enjoyable bicycle routes.



The University has existing pathways and bicycle parking, encouraging its students and staff to cycle.

Community members cited existing constraints, including gaps in bikeways, safety concerns, and difficult intersections, as obstacles to cycling (*Map 2*). Numerous bicycle crashes occur on these routes; causes include heavy traffic and reckless behavior by cyclists and drivers (*Map 3*). WILMAPCO’s congestion management system has found that many streets and intersections are congested; this leads to uncomfortable cycling conditions and shows the need to enhance alternatives to driving in congested corridors (*Map 4*). Limited end-of-trip facilities and parking are particular concerns in downtown Newark; around the University, extensive bicycle racks and attractive pathways encourage cycling. Area cyclists would also like to see better maintenance of existing routes and more enforcement of and education about bicycling laws.



Delaware Avenue Bicycle Lane

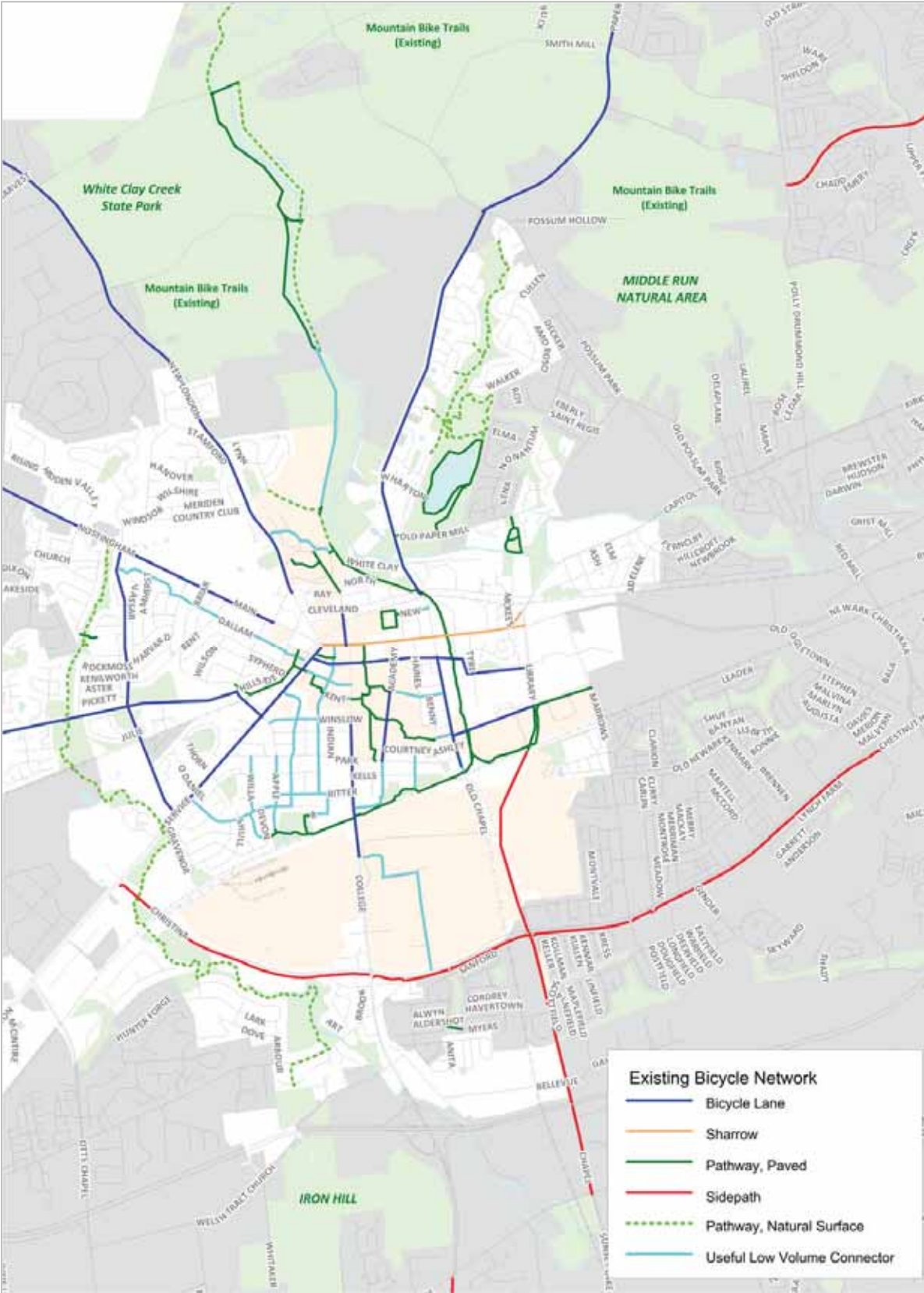


Main Street bicycle parking

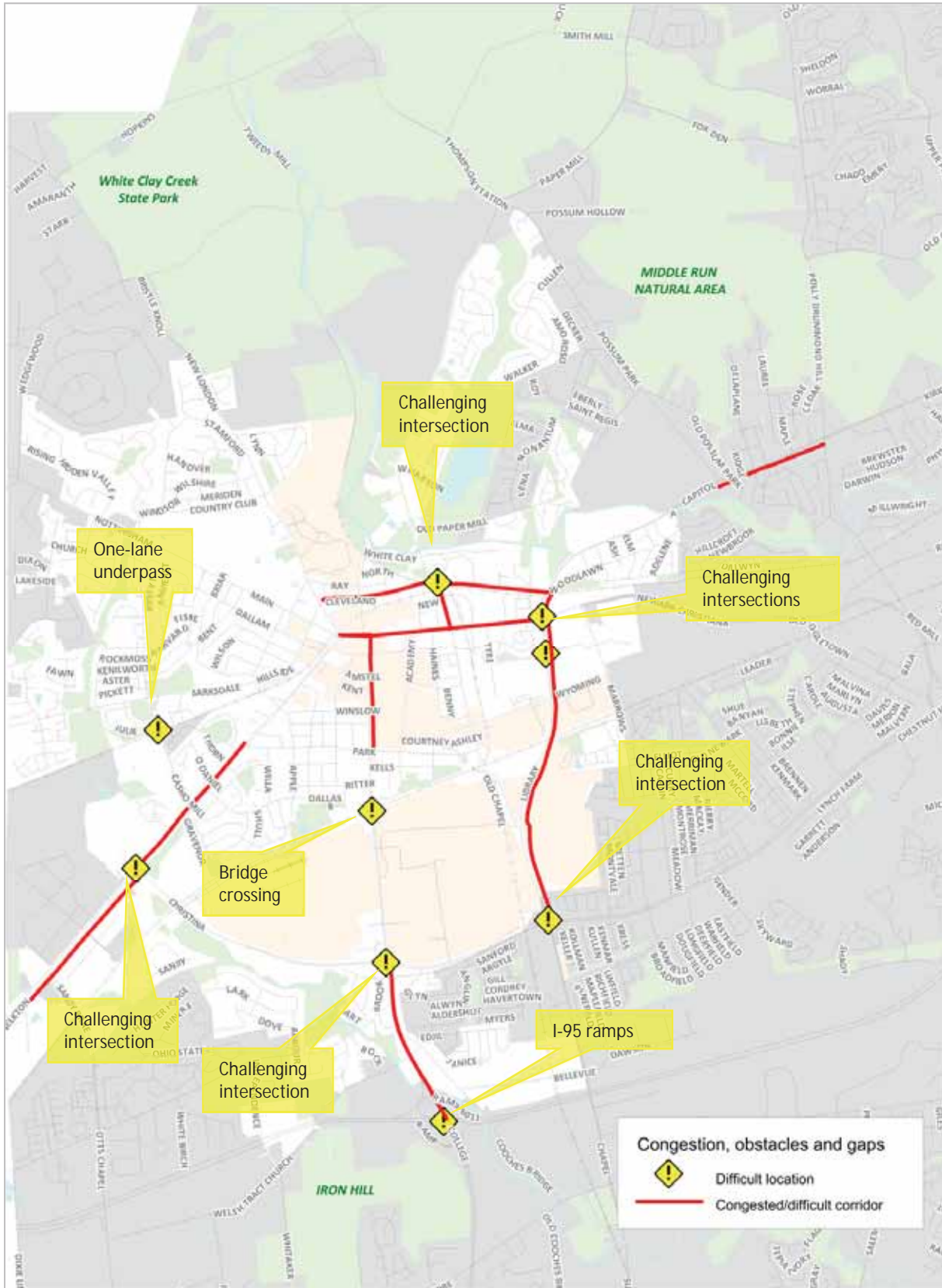


This intersection is properly striped; however, many are not or have faded markings.

Map 1 – Existing routes

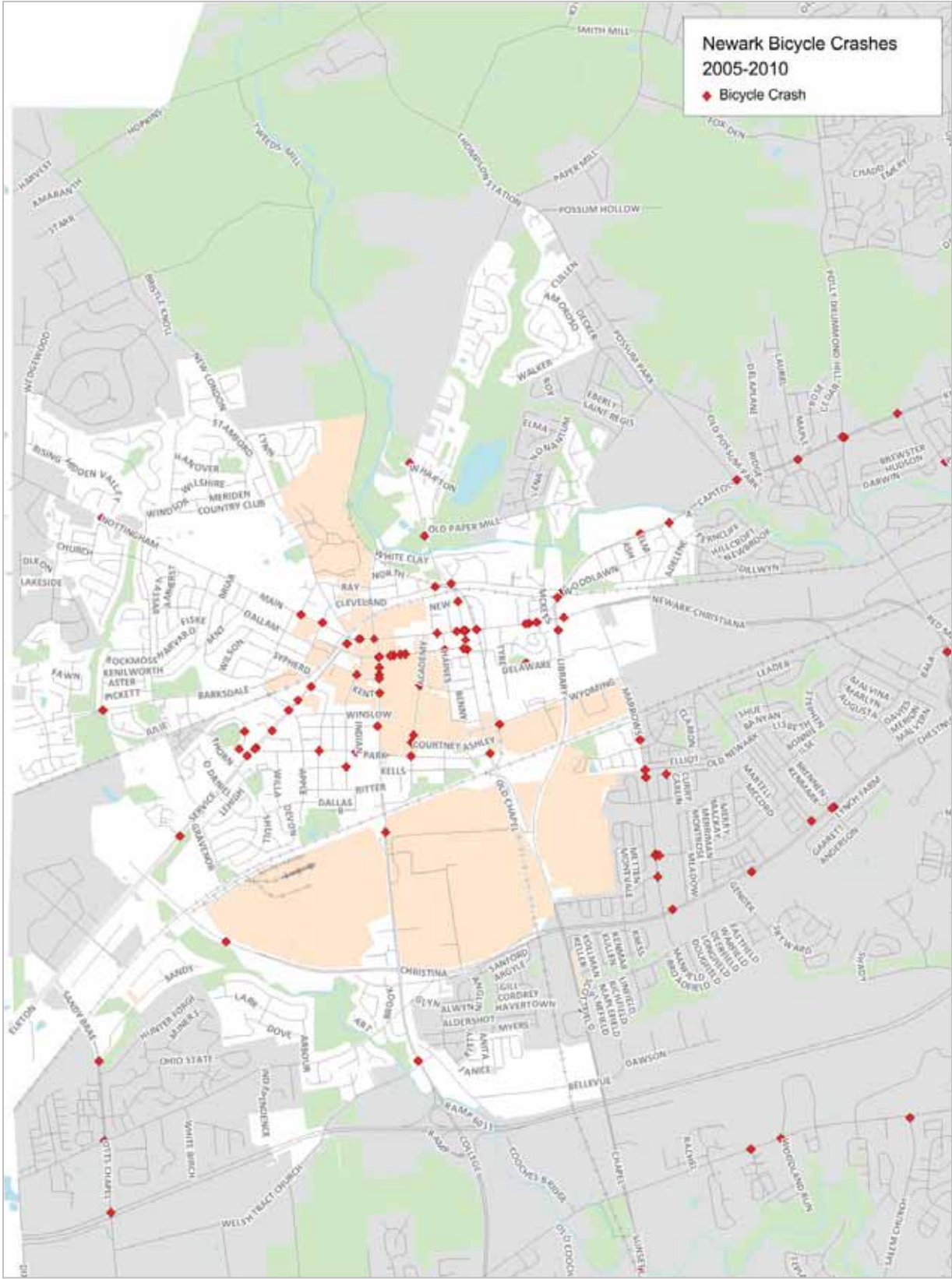


Map 2 – Major Congestion, Obstacles and Gaps





Map 3 – Crashes





Concern about crashes was identified by survey respondents as a reason for not bicycling more. Numerous crashes occur on arterial streets in Newark. Fear of safety along these routes discourages people from bicycling to major destinations along these corridors. Though some of these streets have designated bicycle lanes, high traffic speeds and volumes can make cycling dangerous. Safety problems are made worse by improper bicycling behavior, especially riding the wrong way in the bicycle lanes.

While there were no fatal crashes, between 2005-2010 106 bicycle crashes occurred, many along College Ave. (17), Elkton Road/South Main Street (16), Delaware Avenue (15), East Main Street (13), Chapel Street (9), Park Place (9), and Academy St. (8). Many (44) are intersection crashes, with clusters of three or more around Elkton/Casho Mill Road, South Main/Apple Road, South College/Park Place, Delaware Ave./Academy, Delaware/Haines, Chapel/Main, and Marrows Rd./Brookside Blvd. The number of crashes per year has been on an upward trend, doubling from 2005 (11) to 2010 (22). Alcohol was listed in police reports as a factor in only five of the 106 crashes.

Most crashes occurred in daytime, daylight conditions during the week, with the greatest number occurring on Wednesdays. The greatest number occurred during summer months and fall semester, with September having the most crashes.

Newark's data present a challenge to assessing causes of crashes. Much of the crash data list the cause and manor of impact as unknown or is not filled in, however head-on (30) was the most reported manor of impact. Data also only reflect crashes reported to police or emergency personal. Unreported crashes, such as single-bicycle crashes without major injury, are not factored into this analysis.

Bicycle Crashes by Year	Number
2005	11
2006	12
2007	15
2008	19
2009	27
2010	22

Time	Number
Midnight-3 a.m.	2
3 - 6 a.m.	1
6 - 9 a.m.	11
9 - noon	14
noon - 3 p.m.	24
3 - 6 p.m.	30
6 - 9 p.m.	17
9 - midnight	7

Day of Week	Number
Sunday	9
Monday	17
Tuesday	18
Wednesday	23
Thursday	16
Friday	16
Saturday	7

Light Conditions	Number
Daylight	81
Dark - road lighted	16
Dawn	3
Dark - road not lit	3
Dusk	2
Dark - unknown	1

Source: DelDOT, crashes 2005-2010

A 1996 FHWA study of crash data found that the most frequent bicycle/motor vehicle crash types were<sup>1</sup>:

<u>Crossing Path Crashes</u>	<u>% of All Crashes</u>
Motorist failed to yield to bicyclist (includes drive out/through at intersections and at Midblock/driveway locations)	21.7
Bicyclist failed to yield to motorist at an intersection	16.8
Bicyclist failed to yield to motorist, midblock	11.8
Other crossing path crashes	7.2
<b>Subtotal %</b>	<b>57.5</b>
<u>Parallel Path Crashes</u>	
Motorist turned or merged into bicyclist's path	12.2
Motorist overtaking bicyclist	8.6
Bicyclist turned or merged into motorist's path	7.3
Other parallel path crashes	7.4
<b>Subtotal %</b>	<b>35.5</b>
<u>Specific Circumstances Crashes</u>	
(such as off-roadway, backing vehicle, intentional, and other unusual crash types).	7

The same study found that the most severe crashes, measured by the percentage of bicyclists seriously injured or killed, were:

#### Crossing paths

- Bicyclist turning error (23.8%)
- Bicyclist failed to yield, midblock (22.1%)
- Bicyclist failed to yield, intersection (20.1%)

#### Parallel paths

- Operator loss of control (34.6%)
- Wrong-way operator (most often the bicyclist) (32.1%)
- Motorist overtaking (29.4%)
- Bicyclist turn/merge into the path of a motorist (25.2%)

<u>Month</u>	<u>Number</u>
January	6
February	1
March	9
April	9
May	6
June	10
July	10
August	11
September	17
October	13
November	12
December	4

<u>Type</u>	<u>Number</u>
non-intersection	10
Non-intersection/nonmotorized	10
Fixed object	5
Intersection/nonmotorized vehicle	4
Car stopped in traffic	3
Pedestrian	2
non-intersection/opposite direction	2
Intersection, Not stated	1
non-intersect from same direction	1
Parked car	1

<u>Manor of impact</u>	<u>Number</u>
2-vehicle	6
Rear end	3
Head on	30
Rear-to-rear	2
Angle	1
Sideswipe - same direction	0
Sideswipe-opposite direction	0

Source: DeIDOT, crashes 2005-2010

<sup>1</sup> Hunter, W.W., J.C. Stutts, W.E. Pein, and C.L. Cox. Pedestrian and Bicycle Crash Types of the Early 1990's, FHWA-RD-95-163, Federal Highway Administration, Washington, DC, June 1996.

