Chapter Two: Township Wide Greenways Plan

Purpose, Goals and Objectives

The purpose of the New Garden Township Greenway Plan is to:

1. Conduct a study of the community and effectively identify and delineate existing natural areas, "green corridors" and other greenway enhancement opportunities within the community;
2. Develop a set of planning policies for how natural areas, roadways, and easements may be utilized and appropriately integrate these policies within the comprehensive plan;
3. Articulate acquisition policies for obtaining greenway areas for a variety of public benefits; and,
4. Examine municipal ordinance provisions to ensure compatibility with Chester County planning and ensure that greenway areas are appropriately protected as important natural features for the benefit of the public.

Greenway Plan Goals include:

- Identify township destinations, existing trails, and potential connections to regional facilities located in adjacent municipalities;
- Identify potential greenway / trail types;
- Identify preferred trail route(s) and trail support facilities such as Township destinations, developments with existing sidewalks, new developments, and other trail facilities; and,
- Identify project partners for greenway implementation.

Greenway Plan Objectives include:

- Correlate information gathered from this and other studies into a single comprehensive study;
- Identify key issues, opportunities and constraints for greenway development;
- Map alternative trail alignments;
- Specify construction requirements (per facility type) and prepare an estimate of probable development costs;
- Provide measures for the preservation of natural areas found along stream corridors; and,
- Prepare an implementation and funding strategy, including the identification of potential funding resources.

Inventory & Analysis

Data Collection & Methodology

Data found within this report were compiled from many different sources, including previous planning efforts summarized later in this chapter, and new field reconnaissance data provided by the consultant.

Geographic Information System (GIS) base map information was obtained from New Garden Township's GIS department. Field maps were prepared from the GIS database consisting of the base aerial photography and other identifying features. The consultants performed initial field reconnaissance on 3/27/08 and 5/1/08 to inventory, analyze and document existing conditions. Field data were recorded by the consultant onto the field maps, and photographs were taken of existing site conditions for use in the evaluation process of the trail alignment alternatives. Additional field visits were performed to field check proposed alignments and verify existing conditions during the conceptual trail alignment design phase.

The Township assembled a study committee to represent a diverse cross section of the community. This committee provided valuable insight and direction to the consultant for development of the plan. In addition to the site visits, a series of public meetings and study committee meetings were held throughout the planning process. These meetings provided additional information and community feedback that contributed to the development of the New Garden Township Greenways Plan.

The completed Final Greenways Plan, GIS mapping was forwarded to the Township to be utilized for future planning endeavors. It should be noted that a topographic survey of existing conditions must be prepared for any specific trail sections prior to commencing design development and construction documentation.

Natural Resources

The Natural Resources Inventory found within New Garden Township's Comprehensive Plan provides a thorough and detailed description of the environmental and physiographic features. The following are generalized descriptions of those features that directly impact greenway and trail development. Graphic excerpts from the Comprehensive Plan illustrating the locations of these features and/or resources are on the following pages.

The **Chester County Natural Areas Inventory (NAI)** prepared for the Chester County Planning Commission in 1994 has one identified location in the northwestern portion of the township. The NAI identifies the East Branch of the White Clay Creek from its source to the Borough of Avondale as being an

exceptional value stream as identified by the Pennsylvania Department of Environmental Resources (currently the PA Department of Environmental Protection or DEP), and maps this area as a 'High Gradient Clearwater Creek' natural community within the NAI document.

The only published **Pennsylvania Natural Diversity Index (PNDI)** site within New Garden Township is located within privately-owned property on the Township's eastern border with Kennett Township. Please refer to the 'Steep Slopes, Woodlands, Ponds, and PNDI Sites' exhibit on page 10. The performance of PNDI searches are now required for all DCNR Community Conservation Partnership Program applications and is recommended for all future development of trail or greenway facilities. This search may be performed online at the following website:
http://www.naturalheritage.state.pa.us/

Hydrology & Soils

The 'Floodplain Wetlands Hydric and Alluvial Soils' exhibit (p.9) from the Comprehensive Plan indicates the locations of the natural features associated with the township's hydrology. These locations represent the township's most sensitive natural areas that may be affected by increased stormwater runoff as a result of new developments. The Red Clay Creek and White Clay Creek watersheds boundary can be generally defined as following Newark Road from the northern township line south to its intersection with Route 41, then southeast along Route 41 to the township line in the southeast. Floodplains, wetlands and hydric & alluvial soils provide physical limitations to development, but also provide important ecological functions relative to water quality, erosion and sedimentation control, and wildlife habitat.

Topography & Woodlands

The 'Steep Slopes, Woodlands, Ponds, and PNDI Sites' exhibit (p.10) indicates the locations of slopes in excess of 20% as well as significant woodland stands. Township-wide topography can be generally characterized as rolling with significant relief differences that must be considered for locating potential trail alignments and selecting the most appropriate trail type as described later in this chapter (hiking or multi-use). Steep slope areas in excess of 20% are typically undevelopable by default, and with existing woodland stands often associated, these areas serve as important wildlife habitats. The highest concentration of steep slopes is located along the main branch of the White Clay Creek in the southwestern corner of the Township. The remainder of steep slope areas are associated with the stream valleys and along the northern side of Baltimore Pike.

Manmade Resources

Land Use

The Existing Land Use Inventory found within New Garden Township's Comprehensive Plan provides thorough description of the Township's existing land uses and their planning implications. Agriculture and Woodlands comprise the highest percentage of land area (36.6%) within the Township, with Residential (35.2%) and the Mushroom Industry (14.7%) rounding out the top three. Residential land uses are predominantly single family detached dwellings indicating a pattern of suburban sprawl. Residential and agricultural land uses are evenly distributed throughout the Township, while the Mushroom Industry lands are generally located nearest the adjacent Borough of Avondale and along Baltimore Pike. Future land use recommendations include encouraging denser residential development and infill around existing villages and providing resource protection areas nearest the most sensitive natural resources.

Developable Parcels

A shown on the following 'Open Space' exhibit (p.12), there are a number of developable parcels exceeding five (5) acres in size where the majority of future land development is likely to occur. These lands become opportunities for trail building through the land development process. Also shown on the 'Open Space' exhibit are Township-owned and protected lands that could become destination points for the greenway system.