## Land Use and Demographics

The City of Newark is a major residential and commercial center in our region. According to the 2010 Census, Newark has a population of 31,454, a 10% increase since 2000 (*Map 5*). Currently, the University has over 16,000 undergraduate students, 3,600 graduate students, 1,500 English Language Institute students (per year), and 3,900 employees. According to the Census (2007-2011 American Community Survey 5-Year Estimates) 3.9% of Newark residents commute by bicycle. Work trips, however, represent only a small portion of the many trips on Newark's streets throughout the day; many other trips are for shopping, school, dining, recreation, and through traffic.

The City of Newark is a compact area (8.9 square miles) with a mix of land use types, including abundant parks, open space, and recreation areas, a vibrant mixed-use Main Street, and the University of Delaware. Residential areas are a mix of single-family homes and higher density apartments, townhouses, and condominiums.

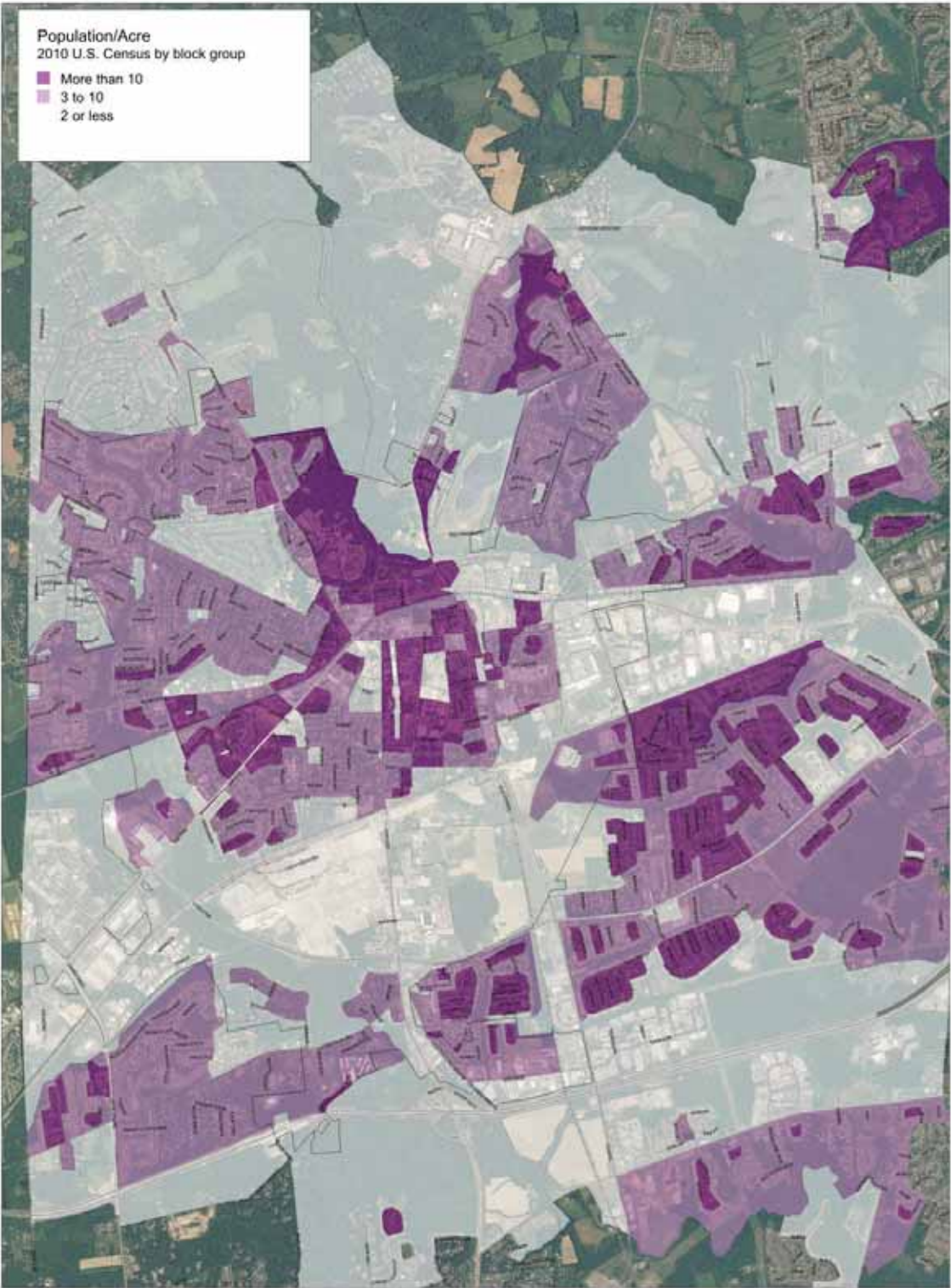
"Bicycle Oriented Development" (BOD) involves community planning that mixes residential areas and destinations within an easy bicycling distance of 1-2 miles, or a 5-10 minute bicycle ride (*Map 6*). Given Newark's land-use mix and compact size, BOD offers a real potential to shift trips from driving to bicycling when combined with improvements to the bicycle route network, the addition of end-of-trip facilities and bike parking, and policies to promote bicycling or discourage driving. All residential areas are within a 2½-mile bicycle ride to Main Street or the University, making bicycling a practical option for local trips.

Open space within Newark consists of more than 1,200 acres of city parks, stream corridors, and open space at schools and the University. Beyond municipal boundaries, White Clay Creek State Park, Iron Hill County Park, and Fair Hill Natural Resources Area (Maryland) offer miles of trails for mountain biking and attract users from throughout the region.

Unfortunately, Newark's cycling connections with surrounding areas are limited. Access from the south of I-95 is difficult on both SR 896 and Elkton Road due to the ramp areas. Access from Kirkwood Highway is also difficult.

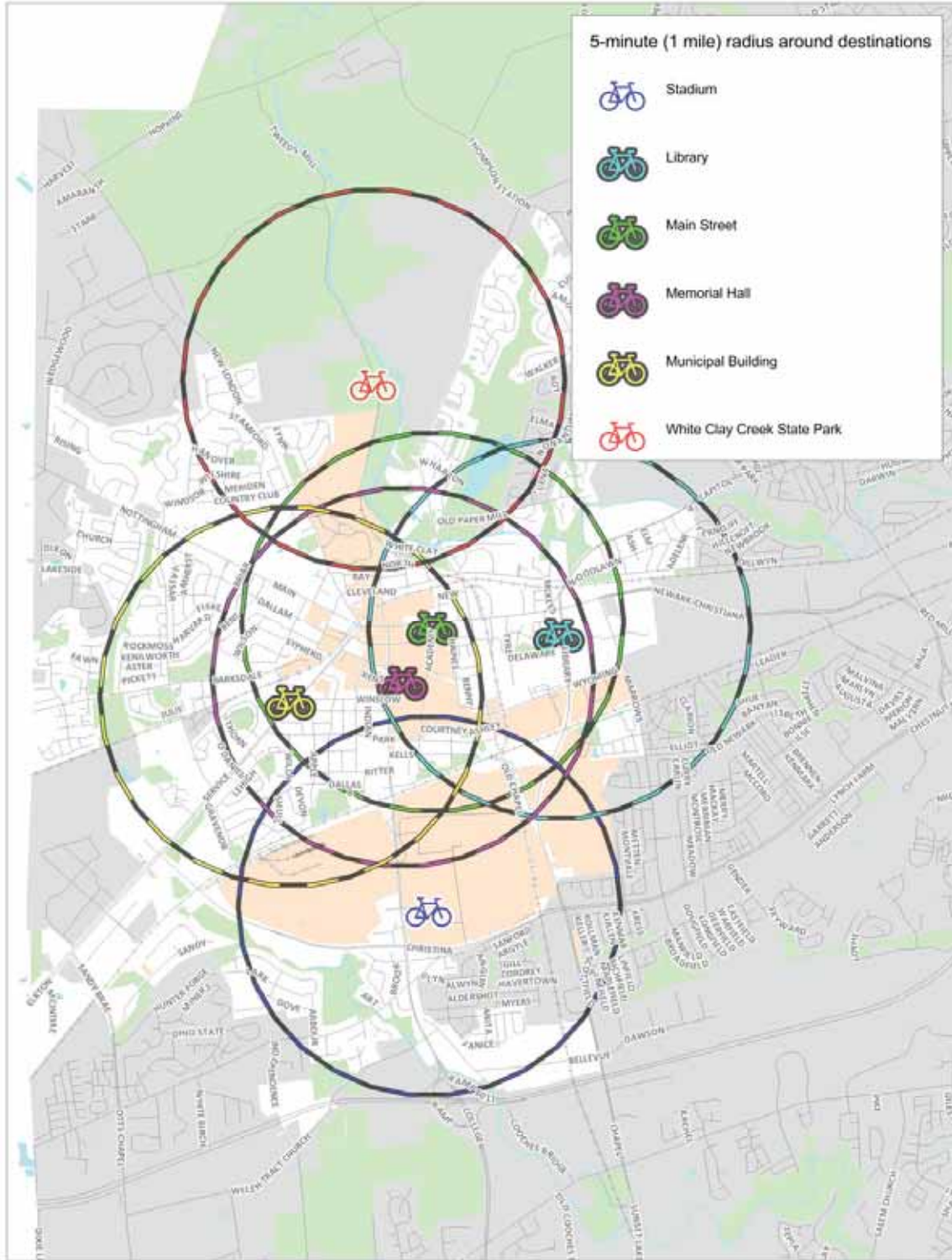


Map 5 – Population Density





Map 6 – “Bicycle Oriented Development” area within a easy 5-minute bicycle ride



## Existing Programs and Organizations

Governmental, institutional, private, and nonprofit organizations all play a part in implementing projects and programs for bicycling. The **Newark Bicycle Committee** is a partnership of interested cyclists and agencies working to improve bicycling in Newark and is the primary coordination body for planning and implementing bicycling projects, policies, and improvements in Newark. Newark's Bicycle Committee is committed to:

- Promoting existing biking facilities
- Improving maintenance of existing routes
- Advocating safe cycling behavior
- Advocating enforcement of safe driving
- Planning future facilities

Major participants include:

**City of Newark:** Newark responsibilities include provision and maintenance of transportation facilities along locally maintained streets, land use development decision-making and code enforcement, parks and recreation, and enforcement of traffic laws. The breadth of Newark's involvement encompasses all departments, particularly:

- **Parks and Recreation Department:** Provides and maintains off-road bicycle and pedestrian corridors.
- **Planning and Development Department:** Provides overall City coordination and oversees land use process and bicycle parking. The Planning Department also coordinates with the Downtown Newark Partnership on activities to improve streetscaping and design along Main Street.
- **Police Department:** Is responsible for enforcement of all traffic laws.
- **Public Works:** Is responsible for improving and maintaining all local streets and may install signs and do minor maintenance along state streets.

**DeIDOT:** DeIDOT is responsible for providing and maintaining transportation facilities throughout the State of Delaware, including state streets within Newark. Roadway improvements and some maintenance activities done by DeIDOT are addressed by the Delaware Complete Streets Policy. The Policy was created to ensure that system modifications are routinely planned, designed, constructed, operated and maintained in a way that enables safe and efficient access for all users. The result should be a system for all users that is comprehensive, integrated, connected, safe, and efficient, allowing users to choose among various transportation modes, both motorized and non-motorized. All departments within DeIDOT share responsibility for implementing the Complete Streets policy, particularly:

- **Delaware Transit Corporation:** Designs and provides the public transportation services, including bike racks and lockers at train stations and park-and-rides and bicycle racks on buses.
- **Planning:** Provides comprehensive transportation planning and development coordination services to address mobility needs. Programs within Planning:
  - Safe Routes to School Program includes programs and infrastructure designed to making encourage walking and bicycling to schools.
  - The Delaware Bicycle Council was established in 1990 to "consider, review and work on matters pertaining to bicycling, bicycle safety and bicycle safety education and to make

recommendations to various state agencies.” Members include representatives from the Department of Transportation, the Council on Transportation, the Department of Education, Delaware State Police, Office of Highway Safety, Division of Parks and Recreation, Council on Greenways and Trails, Division of Public Health, and seven citizen members.

- Delaware Bike Maps are periodically updated and reprinted by DelDOT Planning. The New Castle County map includes an inset detailing Newark area routes.
- Transportation Enhancement/Transportation Alternatives Program provides federal funding and state support for the planning, design, and construction of bicycle and pedestrian projects.
- Planning reviews subdivision plans to assess the transportation impacts of developments and makes recommendations to the City.
- **Public Relations:** Supports the department’s programs and policies by planning, developing, and executing a variety of programs and customer services. For example:
  - Adopt-A-Bike Path program is a partnership between the Department of Transportation and volunteers, working together to make Delaware’s bike paths cleaner and safer for pedestrians and bicyclists.
  - See It Both Ways campaign seeks to combat bicycle vs. motor vehicle accidents. It provides materials to educate motorists and cyclists about concerns and point of view of each mode of transportation.
- **Transportation Solutions:** Develops, constructs, and maintains the State’s infrastructure in a manner that results in a safe, cost-effective, and efficient multi-modal transportation network that enhances mobility, commerce, and livability. This includes:
  - Planning, design and construction of major roadway improvements
  - Preservation and rehabilitation of all state maintained roadways by maintaining a pavement system rating of a least 85 percent fair or better.
  - Maintaining materials, traffic control devices, signage, pavement markings, and surfaces of quality for the traveling public.
- **Maintenance & Operations:** Maintains and operates a convenient, safe, efficient, cost-effective, and environmentally-sensitive highway system by keeping the state’s road transportation network in a state of good repair through the careful and consistent application of personnel, equipment, and financial resources. City of Newark is part of the North District maintenance area.

**Wilmington Area Planning Council (WILMAPCO):** WILMAPCO is designated by the Governors of Delaware and Maryland as the Metropolitan Planning Organization (MPO) for New Castle County, Del., and Cecil County, Md., and is responsible for transportation planning in the region. To receive federal funding, projects must be included in the WILMAPCO *Regional Transportation Plan* and *Transportation Improvement Program*. In addition, WILMAPCO provides planning support to the Newark Bicycle Committee and City of Newark.

**University of Delaware:** The University is the City’s largest employer and largest land owner, with the Newark campus totaling 970 acres and the STAR campus totaling 272 acres, and has a student population slightly more than half the City’s total population. Thus, the University plays a major role in making Newark a bicycle-friendly community. Primary departments include:

- **Employee Relations:** Responsible for policies and procedures regarding employee commuting and benefits for bicycle commuters.

- **Transportation/Parking Services:** Responsible for planning and operation of parking facilities including bicycle racks, and buses including bike racks on buses.
- **Environmental Health and Safety:** Has the mission to serve the University community and ensure they are provided with healthy and safe living, work, academic, and recreational facilities and programs.
- **Facilities and Auxiliary Services:** Department serves as stewards of the University's physical and operational foundations, which help define the campus experience. They provide places of learning, innovate and renovate the built environment, and supply the daily care of students and structures. They help create the connections that keep the campus running, including getting people where they need to go and building and tending the spaces where the community comes together. They are committed to thoughtful and progressive planning that balances of historic architecture with the needs of a 21st century campus and reduces the impact on the community and the planet.
- **University Police:** Department works to create an environment where people can feel safe to learn, work, live, and visit and is committed to providing quality service and protection to the entire University community. Programs include the Bicycle Registration Program and Bicycle Safety classes.
- **Healthy Hens Student Wellness:** Healthy Hens Student Wellness cultivates a healthy and safe community that inspires students to succeed as leaders, role models, advocates and good citizens. Healthy Hens Student Wellness engages all members of the University community in health promotion and prevention strategies that empower students to develop skills and competencies that support healthy choices and academic success as a foundation for lifelong development. Recent programs included Alternative Journey to Work to encourage alternative, more sustainable ways to work or to classes.
- **HealthyU Employee Wellness:** HealthyU Employee Wellness is committed to improving and sustaining the overall health and well-being of the university community. They provide employees with the resources necessary to perform at their best and support their quality of life, including workshops and fitness classes.

**Newark Bike Project:** The Newark Bike Project is a community repair shop that offers shared access to professional tools and knowledgeable volunteer mechanics. Their mission is to educate, create community, and empower individuals in a way that encourages sustainability. Funding comes primarily from the sale of used bikes that have been donated by the community but also from financial donations, grants, and parts sales. Current programs and events include:

- **Open Shop Hours:** Scheduled hours, during which community members can repair their bicycles with assistance from volunteers. A key feature of a bike collective is a "learn to do-it-yourself" bike shop. This community shop model serves as a place where youth as well as adults can collaborate on projects, learn to repair and maintain their bicycles, and shop for bicycles, parts, and accessories. In addition to volunteer mechanic expertise, the shop includes full sets of professional tools and an inventory of used parts for virtually any repair.
- **Classes:** Classes include wheel/tire repair workshops and general mechanic training courses that will train community members to work on the most common repairs and adjustments to several types of bicycles.
- **Used-Bike Sales:** Donated bikes may be sold to the community to raise funds for shop and program operating costs. Bikes are generally priced between \$30 and \$150, with the majority of rideable bikes in the \$50-\$80 range. Occasionally, youth Bike Swap events are also held.



- ***Bike Buy-Back Program:*** Refunds a portion of the purchase price for use of a bike for less than one year. Program is geared toward English Language Institute students and other visiting students.
- ***Chainbreakers Collaborative:*** This is a youth program run out of the Newark Bike Project, aimed at area youth ages 10 to 15. Kids will gather to learn bike mechanic skills, build character, and actively participate in their community.



Photo: Newark Bike Project

***Bike Delaware:*** Bike Delaware is an independent, non-government, member-supported nonprofit advocacy organization whose mission is to make bicycling a safe, convenient, and fun transportation option by working in partnership with government, business, and community groups.

Other organizations involved in the Newark area include:

***East Coast Greenway Alliance:*** The East Coast Greenway is a developing trail system, spanning nearly 3,000 miles, as it winds its way between Canada and Key West, linking all the major cities of the eastern seaboard. Over 25% of the route is already on safe, traffic-free paths. East Coast Greenway alignment would link Newark to Elkton, Churchmans Crossing, and points beyond. Within Newark, designated sections of the route include the SR 72 pathway and the Hall Trail.

***White Clay Bicycle Club:*** White Clay Bicycle Club offers a wide variety of year round cycling experiences, on-road and off-road, fast and challenging, leisure and fun. The club is based in northern Delaware and offers frequent rides in the Newark area. In addition to cycling, the club offers enrichment programs and opportunities to lend support to advocacy issues, locally and nationally.

***Delaware Trail Spinners:*** The Trail Spinners is an organization of mountain bicyclists of all abilities, joining together to enjoy and promote the sport of mountain biking. Members seek to balance their enjoyment of riding with responsible trail use and are committed to preserving access to trails through education and advocacy. In addition to recreational and instructional rides, members volunteer significant time and effort to construct, preserve and improve trails for shared use. Current projects include the planning, design, and construction of trails in Newark's Redd Park.

## RECOMMENDED BICYCLE NETWORK

The recommended bicycle network provides a comprehensive network of facilities that connect homes, work sites, schools, parks, community centers, library, retail, and other destinations. The map (*Map 7*) on the following page shows existing and recommended routes. The remainder of this section describes types of facilities and includes suggested design considerations. Some designs are in keeping with the DeIDOT Road Design Manual, Delaware Manual on Uniform Traffic Control Devices (MUTCD), and the AASHTO Guide for the Development of Bicycle Facilities—all accepted design practices. Other recommendations look at national and international best practices<sup>2</sup>. For these best practices, the Plan draws largely on the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide based on the experience of the best cycling cities in the world. The NACTO Guide has been adopted by many of leading bicycle-friendly cities and is widely used in the Mid-Atlantic, including Washington, D.C., Baltimore, New York City, and Philadelphia.

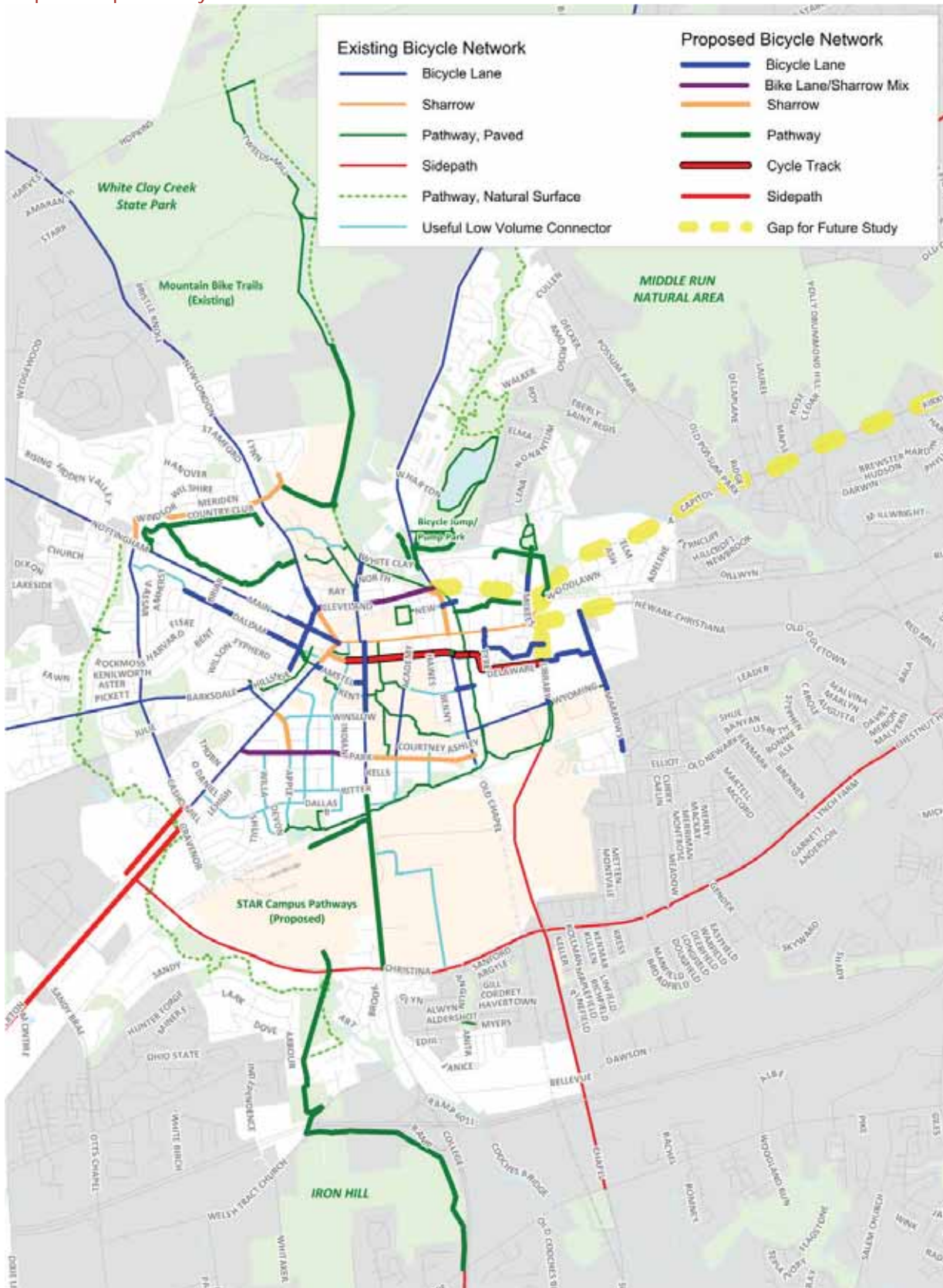
### PREFERRED DESIGNS

A short summary of preferred route design is as follows:

Type	Width	Surface	Treatment	Function
<b>Bicycle lane</b>	4-6 ft.	Asphalt	Striped lane for bike travel on street.	Bicycle travel along streets.
<b>Sharrow/ Shared Street</b>	NA	NA	Share lane marking and/or signage for shared use of lane.	Accommodates bicyclists on lower volume, lower speed streets without sufficient width for bicycle lanes.
<b>Pathway, Sidewalk or Greenway</b>	10-16 ft.	Asphalt or concrete	Route completely separated from motor vehicles and shared by bicycles and pedestrians.	Provides linear park and desirable, traffic-free connections to key destinations. May parallel roads where traffic speeds or limited right-of-way make providing sidewalks and bicycle lanes infeasible or undesirable. Best when crossing infrequent driveways.
<b>Cycle track</b>	10-16 ft. if 2-way	Asphalt or concrete	Route within the street, separated from motor traffic and is distinct from the sidewalk.	Provides greater separation from traffic than a bike lane and greater separation from pedestrians than a pathway.
<b>Trail</b>	Less than 10 ft.	Earth or stone dust	Primarily recreational route to connect with larger bicycle and pedestrian network.	Provides more natural trail for recreational use by pedestrians and hybrid and mountain bikes.

<sup>2</sup> FHWA approval for experimentation is required for traffic-control measures not consistent with the MUTCD (e.g., signs, pavement markings, signals). In an August 20, 2013, memo, FHWA expresses support for “a flexible approach to bicycle and pedestrian facility design.” The memo identifies the AASHTO and NACTO guides, noting that NACTO “builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. FHWA supports the use of these resources to further develop nonmotorized transportation networks, particularly in urban areas.”

Map 7 – Proposed Bicycle Network



Street	Limits	Recommendation
<b>On road bicycle recommendations, short-term</b>		
Delaware Ave., S. Main, N. College, etc.		Install Bicycle Wrong-Way Traffic Signs in direction opposite traffic
Academy Street	South of Lovett	Bike lanes (2 10-foot lanes w/ 2 5-foot bike lanes)
Academy Street	North of Lovett	Bike lanes (2 10-foot lanes w/ 2 4-foot bike lanes) or sharrows
Apple Road	Park Place – Hall Trail	Local street; improvements not needed
Apple Road	Park Place to Elkton	Sharrows
Barksdale Road	All	Adjust existing bike lane to be compliant with current guidelines
Casho Mill Road	All	Southbound sharrows through underpass and adjust existing bike lane to be compliant with current guidelines
Cleveland Avenue	West of College	Sharrows and bike lane mix
Cleveland Avenue	College to Paper Mill	Eastbound sharrows with 11-foot travel lane and 7-foot parking lane, westbound 5-foot bike lane with 11-foot travel lane; if parking lane is removed, consider eastbound bike lane as well
Cleveland Avenue	Paper Mill to Library	Sharrows and/or bike lanes (with off road north of businesses along White Clay Creek)
Country Club/Windsor/Delrem	All	Sharrows
East Park Place	All	Sharrows
Elkton Road	Casho Mill Rd. to Md. line	Bike lanes and off-road path (East Coast Greenway)
Hillside Road	All	Two 11-foot lanes and two 5-foot bike lanes
Library Avenue	South of Delaware Ave.	Bike lanes
Library Avenue	North of Delaware Ave.	No short-term improvement proposed
Marrows Road	All	Bike lanes
New London Road	Main to Cleveland Ave.	Sharrows
New London Road	North of Cleveland Ave.	Bike lanes
North Chapel Street	All	Sharrows
North College Avenue	Main to White Clay Dr.	Bike lanes, install fluorescent “No Outlet” sign at North St.
North College Avenue	White Clay Dr. to barrier	Reduce speed limit to 15 mph, add bicycle signs
Paper Mill Road	At White Clay Creek	Sharrows on White Clay Creek bridge and off-road path
South Chapel Street	South of Delaware Ave.	Two 10-foot lanes and two 5-foot bike lanes
South Chapel Street	Main to Delaware Ave.	No short-term improvement proposed
South College Avenue	All	Bike lanes in both directions where not already complete, consider removing on-street parking by Morris Library to provide space for bicycle lane. A long-term alternative might be a bikeway on UD property.
South Main Street	West Main to Delaware Ave.	Sharrows to assist in eastbound travel from East Main to Delaware Ave
West Main Street	New London to Hillside	Two 11-foot lanes and two 5-foot bike lanes, remove parking (if any), sharrows at Hillside turn lanes



Street	Limits	Recommendation
West Main Street	West of Hillside	Two 11-foot lanes and two 5-foot bike lanes, sharrows at Hillside turn lanes
West Park Place	College to near Apple	Two 11-foot lanes and two 7-foot bike lanes and/or traffic calming
West Park Place	Near Apple to Elkton	Westbound 11-foot lane and 5-foot bike lane, eastbound 12-foot lane with sharrows and 8-foot parking lane, or traffic calming
Wyoming Road	All	Adjust existing bike lane to be compliant with current guidelines
Wyoming Road	At S. Chapel	Align bicycle route and crosswalk across intersection to highlight future East Campus Gateway

**On-road bicycle recommendations, long term**

Delaware Avenue	Orchard to Newark High School	Cycle track providing 2-way travel and related intersection changes
Delaware Avenue	Library to Marrows	Extend Delaware Ave. with bike lane
Library Ave	Wyoming-Main	Study to determine preferred design, bicycle lanes and/or sidepath

**Off-road bicycle recommendations<sup>3</sup>**

Cleveland Ave. Pathway	Kirkwood Highway to Creek View Road	Off-road easement north of commercial properties along Cleveland Ave provides an alternative east-west route to Cleveland Ave.
Curtis Paper Mill / Pomeroy Spur	Pomeroy to Reservoir	Connection for Curtis Paper Mill Master Plan
Elkton Road East Coast Greenway	Casho Mill to Md. line	Completion of East Coast Greenway off-road pathway
Iron Hill Pathway	Old Baltimore Pike to STAR Campus	Path to connect those south of Newark to downtown, University and train station
Library Ave.	Wyoming– SR 4	Upgrade sidepath
Pomeroy Trail Connector	Creek Road to Fairfield Crest Park	Conversion of gravel road to all-weather surface
South College Ave.	Bridge over Amtrak	Improve pedestrian/bicycle connection across Amtrak line
STAR Campus	Areawide	On and off street connections to all destinations

**Intersections identified for consideration of future improvements**

<ul style="list-style-type: none"> <li>• Cleveland Ave/Pomeroy/Papermill</li> <li>• I-95 ramps/SR 866</li> <li>• Library Ave. at SR 4, Delaware Ave. and Main</li> <li>• SR 4 at SR 72, SR 896, and SR 2</li> </ul>	<ul style="list-style-type: none"> <li>• SR 896/Marrows</li> <li>• Delaware Ave at Chapel, Tyre</li> <li>• Pomeroy/Wyoming</li> <li>• S. Main/Amstel</li> <li>• E., W., S. Main/New London/Delaware Ave.</li> </ul>
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<sup>3</sup> Frazer Field pathway was removed from the Plan at the request of the University of Delaware. This partially built connection through University, south of CSX tracks, was intended to serve as alternative east-west route to Main Street but is now gated to restrict thru use. Future Plan updates should reconsider the viability of this project.