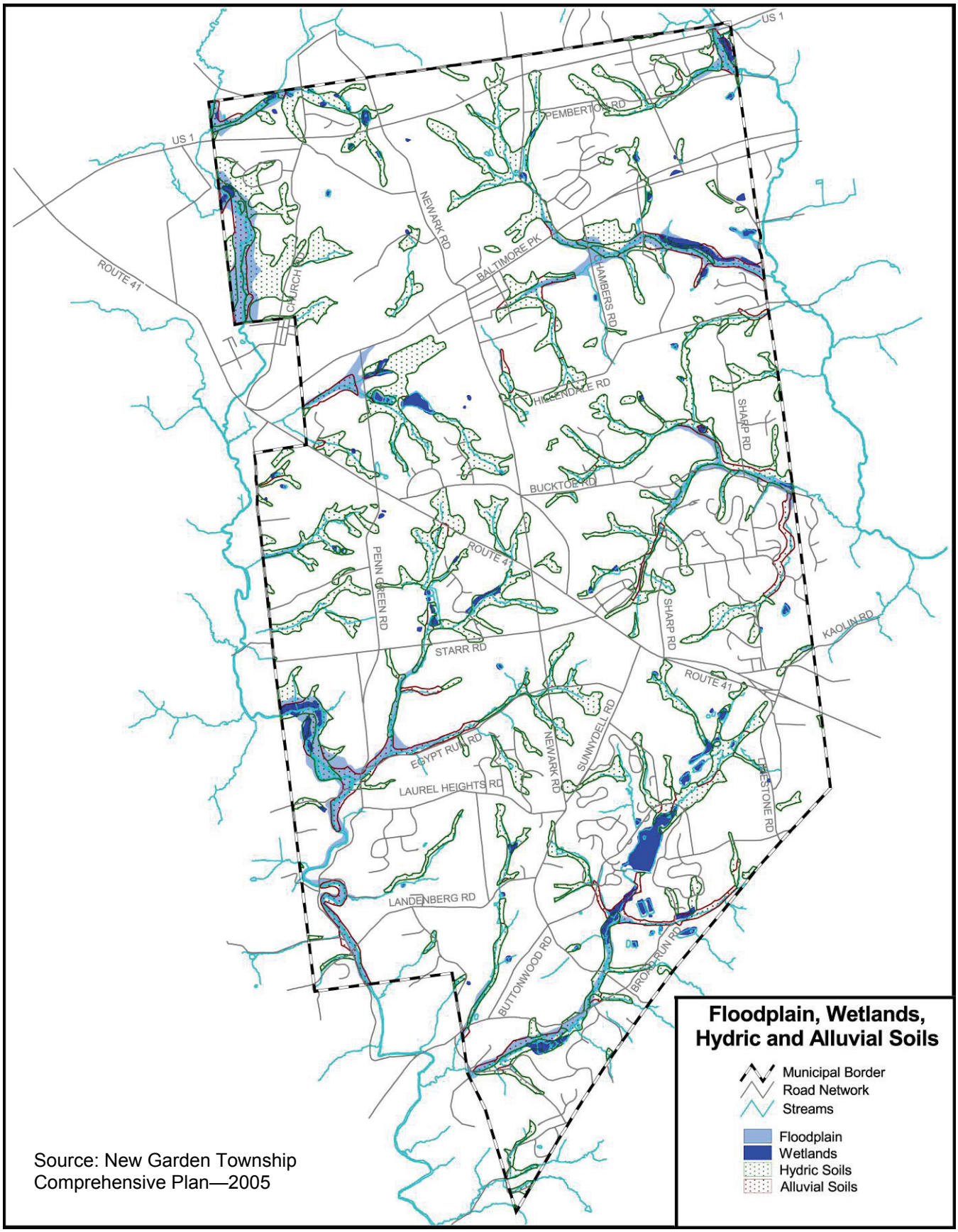
Opportunities and Constraints Summary

Opportunities:

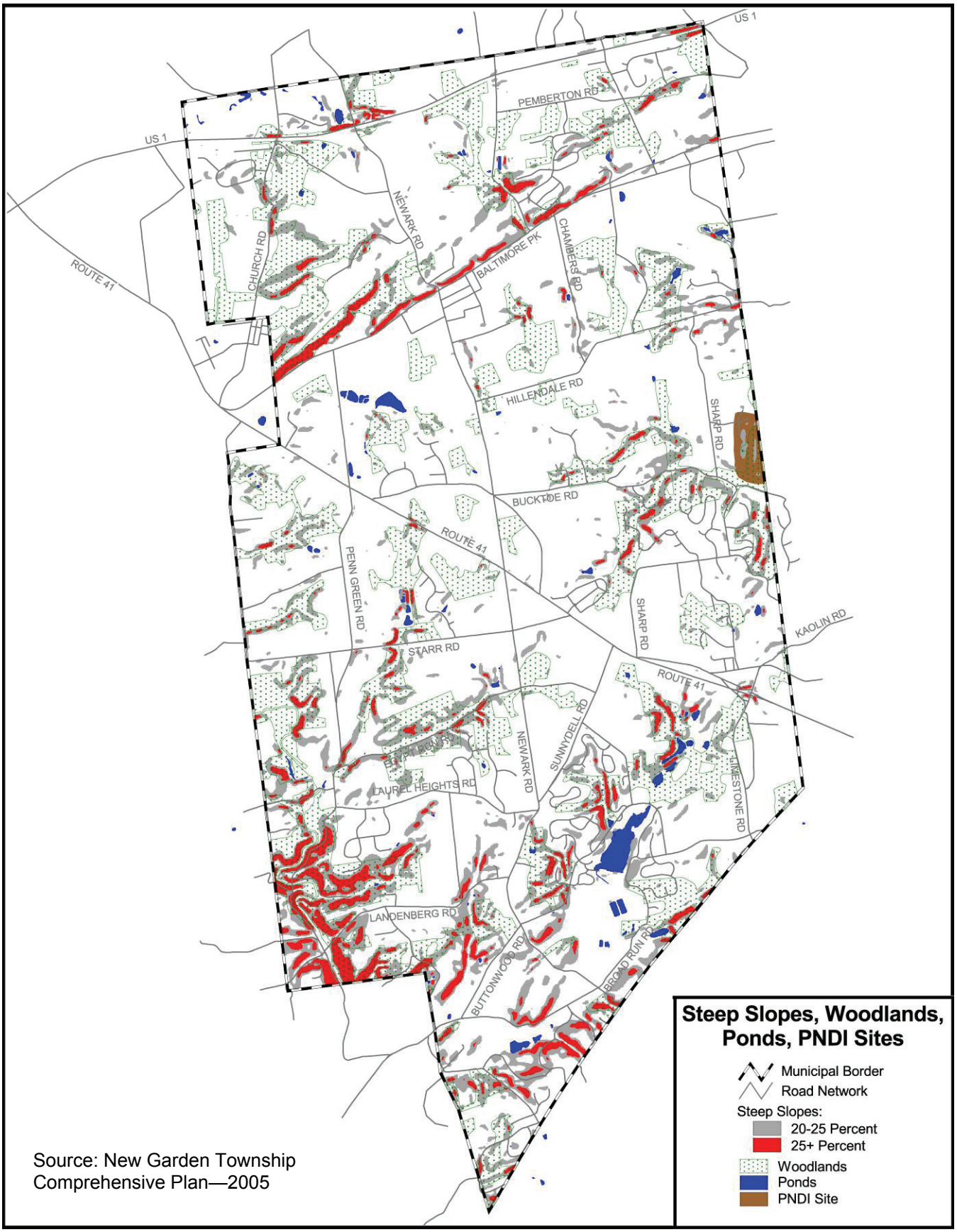
1. The White Clay Creek Corridor provides unique opportunities for both recreation access and historic interpretation with the former railroad line that passes through this valley;
2. The existing active railroad line passing through the village of Toughkenamon may provide a future opportunity for a rail-trail to connect to many of the adjacent municipalities in southern Chester County;
3. New roadway construction projects resulting from increased development and the need to handle higher traffic volumes offer the best opportunity for on-road bike route development; and,
4. The residential and/or commercial land development process offers the most significant opportunity for off-road greenway/trail development.