## Facility Types

### BICYCLE LANES

Designated bicycle lanes can increase safety and promote proper riding. They define the street space for all users and discourage cyclists from riding on the sidewalk. Bicycle lanes help to increase bicyclist comfort and confidence on busy streets. They also provide a visual reminder to motorists to be aware of bicycles and improve the predictability of bicycle/motorist positioning and behavior. Signs showing “Wrong Way” and “Ride With Traffic” can be installed on the back of signposts to promote proper direction riding. Bicycle lanes serve to increase the total capacity of a street while visually narrowing wide pavement to help slow speeding traffic.

Bicycle lanes are most appropriate on arterial and collector streets where the higher speeds and traffic volumes warrant greater separation for safety and comfort. Depending on the speed and volume of traffic, the recommended minimum width is 4-6 feet for bike lanes. Additional width is needed where there is on-street parking so that cyclists can avoid car doors. A maximum width of 7 feet is preferred, because wider bike lanes may get blocked by delivery vehicles, turning cars, etc.

Where additional width exists or vehicle/bicycle conflicts are a concern, some communities have begun using buffered bicycle lanes and colored bicycle lanes:

- Colored Bicycle Lanes:** Colored pavement increases the visibility of the bicycle lane and is particularly suited for potential conflict areas where the bicycle lane crosses driveways, highway ramps, and intersections. High-friction surface treatment, a durable epoxy resin, is preferred for its long lasting color and anti-skid properties. Studies have found that colored lanes increase driver yielding and decrease bicycle crashes.
- Buffered Bicycle Lanes:** Buffered bike lanes mark a separation between the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Generally, buffers should be at least 3 feet wide. In addition to increasing the space between motor vehicles and cyclists, buffers provide space for bicyclists to pass each other, can mark the door zone

*Bicycle Lane: A portion of a road that has been designated for preferential or exclusive use by bicyclists by pavement markings and, if used, signs. The preferred width is 5 feet, or 6 feet when on-street parking is present.*



RS-1b



RS-3c

#### Colored Bicycle Lane



Photo: Green Lane Project/Bikes Belong

#### Buffered Bicycle Lane



Photo: Bike Walk Lincoln Park

of on-street parking, and narrow the perceived width of a wide bike lane to reduce the number of cars using it as a travel and parking lane. The photo shown both marks the door zone and buffers between traffic.

Other optional elements are done to ease turns from bike lanes or complete gaps along one-way streets:

- **Left-side Bicycle Lanes:** Bicycle lanes may be placed on the left side, particularly on one-way streets with heavy delivery or transit use, frequent parking turnover on the right side, high volumes of right turns by motor vehicles, or high volumes of left turns by bicyclists.
- **Contra-flow Bicycle Lanes:** Contra-flow lanes designed to allow cyclist to ride in the opposite direction of motor vehicle traffic. They are typically used on one-way streets to permit two-way bicycling.

Left-side Bicycle Lane



Contra-flow Bicycle Lane



Photos: [www.pedbikeimages.org](http://www.pedbikeimages.org) by Dan Burden

Retrofitting bicycle lanes onto existing streets presents challenges. The recommended bicycle lanes should be incorporated into land-use development projects or transportation projects when these occur. Retrofitting bicycle lanes is least expensive when done at the same time as street resurfacing and restriping. Retrofitting bicycle lanes may be achieved with:

- Remarkings shoulders as bicycle lanes. This presents the easiest conversion because sufficient width is in place. Special care must be taken to redesign facilities at intersections and where shoulders are eliminated due to turning lanes.
- Narrowing the width of motor vehicle lanes. Many existing streets have wider lanes than guidelines suggest, which could be narrowed to allow for bike lanes. Design guidelines allow for 10-foot lanes in nearly all contexts found in Newark, with 11-foot lanes needed only where speed limits exceed 40 mph or there are unusually high truck or bus volumes. A 10-foot travel lane next to a bike lane may work well even when truck or bus traffic is high.
- Parking reduction or narrowing. While an 8-foot parking lane is desirable, a 7-foot parking lane will accommodate most vehicles and, when combined with lane narrowing, provides space for bike lanes. Due to the high demand for parking in Newark, this plan does not recommend eliminating on-street parking except in small, very limited locations where it cannot be avoided.
- Widening the street to add bicycle lanes. This option can be quite costly and is only recommended on high-volume streets without width to mark bike lanes.

## SHARROW OR SHARED-LANE MARKING

### Sharrows



Shared-lane markings, commonly known as “sharrows,” are street markings used to indicate a shared lane for bicycles and automobiles on streets without sufficient width for bicycle lanes. Used to enhance the safe travel of bicycles and motor vehicles in the same traffic lane, sharrows help position bicyclists within the lane and alert motorist to the presence of bicycles. Along streets without on-street parking, sharrows should be 4 feet from the curb or edge of street; currently the DeIDOT MUTCD permits sharrows only on streets with on-street parking. With on-street parking present, sharrows should be at least 11 feet from the curb or at least 2.5 feet from the edge of the parking lane. This shows cyclists the correct position to ride to avoid car doors. Newark and DeIDOT may wish to position sharrows near the center of the lane; placing markings between vehicle tire tracks will increase the life of the markings. In addition, the use of “Bikes May Use Full Lane” signs are recommended to further clarify proper use of the facility.

### *Sharrows or Shared-Lane*

*Markings: On urban roads without sufficient width for bicycle lanes, sharrows are a pavement marking showing a bicycle with a chevron that is placed in the travel lane.*

*Sharrows serve to assist bicyclists with proper lane positioning relative to the curb and on-street parallel parking in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane, alert road users of the lateral location bicyclists are likely to occupy within the lane, encourage safe passing of bicyclists by motorists, and reduce the incidence of wrong-way bicycling.*



Rendering: DeIDOT

On state-maintained streets without bike lanes, it is generally most cost effective for DeIDOT to install sharrows during pavement and rehabilitation projects. Main Street, as the top priority street, had sharrows installed in May 2013 based on community feedback during the development of this Plan.



## CYCLE TRACK

One of the critical missing links to bicycling in downtown Newark is the lack of an adequate westbound bike route through the downtown. To provide for this missing link, it is recommended that Delaware Avenue be reconfigured to include a two-way, separated bike lane known as a cycle track. A cycle track is recommended from Newark High School to Orchard Road. A typical section of this improvement is shown on the next page, subject to refinement through a comprehensive engineering study.

While not in the AASHTO Guide, the NACTO Urban Bikeway Design Guide includes design guidance for cycle tracks based on the experience of the best cycling cities in the world. NACTO recommends that cycle tracks include bicycle signal modifications and enhanced intersection and driveway markings. Bike boxes are a recommended intersection improvement to improve the ease and visibility for bicycle turns.

Cycle tracks have now been used successfully in many cities across North America including New York City, Portland, Ore., Indianapolis, Ind., Saint Petersburg, Fla., and Washington, D.C. Thus, Delaware has the opportunity to apply best practices from the experiences of other communities.

### Cycle Track



Photo: Green Lane Project/Bikes Belong

*Cycle Track: A cycle track is an exclusive bike facility that has elements of a separated pathway and an on-road bike lane. A cycle track is within the roadway, but is physically separated from motor vehicle traffic and is distinct from the sidewalk. They may be separated from traffic with bollards, car parking, barriers, median, painted buffers, and/or mountable curbs. Cycle tracks may be one-way or two-way, and may be at road level, at sidewalk level, or at an intermediate level.*

Proposed Cycle Track: Orchard Road to Newark High School

EXISTING CONDITIONS

- CURB TO CURB WIDTH: 32' TO 41' WIDE
- 2 EASTBOUND TRAVEL LANES WITH ADJACENT SHOULDER/BIKE LANE
- NO ON-STREET PARKING ALONG MOST OF THE CORRIDOR

OPERATIONAL CONCERNS

- NO SAFE/LEGAL ROUTE FOR WESTBOUND BICYCLISTS



PROPOSED SAMPLE PHOTO



PROPOSED SAMPLE PHOTO

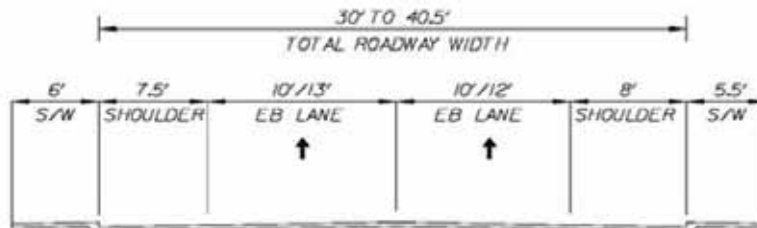
DELAWARE AVENUE EAST OF ORCHARD ROAD



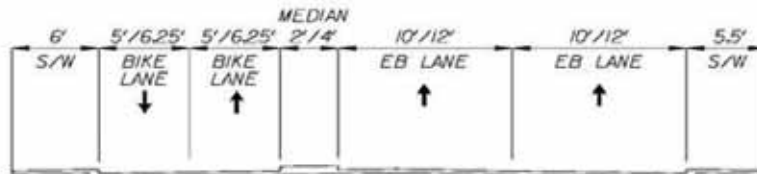
DELAWARE AVENUE EAST OF CHAPEL ROAD



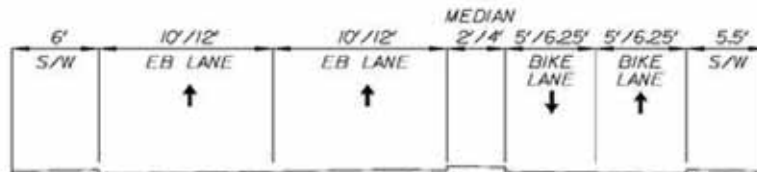
EXISTING



ALTERNATIVE 1



ALTERNATIVE 2



Source: Newark Transportation Plan

## BICYCLE BOULEVARDS

Newark has many low-volume streets that can connect bicycle lanes, pathways to complete the low-stress network of bicycle facilities. These streets can be enhanced as bicycle boulevards to further promote their use for trips by bicycle while reducing excess and speeding vehicle traffic. These “quiet” streets benefit residents and improve safety for all street users. Bicycle boulevards are designed to give bicycle travel priority using signs, pavement markings, and speed- and volume-management measures to discourage through trips by motor vehicles and create safe, convenient bicycle crossings of busy arterial streets.

***Bicycle Boulevards:** Using a mix of signs, pavement markings, and traffic-calming measures, bicycle boulevards discourage through trips by motor vehicles, create safe, convenient bicycle crossings of arterial streets, and give bicycle travel priority. Bicycle boulevards may be used on streets with low motorized traffic volumes and speeds.*

Elements may include:

- Signs and pavement markings on routes that are easy to find and follow.
- Traffic calming measures as described in the Newark Traffic Calming Plan:
  - Measures to slow speeding traffic such as mini-circles, bump-outs, or speed tables.
  - Measures to reduce cut-through traffic, including forced turn islands, medians, and diverters
- Bicycle-oriented intersections. At minor street crossings, this might include replacing 4-way stop signs with mini traffic circles. Major crossings with signals should include bicycle signal detection and actuation. Supplemental signs and markings, median refuge islands, and bicycle signals might also be considered.
- Naming and branding the corridor is also something communities do to promote use of the boulevard. Similarly, green stormwater management and enhanced landscaping further define the corridor.

Specific streets and designs should be developed through a collaborative process that includes the City, adjacent residents, emergency-response officials, and the bicycling community.

Bicycle Boulevard



Mini circle



Photo: [www.bmorebikes.com](http://www.bmorebikes.com)

## PATHWAYS, GREENWAYS, AND TRAILS

Pathways provide a community far more than just a means of transportation. A pathway is a route shared by pedestrians, bicycles, wheelchair users and often other nonmotorized users. They provide direct links between destinations with fewer street crossings than sidewalks and bike lanes. Children and novice bicyclists find pathways a safe place to learn to ride, and people of all ages find them a convenient place to recreate. For many communities, pathways generate tremendous community pride for residents and draw visitors from the surrounding region.

To safely serve bicycles and pedestrians, pathways must provide additional width over a standard sidewalk. Pathways may be sidepaths build adjacent to streets or greenways through parks or open space. Sidepaths should be a minimum of 10 feet wide to allow two-way shared use, with 12 feet recommended as the minimum for most facilities. Where there are space constraints, the path may narrow to 8 feet but should be accompanied by signs warning that the trail narrows. Sufficient clearance along the sides and overhead is needed with a minimum of 2 feet on each side and a 10-foot clear zone overhead.

Additional elements can enhance a pathway's design, including:

- Access points with directional signs on how to reach the path. Paths that are built away from the street may be hard for potential users to find without directional signs.
- Build path to a standard that will allow heavy maintenance equipment and emergency vehicles. This higher up-front cost will result in a longer lasting path with lower maintenance expense.
- Limit the number of street crossings. The joy of using a pathway is having a direct route away from interaction with vehicle traffic.
- Identify and address potential safety issues. If a pathway is likely to be used for commuting and shopping trips, lighting is needed for year-round use.

**Pathway:** A multi-use bicycle and pedestrian path separated from motorized vehicular traffic by an open space, barrier, or curb. Multi-use paths may be within the highway right-of-way or within an independent right-of-way, such as on an abandoned railroad bed or along a stream-valley park. Multi-use paths typically accommodate two-way travel and are open to pedestrians, bicyclists, in-line skaters, wheelchair users, joggers, and other non-motorized users. They are typically surfaced in asphalt or concrete, but may have hard-packed/all weather gravel or dirt surfaces. To safely accommodate a range of users, multi-use paths should be a minimum of 10 feet wide (but may be less in constrained conditions). Greenway trails and sidepaths are types of pathways.

**Greenway Trail:** A linear park outside of roadway right-of-way that accommodates pathways principally for foot traffic and/or bicycles. Typically, greenway trails are planned along creeks, streams, rivers, or other natural features and managed as natural environments. In many cases, the term "greenway" refers to pathways such as the East Coast Greenway.

**Sidepath:** A pathway within the roadway right-of-way or near the road within an easement for multi-use nonmotorized travel. Sidepaths should be a minimum of 10 feet wide (but sidewalks may be substituted in constrained conditions).



Paths in more remote locations may benefit from having emergency blue-light phones.

- Consider the sight distances for bicycles. Sharp turns or heavy vegetation may limit faster moving cyclists from seeing oncoming bikes or pedestrians.
- For sidepaths, a 5-foot buffer from the street is desirable, or a physical barrier should be considered. Buffers may be a planted strip, a shoulder or a bike lane. Sidepaths work best when driveways are infrequent.
- Asphalt is the most common surface; however, concrete, recycled-asphalt millings or stone dust are alternatives, though asphalt millings and stone dust may add ongoing maintenance requirements.
- Intersections with streets need careful design and are discussed in more detail on the next page.
- Provide amenities for pathway users. Amenities include trailheads, public art, maps, interpretive kiosks, water fountains, bike parking, benches, restrooms, and other features to make the facility unique to Newark.