Constraints:

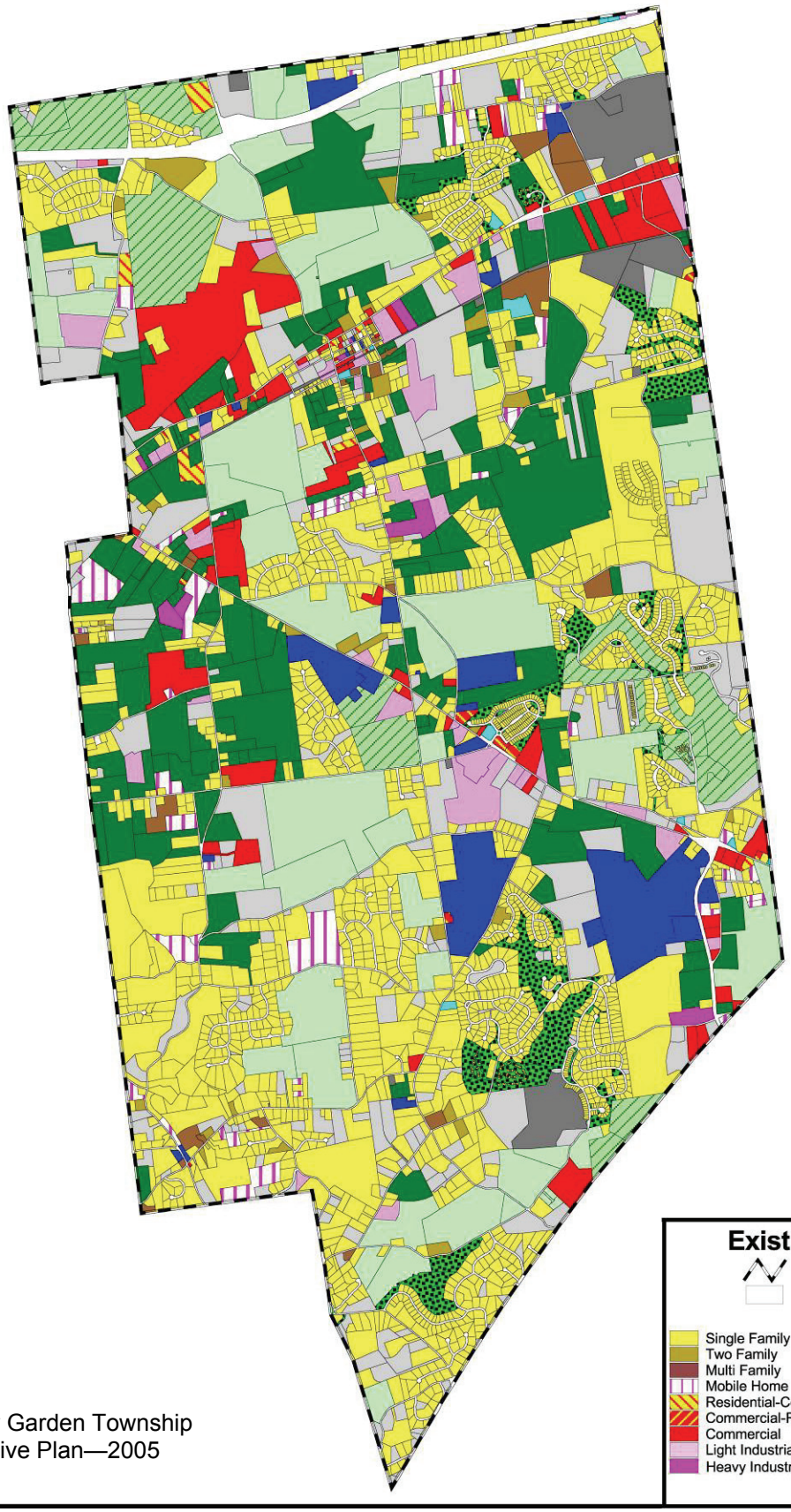
1. Existing roadways with minimal or no shoulders and steep topography limit opportunities for bike route development;
2. Existing residential land developments are relatively isolated with few having existing sidewalks allowing them to plug into a larger system of bicycle and pedestrian facilities; and,
3. Acquisition of property through either easements or outright purchase will be necessary where proposed trail alignments will impact private property.



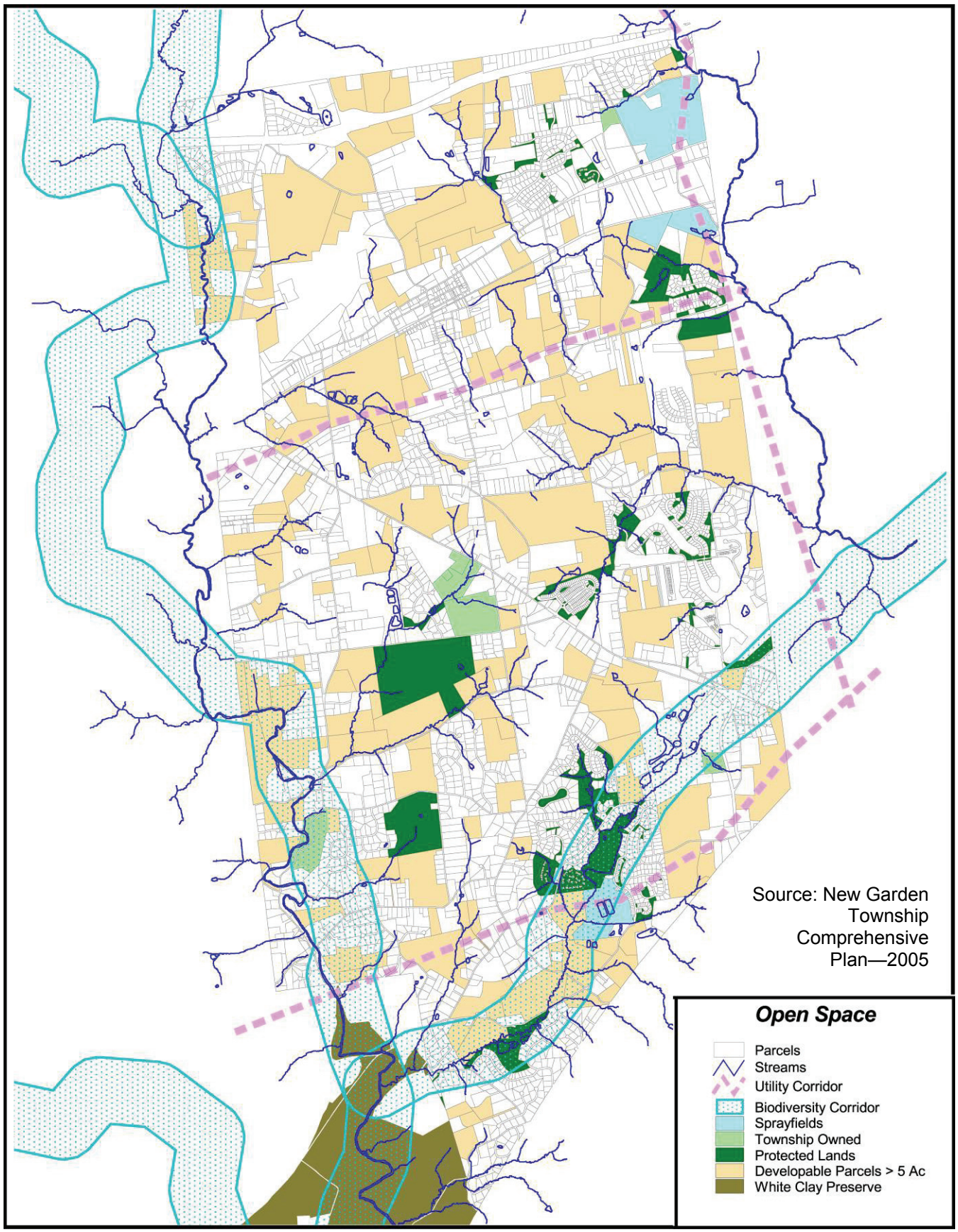
Source: New Garden Township Comprehensive Plan—2005



Source: New Garden Township Comprehensive Plan—2005



Source: New Garden Township Comprehensive Plan—2005

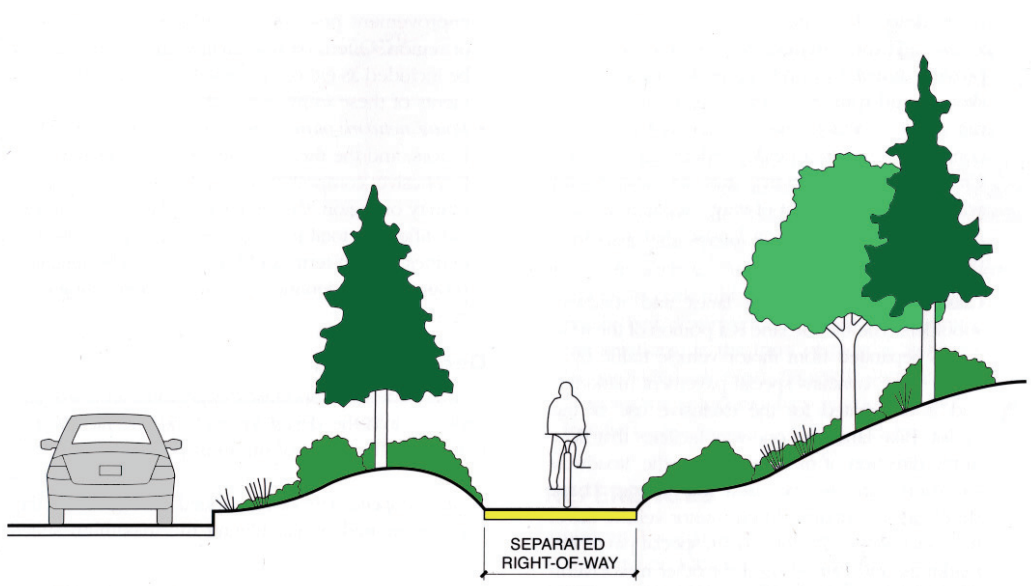

Source: New Garden Township Comprehensive Plan—2005
Open Space
Parcels
Streams
Utility Corridor
Biodiversity Corridor
Sprayfields
Township Owned
Protected Lands
Developable Parcels > 5 Ac
White Clay Preserve

Greenway Network Development and Mapping

Trail Types – Descriptions

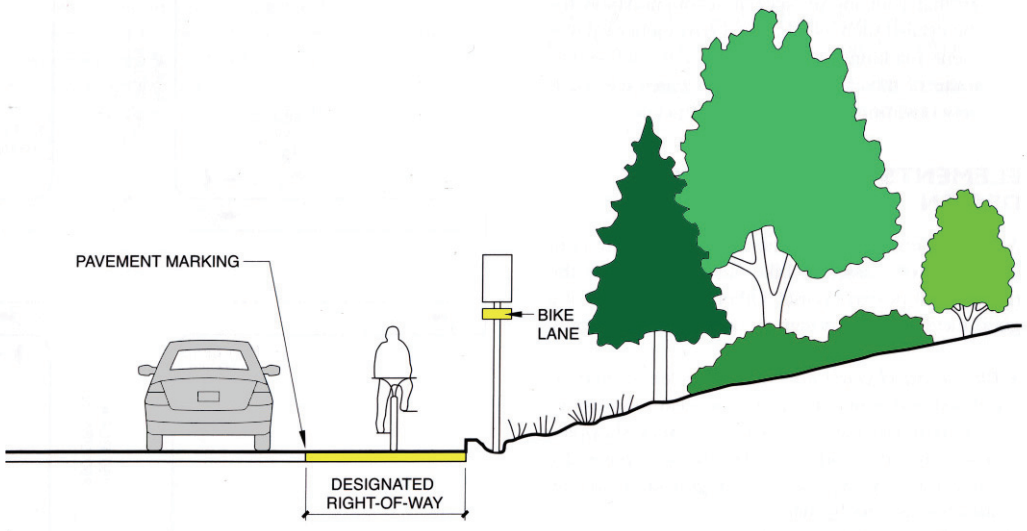
Bikeway Classifications

The following are nationally recognized bikeway classifications as per the American Association of State Highway Transportation Officials (AASHTO). These classifications are specific to bicycle transportation routes and do not include other pedestrian facilities such as sidewalks and off-road hiking trails which are described later in this chapter.



BICYCLE PATH (CLASS I)

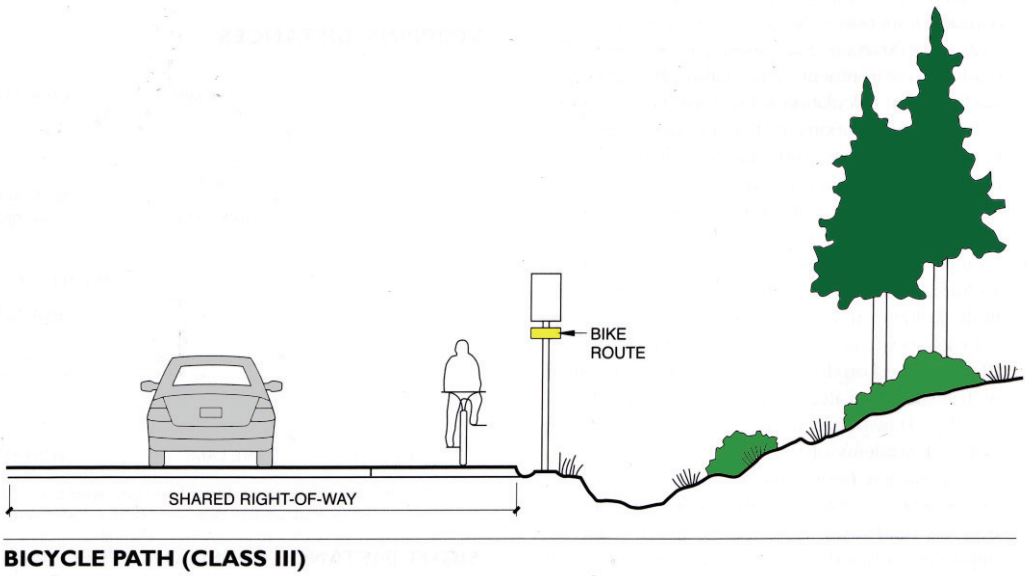
Class 1 Bikeways are completely separated from the roadway. They are also known as 'off-road trails', 'greenways', 'shared use paths', and/or 'multi-use paths'.