Pathway



Sidepath



Cycle Track



Use of bollards should be limited to locations where intrusion by motor vehicles is a likely problem. Bollards should be a bright color such as yellow and have reflective paint or tape. When possible, bollards should be located outside the pathway itself and a clear 5-foot width should be maintained.

## INTERSECTIONS

Intersections, including crossings of driveways, streets, and pathways with bicycle facilities should denote a clear right-of-way and manage interaction with pedestrians and motorists. Intersections may include elements such as colored pavement, signs, medians, bicycle signal detection, and pavement markings. Limiting the mixing between bicyclists and other modes helps to reduce the risk of crashes and increase bicyclist comfort. Required elements at an intersection depend on the bicycle facility type, other traffic, and land use. Intersections can be enhanced with the following features.

**Bike Boxes:** Bike boxes increase the visibility of bicyclists, reduce signal delay, facilitate left turns, help prevent “right-hook” conflicts with turning vehicles at the start of the green cycle, and reduce turning-vehicle encroachment into the bike lane. As one-way streets, Main Street and Delaware Avenue may be particularly suited for bike boxes to assist turning bicycles to be more visible.

**Dotted Lines:** Dotted or dashed lines, sometimes combined with sharrows, may be used at intersections to guide a clear path for cyclists.

**Two-Stage Turn-Queue Boxes:** At multi-lane signalized intersections from a right-side cycle track or bike lane, or right turns from a left-side cycle track or bike lane, two-stage turning boxes help to simplify turns. Turn-queue boxes may also be used at midblock crossing locations.

***Crosswalk:** A designated point on a road at which some means are employed to assist pedestrians and bicyclists who wish to cross a road. At intersections of two roads, crosswalks typically are used by pedestrians only. Intersections between pathways and roads, however, must accommodate bicyclists in their design.*

***Bike Box:** A bike box is a designated area in front of the traffic lane(s) at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase.*

**Bike Box with Dotted Lines**



**Two-Stage Turn-Queue Boxes**



Photo: <http://bikeportland.org>

**Bicycle Lanes/Turn Lanes:** Through movements should be accommodated for bicyclists where the bike lane is interrupted by a right-turn lane. Where space does not exist for a full bike lane to continue, Newark should coordinate with the DeIDOT pilot project to evaluate the best pavement markings.

Bicycle Lanes/Turn Lanes



**Bicycle Signals:** Bicycle signals signify specific light cycles and movements for cyclists. Signals would be needed for the proposed cycle track facility and may also be beneficial at some pathway crossings or bicycle boulevards. Options include a full stop or flashing lights, actuated either manually by a push-button or passively, through detection. Bicycle-signal actuation should be accompanied by an appropriate sign (MUTCD R10-22) and pavement markings.

Bicycle Signal Head



Photo: [www.pedbikeimages.org](http://www.pedbikeimages.org) / Burden

MUTCD R10-22



**Mid-block Crossing Enhancements:** Mid-block and un-signalized crosswalks should be designed with added elements to increase their visibility. Options can be used individually or combined and might include:

Enhanced signs



High Intensity Activated Crosswalks (HAWK)



Rectangular Rapid Flashing Beacon



In-street yield to pedestrian sign



Median refuge island



Raised crosswalk



Photos: [www.pedbikeimages.org](http://www.pedbikeimages.org)/Burden

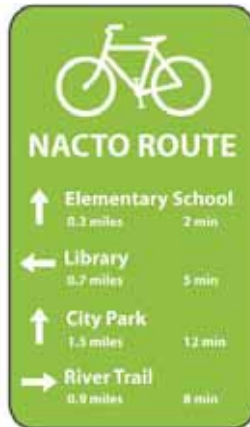


## AREA-WIDE FACILITY RECOMMENDATIONS

**Wayfinding/signing program:** Pedestrian- and bicycle-scale directional signing to key destinations will promote walking and bicycling by residents and visitors. Additional walk/bike directional signs should complement driver wayfinding signs at gateways where bicyclists may arrive, including the train station and bus hubs. Wayfinding to greenways is important, as some trailheads, such as the Hall Trail, are not easy to find for those unfamiliar with them. Additional signing can be oriented toward fitness users by marking distances along greenways and loop walking and bicycle routes for exercise.



This street sign from Vancouver, Canada, shows that a street is a preferred bicycle route.



This example, by the NACTO Urban Bikeway Design Guide, shows direction of points of interest to bicycles, distance, and estimated travel time.



Strategically placed maps, like this one on a Philadelphia trash can, help locals and visitors alike find their way around.

**Complete Streets Policy:** Complete Streets are streets designed for and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, emergency vehicles and transit riders of all ages and abilities must be able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations. According the National Complete Streets Coalition, an ideal complete streets policy:

- Includes a vision for how and why the community wants to complete its streets.
- Specifies that “all users” include pedestrians, bicyclists, and transit passengers of all ages and abilities, as well as trucks, buses and automobiles.
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way.



- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
- Encourages street connectivity and aims to create a comprehensive, integrated, connected network for all modes.
- Is adoptable by all agencies to cover all streets.
- Directs the use of the latest and best design criteria and guidelines while recognizing the need for flexibility in balancing user needs.
- Directs that complete streets solutions will complement the context of the community.
- Establishes performance standards with measurable outcomes.
- Includes specific next steps for implementation of the policy.

The DeIDOT Complete Streets policy applies to all state-maintained streets—most of Newark’s major streets. Newark has also adopted a complete streets policy. Implementation plans for both the DeIDOT and Newark policies are still needed.

**Functional Art:** Public infrastructure can be decorative to improve aesthetics and sense of place and draw attention to bicycling. Functional art might include murals on blank walls and traffic signal boxes that would otherwise be prone to graffiti. The signal box below, from Palo Alto, Calif., is an example of a using the space to promote reduced energy use; similarly, Newark could use signal boxes to promote bicycle safety in a decorative fashion. Decorative bicycle racks and benches offer other opportunities to inject Newark’s personality into the bicycle network.



## PARKING FACILITIES

Adequate and secure bicycle parking should be provided at all major trip destinations to encourage travel by bike. Bicycle parking should be provided as part of multi-family residential developments and all commercial, industrial, and institutional developments and park-and-ride lots. Article XIV. - Off-Street Parking and Loading Requirements in Newark's zoning code does not discuss bicycle parking requirements. Chapter 27 – Subdivisions, Appendix II. – Design Requirements for Parking Lots does discuss some specific requirements. Based on community feedback, requirements were amended by City Council on September 9, 2013 as follows:



*Bicycle facilities. All multifamily residential and commercial major subdivisions with 50 or more parking spaces as defined and required in Chapter 32, Zoning, Article XIV, of this Code, shall meet the following requirements for bicycle racks or similar bicycle storage facilities:*

- One bicycle rack parking space (opening or slot) shall be provided for every ~~10~~ 5 required off-street parking spaces.
- ~~No more than 20 bicycle rack parking spaces shall be required for each subdivision.~~
- Bicycle racks shall be located in areas visible from adjoining or nearby streets or sidewalks.
- Bicycle racks shall be separated from automobile parking areas by curb barriers or located on sidewalks. Sidewalk installation shall be permitted only for sidewalks not located within public rights-of-way.
- Bicycle racks shall be secured and stationary and shall be designed for the lockage of bicycle frames and wheels. Bicycle lockers or similar storage facilities may be substituted for bicycle racks.
- ~~Multifamily and commercial subdivisions in existence as of the date of the adoption of this subsection, with 50 or more parking spaces, shall install bicycle racks meeting these bicycle facility requirements no later than September 1, 1997. Existing on-site bicycle facilities may count toward meeting these requirements.~~
- Bicycle racks shall conform to all other applicable municipal code requirements.
- The Public Works and Water Resources Department shall review construction improvements plans to determine conformity with this subsection and shall inspect and enforce the requirement for the installation of bicycle facilities for existing subdivisions process the discretion and authority to consider alternative facilities and/or approaches to meet bicycle parking needs for a particular major subdivision, including the option to determine that bicycle racks are not required due to said alterative facilities/approaches.

Additional bicycle policy changes should:

- Require all schools to provide bicycle parking. Elementary schools in Newark have bicycle racks, but Newark High School does not.
- Permit sidewalk installation if space allows.
- Provide more specific site planning requirements. Bicycle parking should be located as close as possible to building entrances. Where this is not possible, signs should direct cyclists to the

location of bicycle parking, especially if the rack is not visible from the entrance or street. Ideally, the rack should be located in a covered area.

- Provide rack and locker design requirements; suggested designs are described in detail at [www.bikeparking.com/bikepark101](http://www.bikeparking.com/bikepark101). Inadequate racks put bikes at risk of theft because they can't be properly locked and may damage bikes by bending the wheels. Racks should
  - Support the bicycle upright at two places, not just one wheel. Allow the frame and one wheel to be locked to the rack when both wheels are left on the bike and both wheels to be locked if the front wheel is removed.
  - Allow the use of either a cable or U-shaped lock.
  - Be securely anchored.
  - Be usable by a wide variety of sizes and types of bicycles, including those with no kickstand and bikes with water-bottle cages.
- Review compliance with the requirement that multifamily and commercial subdivisions with 50 or more parking spaces install bicycle racks meeting these bicycle facility requirements no later than September 1, 1997. Many older commercial properties do not appear to have adequate supply of bicycle parking.

Bicycle racks like the one shown below will not provide adequate support for bicycles. This example is also too close to the wall to be used as designed.



Newark should also implement policies and procedures to deal with abandoned bicycles in the public right-of-way. Newark provides bicycle parking for short-term use in the downtown for parking in a convenient, safe, and secure manner. To achieve this, it is important to remove abandoned bicycles that are taking up valuable spaces that could be used by other bicyclists. Just as with on-street motor vehicle spaces, it should be made clear that bike racks in the busy downtown are not intended for long-term storage, to ensure that visitors are able to find parking quickly and easily. An abandoned bicycle procedure should:

- Specify where a bicycle can and cannot be parked.
- Set a maximum duration a bicycle may be parked in the same location.
- Define what constitutes an abandoned bicycle, including no tires or wheels, warped wheels or frame, missing, rusted or broken chain, missing or warped handlebars, and/or any bicycle in such a state that renders it inoperative.
- Specify procedures for tagging, removal, and storage of abandoned bikes, such as biannual tagging of all bikes, giving a 72-hour removal notice, and holding removed bikes for a set minimum number of days prior to donating to charity.

In addition to bicycle racks, provision of showers and changing areas at worksites will encourage commuting trips using bicycle routes and greenways.

# 1. THE RACK ELEMENT

**Definition:** the rack element is the part of the bike rack that supports one bicycle.

The rack element should:

- Support the bicycle upright by its frame in two places
- Prevent the wheel of the bicycle from tipping over
- Enable the frame and one or both wheels to be secured
- Support bicycles without a diamond-shaped frame with a horizontal top tube (e.g. a mixte frame)
- Allow front-in parking: a U-lock should be able to lock the front wheel and the down tube of an upright bicycle
- Allow back-in parking: a U-lock should be able to lock the rear wheel and seat tube of the bicycle



Comb, toast, school-yard, and other wheel-bending racks that provide no support for the bicycle frame are NOT recommended.

The rack element should resist being cut or detached using common hand tools, especially those that can be concealed in a backpack. Such tools include bolt cutters, pipe cutters, wrenches, and pry bars.



**INVERTED "U"**

One rack element supports two bikes.



**"A"**

One rack element supports two bikes.



**POST AND LOOP**

One rack element supports two bikes.

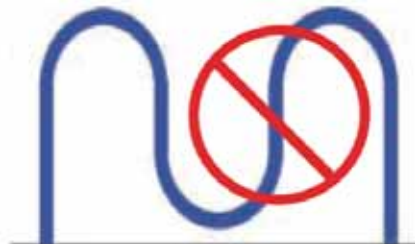


**COMB**

One rack element is a vertical segment of the rack.



Not recommended



**WAVE**

One rack element is a vertical segment of the rack.



**TOAST**

One rack element holds one wheel of a bike.



TRANSIT

Ensuring a strong link to transit is important to enable longer trips combining bus or rail with bicycle. Bicycling facilities with public transit facilities allow users to reach transit stops and destinations; indeed, most transit riders are pedestrians or bicyclists at either one or both ends of the trip. Primary components of bicycle integration with transit include the following:



- Allowing bicycles on transit. All DART buses and most University buses have bicycle racks, allowing longer trips to combine bicycling and transit. These racks equip buses to carry two bikes on the front of the bus. SEPTA’s current bicycle policy allows for the transportation of folding bicycles only during peak times, as space allows off-peak, and the existing fleet offers no designated storage areas for bikes. Delaware Transit Corporation (DTC) should work with SEPTA to promote additional options for bicycle storage on commuter rail.
- Offering benches, shelters, schedule information and bicycle parking at transit. Bus ridership benefits from having information about the routes and facilities to make riders comfortable at bus stops. Currently, Newark has some of these amenities at bus stops, but Newark should work with DTC to monitor ridership and provide amenities at the better performing stops as warranted. Currently, the SEPTA station, DART bus hub, and the SR 896/SR 4 Park & Ride have bicycle racks and lockers. Lockers are well used at the Park & Ride and train station but are underutilized at the Transit Hub.



Bicycle Lockers	Occupied Spaces
Newark Train Station	10 of 10
SRs 896/SR 4 Park & Ride	6 of 8
Newark Transit Hub	2 of 4

Source: DTC, Use as of August 13, 2013

- Bicycle racks at bus stops are also needed. Since buses only carry two bicycles, it is critical to have a place to lock bikes in case all bus racks are occupied.
- Improving connections to transit. Priority projects for implementation include improved and additional crosswalks near transit stops and the train station, as well as improved routes to transit. As most transit riders will need to cross the street for the return trip, safe crosswalks are particularly important.

## BICYCLE EDUCATION AND SAFETY PROGRAMS

Beyond improvements to bicycling facilities and infrastructure, Newark seeks to improve safety and encourage additional bicycling through maintenance, education, and enforcement practices and programs. This section focuses on programs for all street users—child cyclists, adult cyclists, motorists, and law-enforcement officials.

### *Child Cyclists*

Fostering a love of cycling among children while equipping them with skills for safe riding and bicycle repair will lead to a future adult population that chooses to bicycle for recreation and transportation. Programs for youth focus on encouraging safe cycling and helmet use, training in bicycle-riding skills, and expanding access to safe bikes to encourage more riders.



***Safe Routes to School:*** The Safe Routes to School programs makes it safe, convenient, and fun for children to walk or bicycle to school. Elementary and middle schools can receive funding through Delaware Safe Routes to School Program and program assistance through WILMAPCO and DelDOT. The purposes of the program are to:

- Enable and encourage children, including those with disabilities, to walk and bike to school.
- Make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age.
- Facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately 2 miles) of primary and middle schools (Grades K-8).

In addition to infrastructure (sidewalks, signs, pavement markings, bicycle racks, etc.) on school grounds or within two miles of the school, SRTS can fund a variety of education and encouragement programs such as:

- Walking and Biking Safety Assembly: A single-day event with guest speakers to teach bicycle safety skills.
- Participate in National Bike to School Day and/or Walk to School Day: These national events celebrate walking and biking to school. [www.walkbiketoschool.org](http://www.walkbiketoschool.org)
- Frequent walkers/bicyclist rewards program: Use punch cards to track frequency of bicycle and walking trips to school and reward with giveaways such as water bottles,



bike locks, lights, reflective items, and other incentives.

- **Bicycle Trains/Walking School Bus:** Walking school buses and bicycle trains are adult supervised groups of students walking and bicycling to school together.