BICYCLE PATH (CLASS II)

Class 2 Bikeways are designated bicycle lanes within a roadway for exclusive use of the cyclist and contains special pavement markings and signage. Bike lanes are one-way in the direction of motor vehicle traffic. The common standard width for a bike lane is five (5) feet.

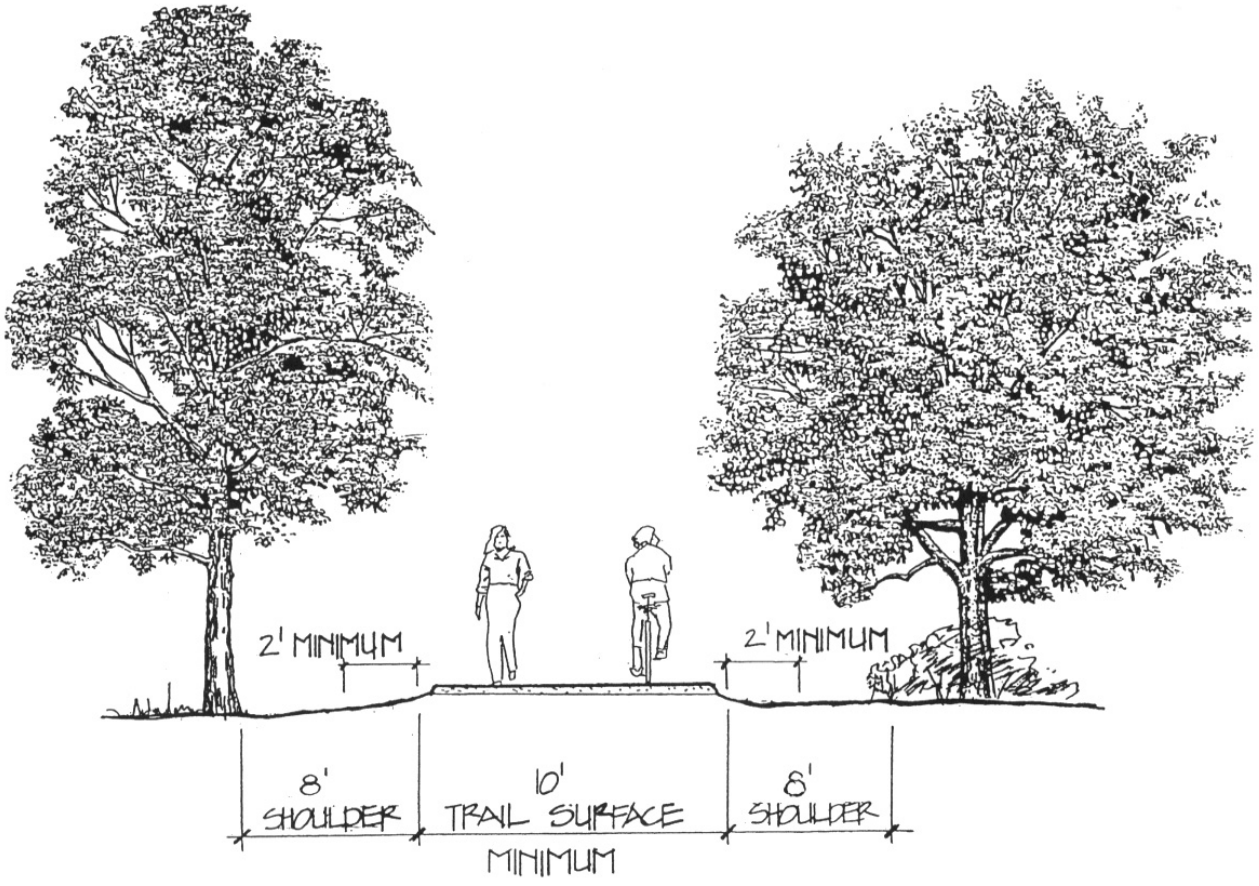
Class 3 Bikeways are also known as 'Bike Routes'. These offer no special accommodations for the cyclist within the road right-of-way. Signs are used to define the route and the cyclist shares the roadway with vehicular traffic.