In Newark, Downes Elementary School has been a past recipient of Safe Routes to School assistance. Through a DeIDOT SRTS pilot program, Downes created a comprehensive Safe Routes to School plan that addresses major congestion issues, access problems during school pick-up/drop-off, traffic awareness, and non-motorized access, facilities, and encouragement. Encouragement programs included Walker/Biker Punch Cards, a walk at recess program, pedestrian safety



education, and a “walking school bus” program. The Safe Routes to School committee coordinated with local police for enforcement of traffic laws near the school, and buses were separated from cars during arrival and dismissal by designating one parking lot for buses only. Changes in the pick-up and drop-off patterns have significantly reduced conflicts between students and buses. Bike racks were installed at the school, and pedestrian/bicycle connections were improved between the school and the adjoining neighborhood.

In October 2013, Downes held its 11th annual Walk to School Day. Approximately 400 students and family members participated in the half-mile walk to celebrate the importance of walking or biking to school and promote a healthier lifestyle. Four students won a bike, a helmet, and a bike lock, which were donated by Safe Routes to School Program.

***Earn-a-Bike Program:*** This program teaches children how to build, fix, and maintain bicycles; safe-cycling skills; and health and nutrition while recycling a donated bicycle. Associated benefits include fostering a sense of self-confidence and pride, teaching in a way that promotes a sustainable and healthy lifestyle, and promoting critical thinking and social skills. Similarly, some communities offer the opportunity to earn a bike through community service volunteerism.

***Bicycle Rodeos:*** A bicycle rodeo is a hands-on clinic to teach children the skills and precautions necessary to ride a bicycle safely. Bicycle rodeos may be organized through schools as part of the SRTS program, or summer/weekend rodeos may be conducted by the Newark Police Department, private/nonprofit organizations such as Newark Bike Project, Kiwanis Club, outdoor recreation companies, Boy Scouts, State Farm Insurance, and bicycle shops or sporting goods stores.

***Helmet Distribution Program:*** The Delaware School Nurse Association’s Bicycle Helmet Education & Distribution Program ran from 1997-2011. During the program, school nurses throughout Delaware distributed almost 20,000 low-cost bicycle helmets and provided bike-helmet education to more than 100,000 school children, before being discontinued due to lack of

sponsorship. Currently, DeIDOT provides bicycle helmets to schools for use by low-income students upon request.

***After-school bicycle maintenance and repair:*** In 2013 the Newark Bike Project (NBP) initiated the Chainbreakers Collaborative Youth Program. Aimed at youth ages 10 to 15, the program teaches bike mechanic skills, builds character, and promotes community involvement with hands-on activities and service-learning projects.

***Bicycle Trips for Kids Program:*** Operating with over 80 chapters in the United States, Canada and Israel, Trips For Kids main goal is to get kids out on bikes and to introduce them to another perspective of the world. With a focus on at-risk and underserved youth, chapters combine lessons in confidence building, achievement and environmental awareness through the development of practical skills, and the simple act of having fun. The organization provides the materials, moral support, and inspiration that an individual or group needs to help disadvantaged kids discover the joy of mountain biking.

***Family and Youth Rides:*** At Newark Charter School, students can join the mountain-biking club, an after-school activity. Riders utilize trails near the school including Iron Hill Park and the James Hall Trail, with occasional trips to other parks. Other communities provide family-oriented rides through nonprofits or municipal governments.

***Safety Town:*** Since 1980, Newark has been part of the National Safety Town program that teaches pre-school and early elementary school-aged children various ways to be safe. More than a thousand children have graduated from the program, which teaches children about safe walking and bicycling as well as other safety topics. Safety Town provides hands-on learning using a miniature town with streets, crosswalks, houses, and signs for children 4, 5, and 6 years old.



Program can be enhanced with additional bicycle-safety elements and expanded eligibility for families, adults, and children to practice safe-cycling skills as well as participate in classes hosted by the City and other community partners.

***Kids Bike Swap:*** NBP offers this program to allow parents and children to sell outgrown child bikes or buy a larger, used bicycle from other families from the Newark community. Programs such as this help keep children and families bicycling as they age and provide an affordable means of buying properly sized equipment.



## Adult Bicyclists

**Public-Awareness Campaign:** Program focuses on responsible road behavior and is directed to bicyclist and motorists alike. DelDOT is in the process of developing materials to educate drivers and cyclists to “See It Both Ways,” which can be distributed by the City of Newark and organizations around the community. A media and information campaign can include newspaper articles, social media, use of the City television channel, radio, bus advertising, posters and flyers mailed in utility bills, or with parking permits.

**Bicycle-friendly University of Delaware:** With more than 20,000 graduate, undergraduate, and English Language Institute students on Newark’s campus and almost 4,000 full-time employees, the University is the largest generator and attractor of bicycle trips in Newark. Between 2002-2012, the number of full-time employees and undergraduate/graduate students and has increased 9% and 7%, respectively, while the cost to park has increased and availability of vehicular parking on center campus has decreased. This has resulted in an increased interest in bicycling to and around Newark’s campus.

According to the League of American Bicyclists, a Bicycle Friendly University “enhances mobility around campus—increasing the amount of biking for transportation, exercise, recreation, and sport. Students and employees are more likely to bike where they are welcomed and accommodated, as it is noticeably safer, more convenient, and



### Bicycle Friendly University Scorecard

#### Engineering

- Does your campus have a comprehensive, connected and well-maintained bicycling network?
- Is bike parking readily available throughout the campus?
- Is the college or university easily accessible by bike?

#### Education

- Does the college or university offer bicycling education classes for students and staff?
- Are there classes for campus motorists on how to share the road with cyclists?

#### Encouragement

- Does your college or university have an up-to-date bicycle map?
- Are there incentives offered for students and staff that commute by bike?
- Is there an active bicycle advocacy group at the college or university?
- Is there an on-campus bike center for rentals and repairs?

#### Enforcement

- Do campus safety/law enforcement officers receive training on the rights and responsibilities of all road users?
- Does your campus have law enforcement or other public safety officers on bikes?
- Is there a program on campus to prevent bike theft?

#### Evaluation

- Is there an institutional plan or program to reduce bicyclist crashes?
- Does your college or university have a current comprehensive bicycle plan?
- Does your college or university have a bicycle program manager?

Source: League of American Bicyclists

more enjoyable.” Benefits cited include improved campus connectivity, reduced carbon footprint and congestion, lower healthcare and parking costs, and happier and healthier students and staff. Applying to the LAB Bicycle Friendly University Program will be a helpful way for the University to assess its current facilities and programs and think comprehensively about facilities, education, encouragements, enforcement, and evaluation/planning to improve conditions. Elements within each of these categories are highlighted on the LAB scorecard on the previous page.

A variety of past and current activities by the University include:

- A partnership with the University, City, and Newark Bicycle Committee to hold Bike-to-Work Day events. The University assists by hosting the event on campus and providing police officers to assist with directing bicycle traffic.
- Construction of the Hall and Pomeroy trails included University-donated rights-of-way.
- University employee bicycle-commuting survey was conducted between November 17, 2011, and January 14, 2012, with 613 responses received. The survey was conducted through a partnership between the University of Delaware’s HealthyU Employee Wellness Program and the Newark Bicycle Committee to gauge current commuting patterns and gain a better understanding of why people bicycle to campus or use other forms of transportation.
- University Police has been a partner for the Bicycle Safety Checkpoint program, described below. Officers assist with safety education and bicycle registration during the events.
- Bicycle registration is available through University Police. The University encourages students and staff who bring bicycles to the campus to register their bicycles through this free program.
- The mission of UD’s HealthyU Employee Wellness Program is to improve and sustain the overall health and well-being of the university community and provide employees with the resources necessary to perform at their best and support their quality of life. In 2012, the Newark Bicycle Committee presented a lunchtime bike-commuting workshop offered by HealthyU Employee Wellness, and in 2013 the Committee took part in UD’s Benefits and Wellness Fair.
- Bicycle parking improvements are currently being planned; implementation in 2013 is funded through an \$80,000 grant received by the University. Currently, the University has a total of 416 racks providing approximately 1,000 bicycle parking spaces. The preferred inverted U racks now account for the majority (210) of its total.

Additional future coordination with the University should address students and employees. Students should be educated about proper, effective cycling, and city-specific bike safety pamphlets and information can be part of the registration process for incoming students. Effective cycling might also be offered as a physical-education course. For employees, a focus should be made on end-of-trip facilities (secure bike parking, showers, etc.), forming bicycle-pools to allow people coming from the same areas to bike into campus together, and working with the City and DeIDOT to promote better connections onto campus. The University should also explore options for implementing the Bicycle Commuting Tax Credit.

***Bicycle Safety Checkpoints:*** Since 2010, the Newark Bicycle Safety Checkpoint Program has been sponsored by DelDOT in partnership with the Newark Bicycle Committee, City of Newark, University of Delaware Police and WILMAPCO. Four checkpoints are held each year, during which our “bicycle pit crew” installs free bicycle lights, gives away helmets, inflates tires, and makes a variety of minor tune-ups. Event organizers also emphasize safe bicycling behavior to checkpoint visitors, particularly the importance of riding in the direction of traffic and using lights at night.



***Effective Cycling course by the League of American Bicyclists (LAB):*** Traffic Skills 101 provides information about bicycle safety checks, fixing a flat, on-bike skills, and crash-avoidance techniques. Training includes classroom instruction, on-bike skills exercises, and a practice ride. Two courses have been held since 2011 in Newark, and it is recommended that the training program continue in the future. Additional promotion should be coordinated with the Newark Department of Parks and Recreation and the University.

***Other measures to consider include:***

- Encourage the medical industry to recommend cycling as a means of exercise.
- Work with bicycle shops to provide incentives for purchase of helmets and safety gear, such as lights and bells.
- Develop informational materials and programs specifically addressing the cycling needs of seniors, such as a tricycle program, and offer classes through the Newark Senior Center.
- Stress sidewalk safety, riding with traffic, drinking and cycling, other rules of the road, including providing articles in community publications.

## ***Motorists***

Educating motorists should always emphasize the mutual benefits of sharing the road with bicycles, which include safer, more inviting streets, increased property value from trails, improved air quality, less traffic, and an enhanced quality of life. Likewise, motorist education should have a tone of mutual respect, stressing that drivers have a need for safe, convenient streets just as bicycles do. The more drivers know about how to behave around bicycles, the more comfortable both drivers and cyclists will be.

Driver education should stress that bicycles are not a toy but a viable means of transportation, often the only means of transportation for many people. Public-awareness campaigns should educate the motorist on how to safely share the road with bicyclists and effect an overall

awareness of bicyclists' rights and responsibilities. "Bikes may use full lane" signs are useful, as they give specific information to drivers as opposed to the more vague "Share the Road" signs.

Community events and family activities can be useful in raising awareness of bicycle/motorist safety. Parents who attend bicycle education events with their children not only set an important example but may learn something themselves about bicycle/motorist safety.

Specific issues to emphasize for motorists include:

- Checking for bicycles when switching lane position, turning or going through an intersection as well as in parking lots, and exiting and entering streets.
- Learning how to safely and considerately pass an individual or group of bicyclists. Delaware law requires drivers to leave at least 3 feet space when passing bicycles moving in the same direction. Drivers should wait to pass until traffic conditions are clear and safe enough to leave 3 feet. Drivers should also check over their shoulder after passing a cyclist before moving back into the lane.
- Paying special attention to children on bicycles, particularly in residential areas and in school zones, on sidewalks, and entering or exiting driveways, since children have difficulty judging traffic speeds and distance and may behave unpredictably.

DelDOT's "See It Both Ways" campaign materials can be distributed in Newark to assist with outreach. Making use of public-service space from newspapers, television, radio, bus advertising, posters, and flyers mailed in utility bills may also be effective. The City should consider including an educational flyer in its mailings to residents, particularly for parking permits. Specific education campaigns can be targeted to fleet vehicle drivers and transit drivers.

### *Law-Enforcement Officials*

Legally, bicycles are defined as a vehicle, and cyclists are given the same rights and responsibilities as other vehicle drivers. Enforcement is a necessary part providing for a safe community for bicycling. Law-enforcement officials are valued to provide credible education about safe behavior and, along with a reasonable fine structure, can help address the greatest safety issues.

The July 2013 issue of *Law and Order* magazine corrects some common misperceptions held by law-enforcement officials. These myths include:





Myth	Reality
<b>"Roads are for motor vehicles"</b>	Roads are for moving people via all modes of transportation.
<b>"Slow vehicles are unsafe"</b>	Slow speeds are safer.
<b>"The 'right' of speed"</b>	While we tolerate other slow-vehicle circumstances (e.g., a truck traveling uphill), all slow-moving vehicles have a right to use the street, including use of the right lane unless preparing for a left turn.
<b>"It is safest for bicyclists to stay out of the way"</b>	Traveling against the edge of the road can endanger the cyclists. Many lanes are too narrow for motor vehicles to safely pass a bicyclist, and keeping far to the right encourages passing too close and sideswipes.
<b>"Bike lanes make cycling safer"</b>	Bicycle lanes are not always the safest option and can result in unpredictable behavior when cyclists risk being hit by opening car doors, swerving around cars illegally turning or standing in the bike lane, or swerving to avoid roadway debris that may accumulate in the bike lane.
<b>"Bicycle paths are safest for cyclists"</b>	Behavior on paths is not regulated by traffic laws and may create issues such as mix of travel speeds. Intersections create conflict points as well, and routes may not serve as direct transportation to destinations.
<b>"Cyclists riding in the middle of the traffic lane will impede traffic"</b>	Typically, impeding laws only apply to motor vehicles, and reasonable speed is allowed to accommodate not only bikes, but farm equipment, horse carriages, etc.

Source: [www.lawandordermag.com](http://www.lawandordermag.com), Kirby Beck

Priorities for enforcement should target the most dangerous behavior by both cyclists and drivers:

***Priorities for bicycle enforcement:***

- Riding against traffic
- Failure to yield at stop or yield signs
- Running red lights
- Riding without lights/reflectors at night

***Priorities for motorist enforcement:***

- Failure to yield right of way
- Unsafe passing
- Harassment or assault
- Inattentive or impaired driving
- Speeding and aggressive driving

Enforcement programs might include:

- Training for Newark Police and UD Police on the laws regarding bicyclists' rights and responsibilities, on how best to approach the bicyclist offender, and on what bicycling and motor vehicle offenses pose the greatest risk to cyclists.
- Enforcement of posted speed limits. High auto speeds make bicyclists feel unsafe, discourage people from cycling, and increase the severity of collisions.
- Creation of bike registration program and coordination with bike shops to register bikes when they are sold.

- Development of a citation structure so that bicycle fines will not be excessive and officers will be more willing to impose them.
- Develop a citation-alternative program, with attendance at an education program, similar to auto traffic school, to allow fees to be waived. Motorists involved in a bicycle collision could also be required to attend, to learn how to safely share the road.

### *Encouragement Programs*



The City should work in partnership with the Newark Bicycle Committee, Newark Bike Project, University of Delaware and other organizations to continue and expand programs to encourage additional bicycling.

Promotional events such as Bike to Work Day enhance bicycle education. Beyond this annual event, workplace promotion of bike commuting can continue year round. This type of promotion could include workplace contests, rewards to bike commuters, and the provision and promotion of lockers, bike parking and showers.

Newark's network of facilities, particularly off-road trails, can attract both residents and visitors from throughout the region. Newark should promote itself as a "Trail Town" by advertising the existence and location of facilities and programs. Economic-impact studies conducted by towns along the Greater Allegheny Passage Trail have found that overnight visitors spend an average of \$114 a day in trail communities, and local trail users spend an average of \$17 each trail use. Newark's location along interregional trails like the East Coast Greenway, Mason Dixon Trail, and September 11th National Memorial Trail, as well as the surrounding abundance of greenways and mountain biking trails makes Newark an ideal hub of bicycle-oriented tourism.

To promote this tourism, Newark has been invited to apply to become an International Mountain Bicycling Association "Ride Center." If accepted, Newark would join the 11 international communities designated as having world-class mountain bike facilities.

Bike share programs are another way to promote bicycling. Currently, a University Group, UD Cycles, is researching options for a pilot program on campus with an initial three check-out stations. This could be expanded to include the downtown, train stations, and interregional bus stop. Their proposal notes that similarly sized Universities have 20-30 bikes with 300-400 students enrolled.

Offering beginner and intermediate social rides and family fun rides helps get locals out riding. Community events such as charity bike rides, costume rides, bike fairs and bicycle rodeos are useful in attracting adults and families in more recreational surroundings. Bicycle safety checks and helmet giveaways can be a part of these rides.

As with education, public-awareness campaigns can emphasize the individual and community benefits of using a bicycle for daily trips. Business promotions through Downtown Newark Partnership (DNP) can also be explored.



*Photo: Dave Vispi*



## LAND USE

The Newark Bicycle Plan was developed in coordination with an update to Newark's Comprehensive Development Plan. The Comprehensive Plan promotes the integration of land use and transportation planning to support bikeable, livable, walkable, transit-oriented communities. Attractive, compact neighborhoods, mixed-use centers that help promote short trip length, and a clean environment all work to make bicycling a viable form of transportation and reduce traffic. Good design, such as that laid out by the DNP Design Guidelines, promotes land use that is well suited for bicycle trips.

The Newark Bicycle Plan promotes the community vision laid out in the Comprehensive Development Plan. Specific elements of this three-part Vision that tie most directly into the Bicycle Plan are *highlighted* as follows:

- **Healthy & Active Community: A community that provides safe infrastructure and amenities to allow opportunities for a healthy and active lifestyle, to include aspirations such as:**
  - **Bicycle and pedestrian accessibility.**
  - **Complete streets.**
  - Ample parks and open space.
  - Compact & mixed use development
  - Access to healthy foods.
- **Sustainable Community: A community that will be sustainable, both economically & environmentally, for generations to come, to include aspirations such as:**
  - **Promote transit and other alternative transportation modes for reduced dependence on fossil fuels.**
  - Stream valley protection.
  - Energy conservation and recycling.
  - Air and water quality.
  - Diverse economic base
  - Preserving historical resources.
- **Inclusive Community: A community that embraces cultural diversity and lifestyles for all age groups, to include aspirations such as:**
  - **Access to transit and other alternative transportation modes for increased choice.**
  - Range of housing choices and affordability levels.
  - Access to a variety of dining, shopping, entertainment, and employment options.
  - Parks and open space offering a range of activities.
  - Support services such as day care, health care, and retro-fitting houses.





## MAINTENANCE

### *Maintenance Plan*

#### *Organizational Strategies*

City of Newark and DeIDOT share management responsibility for facilities in Newark, with Newark responsible for the maintenance of off-road routes and city streets and DeIDOT responsible for state streets. The managing agencies need to develop a planned maintenance management system for the network. The elements of this system should include

- Inventorying the routes and its related facilities
- Setting of maintenance goals and standards for the quality of maintenance
- Developing the tasks necessary to achieve maintenance quality levels
- Assigning the maintenance tasks to designated groups or individuals
- Monitoring the quality of the work
- Implementing a control system for tracking accomplishments and relevant costs
- Evaluating the maintenance management program

Effective maintenance requires that an individual be delegated responsibility for this function. Because maintenance is a major program that is related to greenway, sidewalk, and bicycle route safety, attractiveness, and image as well as in affecting potential liability for crashes, it should be a function of a paid staff person. This person would oversee maintenance management operations, coordinate volunteerism, work with the employees and volunteers who do maintenance, develop a maintenance program, track costs, and project future requirements.

Developing an effective maintenance management system is an on-going process with more effective maintenance methods and techniques developed through experience. It will be important for people to recognize that creativity and experimentation with various approaches will help to improve maintenance operations.

The overriding maintenance program goal for the networks should be to provide for safe, clean, attractive routes for all users.

#### *On-Road Bicycle Route Maintenance Requirements*

Bicycle routes need regular sweeping and maintenance so that they remain safer for users. Approximately half of bike crashes are from falls, often caused by poorly kept street surfaces and debris. Critical maintenance includes regular sweeping and periodic restriping.

Primary activities include:

- Inspections—2 x per year
- Sweeping—as needed
- Pavement sealing, potholes—as needed-15 years

- Culvert and drainage-grate inspection—before winter and major storms
- Pavement-marking replacement—1-3 years
- Sign replacement—as needed

### *Off-Road Route Maintenance Requirements*

A description, frequency, and general comments for each activity are outlined. Both short-term periodic maintenance tasks (such as mowing) and long-term tasks (such as trail resurfacing) are provided. A discussion of key maintenance tasks follows.

**Vegetation Management:** The principal purpose of a vegetation management program is to keep the trail clear of vegetation, both horizontally and vertically, to permit the safe passage of greenway users. Control of vegetation is also required to help keep swales and drainage structures clear of debris and to minimize mechanical damage by tree roots to trail structures such as walls and bridges.

In addition to these basic functional criteria, vegetation management can also address the following objectives:

- Enhance the aesthetic quality of the greenway.
- Maintain or enhance desirable views from the greenway.
- Minimize long-term maintenance.
- Encourage diverse native-plant communities.

The following vegetation-management practices should be employed.

- **Mowing:** Herbaceous material should be mown three to four times a year, a minimum of four feet from the trail edge. A flail-type mower is recommended as rotary types blow the screenings off the trail.
- **Herbicide use:** Herbicides may be used selectively to remove vegetation from the trail surface on an annual basis, as required. Sunny areas are the most susceptible to weed growth. Weeds should be treated promptly, before the integrity of the trail is affected.
- **Woody-vegetation control:** Trees and shrubs should be controlled by an annual mowing of the entire width of graded rail-bed. Removal of woody vegetation to this width should minimize the need for frequent mechanical or hand pruning to maintain adequate horizontal and vertical clearances. Selective removal or “limbing up” of trees should also be scheduled to maintain or create desirable views from trail. Trees and shrubs should also be kept clear of all drainage structures, bridges, and walls that may be subject to mechanical damage by tree roots.
- **Invasive vines:** Moreover, vegetation control should include removal of invasive vines, such as poison ivy. A continuing effort to remove poison ivy, whose growth often increases after clearing, from the trail area will make the trail and its immediate environment more “user-friendly.”

These recommendations are guidelines. Site-specific conditions as well as aesthetic issues must also be considered. For example, it may be desirable to leave trees in certain areas within the graded rail-bed to provide shade or reduce the linear monotony of the trail corridor. The shade provided by a dense overhead canopy might be well worth the additional maintenance activity created by leaves and branches on the trail.

**Litter and Trash:** Litter problems tend to occur at access points/trailheads to greenways. These areas are more intensively used and often by individuals who are not avid greenway users. Providing trash receptacles offers only a partial solution to this problem and, in fact, creates a new one. Some greenway managers recommend that trash receptacles not be provided because, in their experience, it tends to generate non-trail user trash.

This problem would appear to be on the increase as trash pickup fees continue to increase. Several managers reported that, as a group, greenway users seem to be willing and accustomed to “packing out” their trash, reducing the need for trashcans at access points. Costs for such receptacles are shown, however, in our cost estimate. The design of bollards and gates at trail-access points will help to limit dumping from vehicles while retaining access for trail users.

**Vandalism and Graffiti:** Vandalism tends to be concentrated at the most accessible part of a greenway, specifically access points. The Delaware and Raritan Canal State Park staff anticipates a yearly replacement cycle of about 10% of the total number of access-control gates along that trail. These gates, as well as other custom fabricated items subject to vandalism and wear, are purchased in quantity to reduce costs.

Past experience shows bridge overpasses often attract graffiti, and some repainting of the bridges should be included in a yearly maintenance program. Painting of the overpasses, as has been done in some locations in the past, is a good way to denote the greenway, and make these structures less attractive to vandals. Alternatively, initial application of an anti-graffiti coating will make cleaning easier.

**Facility Surface Maintenance:** Asphalt is most often used on multi-use pathways because of its long-term cost effectiveness and desirable appearance. Special paving, crushed stone and natural surfaces will require much more maintenance.

**Drainage Structures:** If structures such as pipes, inlets, and swales are not properly restored during the construction phase, increased maintenance costs will result from continuous periodic maintenance of the structures and possible damage to the greenway due to poor drainage or erosion. This problem continues to plague the managers of the Delaware and Raritan Canal Trail in New Jersey.





Photo: Frank Warnock



Photo: Frank Warnock



## FUNDING AND IMPLEMENTATION PLAN

### *Funding*

#### FEDERAL FUNDING PROGRAMS

##### ***TRANSPORTATION ALTERNATIVES PROGRAM***

The Transportation Alternatives Program (TAP) offers funding opportunities to help expand transportation choices and enhance the transportation experience, formerly known as the Transportation Enhancements (TE) Program. TAP activities must relate to surface transportation and fall into one or more of the following categories, most related to bicycle improvements:

- Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation
- Construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs
- Conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other non-motorized transportation users
- Recreational trails program (administered by DNREC)
- Safe Routes to School program

In Delaware, projects require a 20% funding match.

Delaware TE Coordinator  
 Jeff Niezgoda  
 Delaware Department of Transportation, PO Box 778, Dover, DE 19903  
 Tel: 302-760-2178  
 Fax: 302-739-2251  
 Email: [jeff.niezgoda@state.de.us](mailto:jeff.niezgoda@state.de.us)  
 Web: [www.deldot.gov/information/community\\_programs\\_and\\_services/te](http://www.deldot.gov/information/community_programs_and_services/te)

##### ***SAFE ROUTES TO SCHOOLS***

The SRTS program provides funds to substantially improve the ability of primary and middle school students to walk and bicycle to school safely. While the SRTS program still exists in Delaware, the funding has been combined with TAP funds. Planning and infrastructure assistance still remain available. The purposes of the program are as follows:

- To enable and encourage children, including those with disabilities, to walk and bicycle to school
- To make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age
- To facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately 2 miles) of primary and middle schools (grades k-8)

Delaware Safe Routes to School Coordinator  
Sarah Coakley  
Delaware Department of Transportation  
P.O. Box 778  
Dover, DE 19903  
Phone: (302) 760-2236  
Fax: (302) 739-2251  
Email: [sarah.coakley@state.de.us](mailto:sarah.coakley@state.de.us)  
Web: [www.delDOT.gov/information/community\\_programs\\_and\\_services/srts](http://www.delDOT.gov/information/community_programs_and_services/srts)

### ***NATIONAL RECREATIONAL TRAILS PROGRAM***

Funded under TAP, the Recreational Trails Program provides funds to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, and equestrian use.

Funds may be used for:

- Maintenance and restoration of existing trails
- Development and rehabilitation of trailside and trailhead facilities and trail linkages
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails (with restrictions for new trails on federal lands)
- Acquisition of easements or property for trails and operation of educational programs to promote safety and environmental protection related to trails

For further information contact:

Delaware National Recreational Trails Contact  
Susan Moerschel, Manager  
Delaware State Parks  
89 Kings Highway  
Dover DE 19901-7305  
302-739-9235; Fax 302-739-3817  
[susan.moerschel@state.de.us](mailto:susan.moerschel@state.de.us)

David Bartoo, Trail Specialist  
[david.bartoo@state.de.us](mailto:david.bartoo@state.de.us)

### ***CONGESTION MITIGATION AND AIR QUALITY PROGRAM (CMAQ)***

CMAQ is available for “non-attainment areas” that do not meet federal air-quality standards. New Castle County is designated as moderate non-attainment for ozone and fine particulate matter (PM<sub>2.5</sub>). CMAQ provides for projects that improve air quality and reduce congestion. This includes improvements to pedestrian and non-recreational bicycle transportation infrastructure that contribute to a reduction in travel by single-occupant vehicles.



### ***WILMAPCO TRANSPORTATION IMPROVEMENT PROGRAM (TIP)/DELDOT CAPITAL TRANSPORTATION PROGRAM (CTP)***

The WILMAPCO TIP and DeIDOT CTP contain all state and federal transportation-funded projects in the region for four and six years, respectively. The programs contain an area-wide Pedestrian and Bicycle Improvements project that funds a variety of on- and off-road facilities.

### **DELAWARE FUNDING PROGRAMS**

Delaware funding programs may be used to match federal funds, subject to state program guidelines.

#### ***COMMUNITY TRANSPORTATION FUND (CTF)***

CTF funding provides a fixed amount of funds annually to each State Senator and Representative to be used as they and their constituents believe is best for transportation improvements within their district. Legislators may also fund their own project ideas, and they have the option of banking a portion of their yearly CTF budget for up to three years in order to fund a larger transportation improvement.

[www.deldot.gov/information/pubs\\_forms/brochures/pdf/ctf\\_brochure.pdf](http://www.deldot.gov/information/pubs_forms/brochures/pdf/ctf_brochure.pdf)

#### ***DELAWARE LAND AND WATER CONSERVATION TRUST FUND GRANT PROGRAM***

The trust fund was created to provide permanent and steady funding for park land and greenway conservation and outdoor recreation facility development. City and county governments and park districts may apply for grant funding under this program. Grants may be awarded for projects such as land acquisition, greenway corridor acquisition or development, and planning and design of parks or trails.

Robert Ehemann, Grant Coordinator  
DNREC, Division of Parks and Recreation  
89 Kings Highway, Dover, DE 19901  
[robert.ehemann@state.de.us](mailto:robert.ehemann@state.de.us)  
[www.destateparks.com/grants](http://www.destateparks.com/grants)

#### ***NEWARK MUNICIPAL FUNDING***

Newark's annual capital and operating budgets contains funding to improve and maintain bicycle facilities. These funds can be used to match federal transportation funds and other funding sources.



## Prioritization of Recommendations

Public outreach feedback indicated a preference for immediately going after “low-hanging fruit”—those projects that can be implemented most affordably and programs that can be done through existing agency and organizational resources. For infrastructure improvements, this is most easily accomplished by coordinating with other land-use and transportation activities:

- **Coordination with the Land-Development Process:** One of the methods by which the Plan will be implemented is through development or redevelopment projects. The implementation of this Plan depends, in part, on land-use regulations to control the manner in which bicycle and pedestrian facilities are included. Land-use regulations can encourage/require provision of pathways and bike lanes as part of the land-development process, just as they require provision of streets and sidewalks. Likewise, bicycle racks and other end-of-trip facilities are easiest to accomplish when are of initial planning.
- **Coordination with Multimodal-Transportation Projects:** In addition to coordinating with the land-development process, the Plan will also be implemented through multimodal-transportation projects funded through the WILMAPCO Transportation Improvement Program. The U.S. DOT policy—*Accommodating Bicycle and Pedestrian Travel*—states:
  - Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:
    1. Bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.
    2. The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding 20% of the cost of the larger transportation project.
    3. Where sparse population or other factors indicate an absence of need.