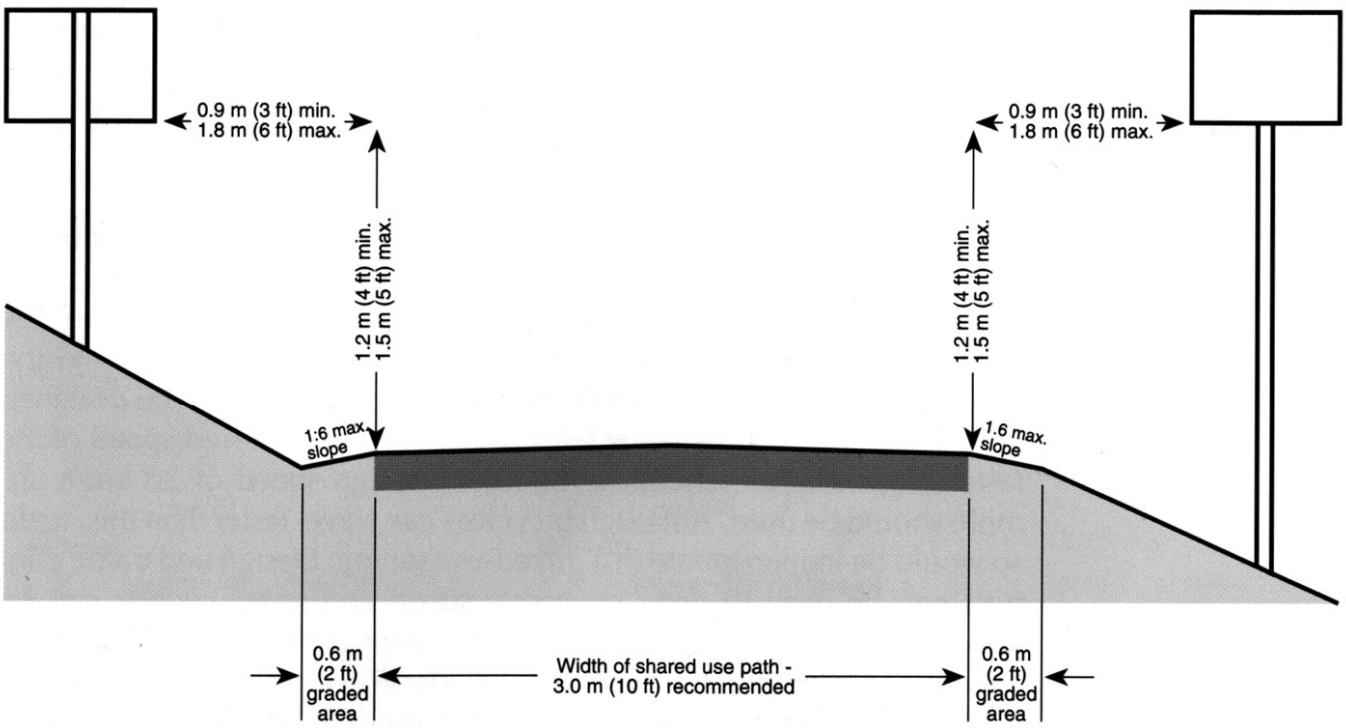


BICYCLE PATH (CLASS III)

(Source: AASHTO - *Guide For Development of Bicycle Facilities)*

Multi-Use Trail (Off-Road)





Cross Section of Two-Way Shared Use Path on Separated Right-of-Way

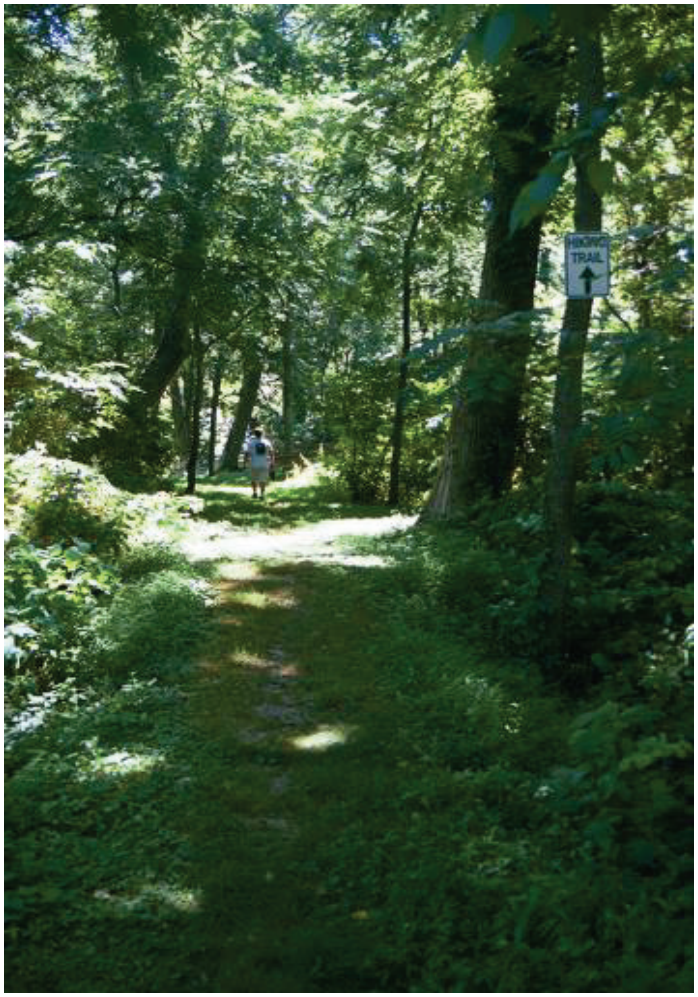
The trail type that provides for the largest population of users is a Multi-Use Trail, also known as Class 1 Bikeways (as described above). The following paragraphs provide a nationally recognized definition of a Multi-Use Trail and its typical design criteria.

The American Association of State Highway and Transportation Officials (AASHTO) defines a Multi-Use Trail or Shared Use Path as: *a bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users*.

As the definition suggests, this trail type provides for a variety of trail users, depending on the trail surface paving and available right-of-way width. Another general trait of multi-use trails is universal accessibility for those with disabilities. This is due to gentle slopes, adequate widths, and smooth surfaces. Parking areas for multi-use trail segments should provide facility access in accordance with the Federal Americans with Disabilities Act (ADA) guidelines to provide for trail users with disabilities.

Both the Rails-to-Trails Conservancy (RTC) and AASHTO recommend a multi-use trail to be ten feet (10') wide, with the minimum width for a two-way trail at eight feet (8'), and for a one-way trail at five feet (5'). Depending on the user

volume, widths of twelve feet (12') or fourteen feet (14') are recommended to avoid potential conflicts. An additional two-foot (2') shoulder is recommended on either side of the trail surface to provide clearance from trees, poles, walls, fences or any other lateral obstruction. Site conditions may warrant additional safety measures such as fencing and increased shoulder widths.



Hiking Trail example.

Hiking Trails

A hiking trail may be defined as a recreational trail that does not meet the design requirements of a multi-use trail such as width, slopes & surfacing. An advantage of hiking trails is that they can allow for access and recreational use of the land quickly at a relatively low cost. A disadvantage of hiking trails is that they generally limit the number and type of trail users due to minimal width, steeper slopes, and softer surfaces, and generally do not meet ADA requirements.

Trail Surfaces

Asphalt or macadam surfaces provide for the widest variety of trail users including bicyclist, walkers, joggers, wheelchair users, and in-line skaters. Initial installation costs are relatively high compared to other trail surface types. However, long term maintenance costs will remain lower than others if properly installed and maintained.

Crushed limestone surfaces can accommodate all trail user types with the exception of in-line skaters. Initial installation costs for this trail surface are relatively low, however long term maintenance costs increase due this surface's higher susceptibility to erosion, especially if not properly installed with swales and cross drains. A crushed limestone surface can also serve as base material for an asphalt surface if trail use increases or funds become available for a surfacing upgrade.

Compact earth surfaces are the least expensive to install, however they limit the types and number of trail users. Compact earthen surfaces are primarily used for hiking only or horse trails adjacent to multi-use trails that receive significantly less trail user volume. Hiking trails may be considered as an

alternate means to reach the more environmentally sensitive areas found within the floodplain area to provide routes to the river for environmental education, bird watching, or fishing access.

Trails and many other recreational facilities are commonly developed within floodplains to take advantage of the relatively flat land. These trails may require additional maintenance to remove debris deposited by a flood event. If a trail is placed where flood waters will have a significant erosion effect, asphalt surfaces are recommended. Trails should not be located within a river's *floodway*, which is where the most significant flood damage occurs.