A more proactive approach may be warranted for higher-priority infrastructure projects identified by the implementing agencies—DeIDOT, City of Newark, and University of Delaware—in coordination with the Newark community and Newark Bicycle Committee. The Plan recommends emphasis be placed on ***Nonmotorized Transportation Priority Areas (Map 8)*** scored using the following scoring criteria (1 point for each criteria met unless noted):

**Proximity to major attractions**

- Within ¼ mile of shopping or commercial land use
- Within ¼ mile of a park, trail, library, or community center
- Within 1 mile of a school
- Within ¼ mile of a transit stop
- Within municipality

**Fills a gap**

- Completes gap in non-motorized transportation network
- Completes portion of regional greenway, e.g., East Coast Greenway

**Population affected**

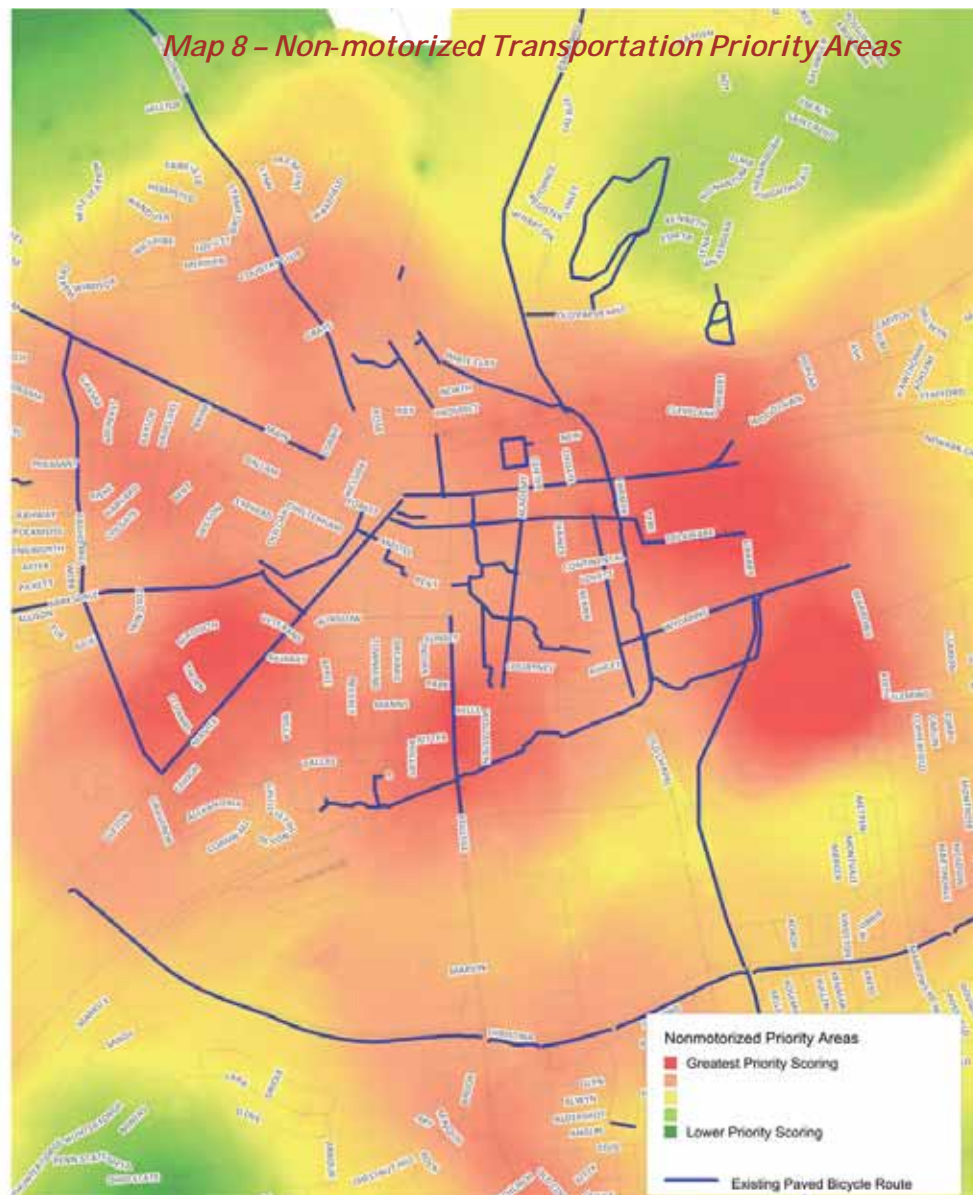
- Composite population and employment density (8+ units/acre)
- Environmental justice/transportation justice (areas with concentrations of minority and low-income/elderly, persons w/disability and zero-car households)

**Safety**

- Concentration of pedestrian and bicycle crashes [*Up to 4 points depending on number of crashes and crash rate*]

**Other impacts**

- Private development approved for adjacent portion of block(s)
- Strong community support
- Right-of-way available



## Evaluation

Progress toward meeting the goals of this Plan should be evaluated by the City of Newark, WILMAPCO, and Newark Bicycle Committee on an annual basis using qualitative and quantitative measures and updated periodically to reflect changing conditions and priorities. Goals and evaluation measures are as follows.

### *Improve bicycle transportation network.*

The annual review should measure progress at completing the bicycling network. Current progress is as follows:

Facility Type (miles)	2013 Existing	2013 Proposed	Total	Percent Complete
Bicycle Lanes	19.2	4.5	23.7	81%
Sharrow/Lane Mix	0.0	0.6	0.6	0%
Sharrow	1.2	3.1	4.3	28%
Off-road Pathway	11.0	8.5	19.5	56%
Cycle Track	0.0	0.7	0.7	0%
Sidepath	12.6	1.9	14.5	87%
Pathway, unpaved	11.0	0.0	11.0	100%

An objective of the Plan is to provide access within ¼ miles of network for all residents. As shown on *Map 9*, currently most residents within municipal Newark have access to the network with a few exceptions in the neighborhoods of Christianstead, Covered Bridge Farms, Woodlawn Ave., and The Hunt at Louviers. Outside the municipal limits, many residential areas lack access, including the Kirkwood Highway corridor to the northeast, and Otts Chapel Road and West Chestnut Hill Road to the southwest.

### *Improve bicycle access to transit.*

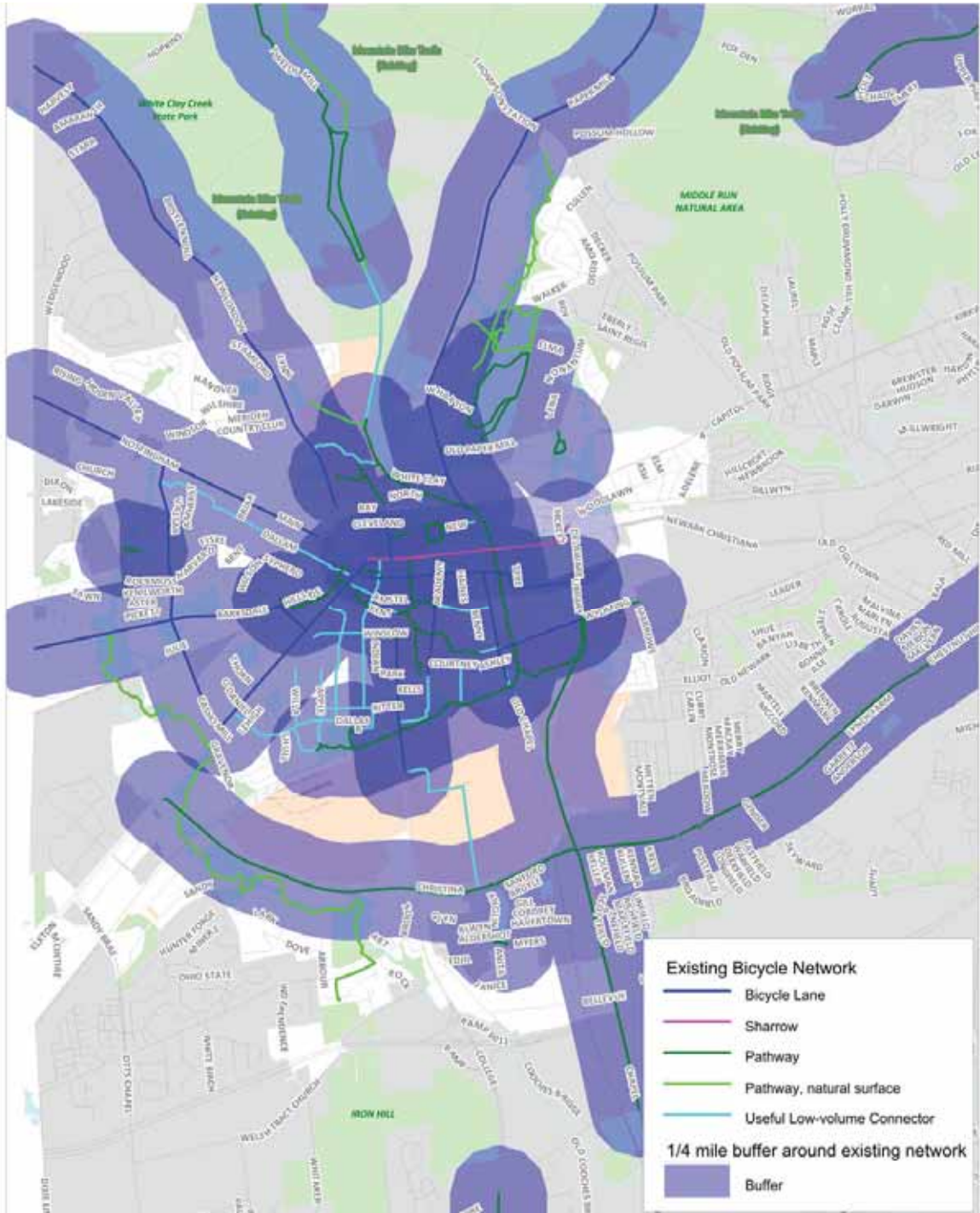
Currently, 22 DART bus stops within municipal Newark are located beyond ¼ mile from an existing bicycle facility. Newark, DART, and DelDOT should monitor this and seek to improve access to these stops. At the three primary transit centers in Newark, Newark Train Station, the SR 4/896 Park & Ride, and the Newark Transit Hub, bicycle lockers are 100%, 75%, and 50% fully occupied, respectively. Newark should work with DART to increase bicycle locker space at the Train Station.

### *Encourage adequate and secure bicycle parking at all major trip destinations.*

Beyond the changes to the bicycle-parking zoning under consideration in the fall of 2013, Newark should continue to improve the bicycle requirements to ensure that the recommended designs are being installed with new development.

Newark should also monitor the installation of new or upgraded bicycle racks, particularly at Newark High School and major commercial centers. The Newark Bicycle Committee should also inventory and monitor the number of existing bicycle racks. On campus, there are currently 416 racks with a total of approximately 1,000 spaces.

*Map 9 - ¼-Mile Buffer Around Existing Bicycle Lanes and Pathways*





***Improve safety for bicycling through design, maintenance, and enforcement practices.***

Newark should monitor the implementation of programs aimed at promotion and enforcement of safe cycling. Some notable achievements in 2013 include:

- Six Bicycle Safety Checkpoint events held
- Bicycling training classes offered by University Police, City of Newark/Trailspinners, and White Clay Bicycle Club/League of American Bicyclists
- Bicycle-maintenance classes offered by Newark Bike Project

In addition, City of Newark, DeIDOT, and WILMAPCO should continue to monitor the number and rate of bicycle crashes and seek to reduce their occurrence. In 2011, 22 bicycle crashes occurred within Newark, including 17 injury crashes, none of which were fatal.

***Incorporate bicycle elements into land-use and development planning.***

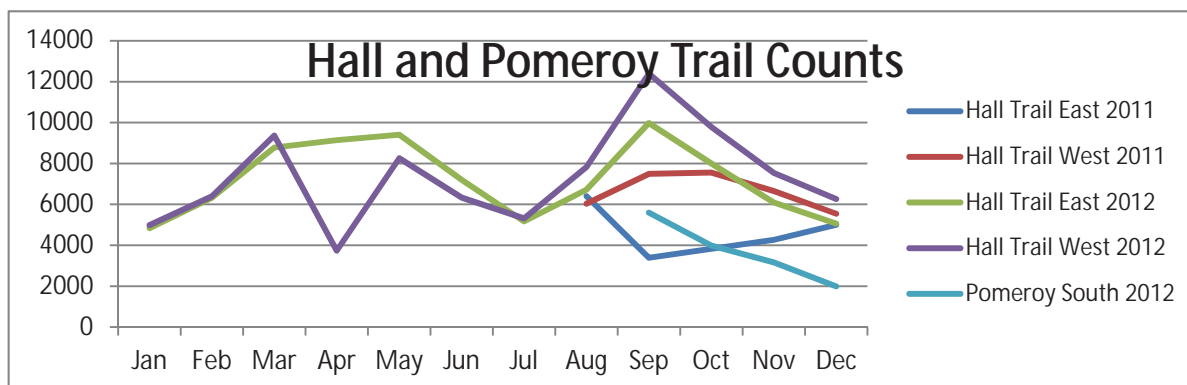
City of Newark Planning and Development Department should continue to monitor development proposals to ensure that they meet or exceed zoning requirement for bicycle parking, that bike racks are conveniently located close to main entrances, and that design fully supports the bicycle frame. Newark should encourage developers to exceed minimum requirements, including provision of covered or inside parking and end-of-trip facilities such as showers or lockers.

***Develop implementation plan.***

Newark should continue to expand community and agency involvement in Newark Bicycle Committee, including development of an annual work program and identification of priorities.

In addition, Newark should work with DeIDOT, WILMAPCO, and State Parks to monitor use of facilities and mode share of bicycle commutes. To do this, all WILMAPCO intersection counts now include bicycle counts, and DeIDOT is encouraged to do this as well.

In addition, three trail counters that count bicycles and pedestrians are located along the Pomeroy and Hall trails; the two located on the Hall Trail averaged 30 users per hour, while the Pomeroy averaged 16 users per hour in 2012. In 2012, annual counts were Hall Trail East—86,690, Hall Trail West 2012—88,180, and Pomeroy South—14,723 (from September through December).



### Quick-Response Actions

Several priority short-range actions were identified through community feedback during the Plan's development. A number of these have been implemented based on this feedback, including:

- ***Sharrows on Main Street.*** The most prevalent comment heard during early phases of the Plan development was the desire to see westbound bicycle facilities along or near Main Street. Based on the strong community desire for improved bicycle access to downtown Newark, the City installed sharrows on Main Street in May 2013. Updated "Bikes May Use Full Lane" signs were also added. Plans are underway to install additional sharrows on other priority corridors.
- ***Street sweeping improvements.*** Public workshop attendees commented on the accumulation of debris in bicycle lanes. As a result, Newark Public Works Department has adjusted the street sweepers to reduce debris observed in bicycle lanes. This City encourages community members who observe debris accumulations to report it at [www.cityofnewarkde.us/requesttracker.aspx](http://www.cityofnewarkde.us/requesttracker.aspx) or by calling 302-366-7040.
- ***Bollard improvements.*** Bollards on pathways serve to keep unauthorized vehicles out while allowing service and emergency access. During the first public workshop, several attendees commented that the black bollards were difficult to see, particularly at night. As a result, Newark Parks and Recreation has painted bollards bright yellow and added reflective tape.
- ***More bike racks downtown and on campus.*** Lack of sufficient bicycle parking was identified as an issue in both the University commuting survey and public workshops. While more bicycle parking is still needed, some steps have been taken to address this concern. In 2012 bicycle racks were added to Main Street between Chapel Street and the University Green. The University received an \$80 thousand grant for bicycle parking in 2013; working with the Newark Bicycle Committee, the University has installed additional parking where needed and has also begun converting older-style racks to the preferred inverted-U style.
- ***Bicycle repair stands on campus.*** In November 2013, six bicycle repair stations were installed on campus at Morris Library, UD Creamery, Kirkbride Hall, and Independence, Thompson and Rodney residence halls. Newark Bike Project has produced a helpful video to demonstrate how stands can be used. Stands include a manual air pump, screwdrivers, straight screwdriver, wrenches, and a tire lever.
- ***Bike-Parking Ordinance adopted.*** In September 2013, Newark City Council approved amended requirements for bicycle-storage facilities as part of new development and redevelopment plans, based on community desire to see a better link between bicycling and land use. This change strengthened the ordinance by increasing the ratio of bicycle spaces to off-street spaces, removing the maximum bicycle parking requirement, and providing the City greater flexibility to work with developers.

*For more information visit*

[www.wilmapco.org/BikeNewark](http://www.wilmapco.org/BikeNewark)

*or contact*

City of Newark

220 South Main Street, Newark, DE 19711

(302) 366-7030