Sources:

- *Guide For Development of Bicycle Facilities*, American Association of State Highway and Transportation Officials (AASHTO), 1999;
- *Trails for the Twenty-First Century: Planning, Design, and Management Manual for Multi-Use Trails*, Rails to Trails Conservancy (RTC), 1993.
- *Statewide Bicycle & Pedestrian Master Plan, Bicycling & Walking in Pennsylvania – A Contract for the 21st Century: Bicycle Guidelines*, Commonwealth of Pennsylvania Department of Transportation

Advanced bicyclist.

Bicyclist Types

The American Association of State Highway and Transportation Officials (AASHTO), and the Pennsylvania Department of Transportation (PennDOT) both classify bicyclists into one of the following three groups:

Group A – *Advanced Bicyclists* – These riders generally use their bicycles as they would a motor vehicle. They are riding for transportation, convenience, and speed and want direct access to destinations with a minimum of detour or delay. They are typically comfortable riding with vehicular traffic. They prefer a sufficient operating space on the travel way or shoulder to eliminate the need for either themselves or a passing motor vehicle to shift position.

Group B – *Basic Bicyclists* – Less confident adult riders may also be using their bicycles for transportation purposes, e.g., to get to the store or to visit friends, but prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and shared use paths and prefer

designated facilities such as bike lanes or wide shoulder lanes on busier streets.

Group C – *Child Cyclists* – Riding on their own or with their parents, child cyclists may not travel as fast as their adult counterparts but still require access to key destinations in their community, such as schools, convenience stores and recreational facilities. Residential streets with low motor vehicle speeds, linked with shared use paths and busier streets with well-defined pavement markings between bicycles and motor vehicles, can accommodate children without encouraging them to ride in the travel lane of major arterials.

It is estimated that only 5% of bicyclists overall would qualify as Group A or Advanced Bicyclists, therefore 95% fall into either Group B or C.

(Source: AASHTO - *Guide For Development of Bicycle Facilities)*

Child cyclist.

Greenway Destinations

The first step in creating a township-wide trail system is to identify potential destinations. In addition to township-owned parcels, parks, schools, and public open space, other locations such as shopping centers, employment centers, and regional recreation attractions are typically considered for inclusion as destinations. Neighborhoods with sidewalks were inventoried by reviewing aerial photography and added to the 'Site Inventory' exhibit found in the report appendix. Although few, these neighborhoods have existing bicycle and pedestrian facilities that may be used to plug into a larger township wide system. Larger privately-owned land tracts that offer the potential for future trail development to provide missing links between other destinations were added to the Site Inventory plan as well.

Preliminary Trail Alternatives

The next step in the analysis and development of a greenway trail plan is to inventory all possible trail alignment alternatives. These proposed alignments included both on-road and off-road connections. The majority of the off-road alignment alternatives were identified by the project committee. The on-road bike routes were identified by Chester County within the NGT Comprehensive Plan. Additional proposed alignments for study were suggested by the project committee and the public. Other alignments were added as part of the

The Hartefeld Community has existing sidewalks.

base mapping analysis and site reconnaissance performed by the consultant. Please refer to the 'Preliminary Trail Alternatives' exhibit found in the report appendix.

The initial alignment alternatives were compared to the information found within the GIS database, including parcel ownership and detailed aerial photography. This detail of base information was not available when previous plans were developed, and allowed for a more site-specific approach to determining the actual effects each proposed alignment might have on its surroundings. The following section provides a description of the general criteria considered to analyze the initial alignments.

Alignment Selection Criteria

The following criteria were used to determine whether or not a proposed alignment could or should be included in a Township-wide trails system.

Safety

All of the recommended alternatives studied are considered to have the potential to safely be included in the proposed system. Each of the on-road routes were cross referenced to existing traffic volumes and field verified for the actual roadway conditions. Some off-road connections were not field verified due to the inability for the consultant to investigate conditions on private property. These alignments should be checked at a later time for safety with respect to slopes and other miscellaneous conditions that would deem an alignment unsafe. This evaluation should be done by the Township where potential alignments can be investigated with permission of the private landowner.

Connectivity / Continuity / Level of Service

Each of the recommended alignments need to be capable of being part of a larger system and/or provide a level of service worthy of its development. An individual trail segment that does not provide a connection between destination points or does not plug into a larger system is not recommended.

Existing Sidewalks

Some of the Township neighborhoods have existing sidewalk systems. These neighborhoods were inventoried and identified on the trail mapping. This inventory of existing sidewalks was used to determine if a proposed pedestrian alignment was necessary or if it would simply be duplicating an existing facility.

Private Property Impacts
Parcel boundaries and ownership information within the GIS database provide a level of information that was not readily available in previous planning efforts. By reviewing the property ownership along any potential off-road alignment, the approximate number of potential impacts can be identified, assessed, and calculated to determine whether or not an alignment should be pursued.

Environmental Impacts
Trail alignments that have the potential for significant environmental impacts such as clearing of wooded areas, requiring significant grading, or disturb wetlands and/or any other sensitive ecosystems should be generally avoided.

Constructability / Cost
Engineering can provide solutions to almost anything; however the costs associated with providing an engineering solution may be unreasonable or cost prohibitive. Alignments that require significant engineering efforts and abnormal construction costs should be generally avoided - unless it is the only solution possible for a critical trail linkage.

Proposed Greenways Trail Plan

Through the existing conditions analysis, the public participation process, and discussions with the Study Committee, it became apparent that the Township needs to take advantage of the possibilities associated with new land developments and roadway improvements to provide the bicycle and pedestrian connections that are lacking between many of the destinations described herein and the Township's residential communities.

A few of the Township's newer communities have existing sidewalks, while the majority of others do not. Some existing roads have adequate width to allow for bike lanes or bike routes, while most do not. This plan proposes to fill those missing links between communities and destinations by recommending the following improvements.

Accessibility for the proposed greenways trail and other facilities should be designed in compliance with the ADA accessibility guidelines for outdoor recreation areas. These guidelines may be found at the ADA website: www.access-board.gov/PUBS/outdoor-rec-rpt.htm

Multi-Use (Off-Road)
These off-road alternatives are intended to provide safe local connections outside of the road rights-of-way between neighborhoods and destinations. These connections vary in length and proposed to be located within publicly-owned land or rights-of-way or within future land developments. Some of

Existing bridge abutments near Auburn Road.

Existing bridge abutments between the Phelps and Szymanski properties.

Pedestrian bridge on Brandywine Conservancy property.

these segments may already exist on an informal basis, or begin within Township-owned lands as hiking trails. If the demand and physical conditions warrant, these connections should be developed as full Multi-Use Trails or Class 1 Bikeways. Each of these proposed segments was estimated for costs as a Multi-Use Trail option. Construction requirements for these sections include site preparation & vegetation clearing, earthwork & drainage improvements, and a compacted limestone dust surface – at an estimated cost of $50 per linear foot. Asphalt surfacing would incur an additional $10-$15 per linear foot.

Bridges

There are two (2) significant trail bridges proposed to be located in the White Clay Creek valley along the former railroad alignment utilizing the existing remaining bridge abutments. The first bridge (approximately 200 feet in length with three spans) will be located immediately south of Auburn Road, and the second bridge (approximately 125 feet in length with two spans) is located partially within the Phelps property. A third set of existing bridge abutments is located within the Phelps/ Szymanski lands, but is not recommended for bridge development as the southern side has no potential for a trail connection.

The existing abutments for the two proposed bridges appear likely to be able to withstand the loads associated with a 10-12 foot wide trail bridge capable of carrying single unit trucks (10 ton maximum) for maintenance or emergency access. The Township must decide whether or not vehicular access will be necessary within this valley as it will determine both the engineering requirements and ultimately the type of bridge and improvement costs.

Engineering studies will need to be performed to evaluate the condition of the existing abutments and piers to establish the costs necessary for their rehabilitation. Permitting agencies (County

Conservation District, DEP and Corps of Engineers) will have to be contacted to identify waterway clearances and permits for stabilizing the foundations of abutments and piers - if necessary - and erection of the structure. These engineering studies and agency requirements will establish the basis for more accurately identifying the potential costs for the bridge construction. Note also that the type of material (wood or steel) will affect the cost of the installation and maintenance of the structure. For purposes of this study, Bridge #1 near Auburn Road could cost in the range of $250,000 and Bridge #2 connecting the Phelps and Szymanski properties could cost in the range of $160,000.

Township-owned former rail bed north of Auburn Road.

Hiking Trails

Hiking trails are the most easily developed trail types as they require the least amount of construction effort. Hiking trails are proposed for steep slope areas and other locations with sensitive natural features such as stream corridors. These hiking trails may be considered for use by mountain bikers where physically feasible and where this type of use will be considered acceptable by local user groups. Construction requirements for these sections include sensitive vegetation clearing and routing in wooded natural areas, primitive directional signage, and minimal wood chip or compact earthen surface improvements where necessary – at an estimated cost of $3 per linear foot.

Township Open Space parking in the Lavender Hill community.

On-Road Bike Routes

These improvements are geared towards the Group A or advanced bicyclists within the community. The roadways suggested for this network have the existing right-of-way available to provide for a comfortable riding experience for the advanced cyclist and would require only minimal improvements in most cases. Due to the traffic volumes associated with many of these roads, it is not envisioned that the Group B or C cyclists will feel comfortable on these routes even with the proposed improvements.

The Octarora railroad could be a future rail-trail linking many southern Chester County communities.

The Township will need to ensure that provisions for these routes be included in the roadway improvement design process. The Township may consider developing select roadway segments as a Class 2 Bikeway that includes designated bike lanes where the existing right-of-way width will permit and the projected amount of cyclists demand. Construction requirements for the Township cyclist routes are minimal, and include striping, signage, bike safe grates, and additional paving where necessary - at an estimated cost of $3 per linear foot.

Intersection Improvements

A total of seventeen (17) intersections were identified for improvements for the safe passage of bicyclists and/or pedestrians. There may be additional intersections that will require improvements and be identified during the design development process. Construction requirements for these intersection improvements may include crosswalk striping, pedestrian signalization, and/or additional signage. Because the existing conditions vary widely among these intersections, costs associated with these improvements are generally estimated at $10,000 per intersection. Additional information relative to safe pedestrian and bicycle improvements at intersections can be found at the 'Safe Routes to School Guide' website: http://www.saferoutesinfo.org/guide/index.cfm

Regional Connections

There are trail systems that are either existing or being planned within relatively short distances outside of the Township boundaries. These connections include:

- The Red Clay Creek trail system being planned by the Kennett Land Trust and Delaware Nature Society to the east in Kennett Township;
- The White Clay Creek loop trail system, including a connection to the White Clay Creek Preserve being planned jointly by London Grove, Franklin, and London Britain Townships to the south and west of New Garden; and
- The potential for a future rail-trail along the currently active Octorora railroad line that would connect many of the municipalities in southern Chester County to the east and west.

Legal Feasibility

Impacted Properties

This plan recommends both multi-use and hiking trail alignments primarily on lands that are currently undeveloped, however many proposed alignments are located within privately owned properties which will require property acquisition by the Township for trail development.

The alignments shown on the Greenway Trails plan are schematic representations of proposed trails and are not meant to indicate a final or engineered location. Care has been taken in the route selection process to not adversely impact any existing residential properties with routes passing through residents 'backyards'. It has also been clearly communicated through the public participation process that by no means will the Township pursue the acquisition of property for trail development by taking land through eminent domain.

This plan as a whole is a planning document that represents a vision for how the greenway system and associated trails can provide recreation and transportation alternatives as well as environmental protection. The implementation of this plan will occur over a multi-year period and progress at relatively the same pace as the projected population growth. The majority of proposed trail alignments are envisioned to be created through the land development process by requesting that land developers provide these proposed trails within their proposed development plans. Other proposed alignments outside of the land development areas will require the acquisition of right-of-way through either donation from a private landowner (preferred), fee simple purchase, or by acquiring a perpetual easement.

Easements that will be used for public trails are eligible for both state and federal funding – provided that there is a minimum 25 year term of use in the legal agreement. The acquisition of the easements would require an eligible entity – either a unit of government such as a municipality or county, or a competent non-profit organization partner.

Properties potentially impacted by proposed trail alignments can be identified utilizing the Township's GIS system and the existing parcel boundaries and property ownership information found within the GIS database.

The cost to acquire easements is difficult to estimate. The best method for determining what these costs may be would be to ascertain the average per acre real estate value of the land within which the proposed trail segment lies, multiply it by the amount of acreage to be purchased, and adjust it for the projected time of purchase. Easement values will likely differ from fee simple acquisition costs. The Township will only negotiate Greenway trail improvements with private property owners who wish to engage in specific agreements.

A model trail easement agreement has been developed by the Pennsylvania Land Trust Association that can be used by the Township as a starting point document for creating easement agreements where necessary. A copy of this model easement agreement can be found in the report appendix. Other trail and land conservation related tools can be found on the Land Trust's website: http://conserveland.org/ .

Former railroad abutments in Historic Landenberg Village.

The White Clay Creek.

Potential development site in New Garden Township.

General Liability Issues

Questions are often asked about the potential liability a landowner may have when located adjacent to a publicly used trail. The Pennsylvania Recreational Use Statute protects landowners who ease their property for trail use from general liability if their property is infringed upon as a result of the public use of the trail. This act does not prevent a landowner from being sued, however it does provide protection that has been upheld numerous times by Pennsylvania courts. A summary document of this statute prepared by DCNR can be found in the report appendix.

Boundary Surveys

Boundary surveys will be required for all proposed easements and/or purchases. The extent of each survey will be a matter of negotiation between the land owner and the Township.

For purposes of preparing construction documents, a centerline survey with cross sections of the trail alignment every fifty to one-hundred feet, (depending on topography and existing site features), will be the minimum necessary. All proposed bridge structure locations will also need to be completely surveyed.

Riparian Corridor Protection

Riparian corridors within the Township are exposed to ever increasing stress as new developments provide increased stormwater runoff. In addition to providing protection to the existing watercourses, riparian corridors or buffers also serve as wildlife corridors for the migration of birds and animals. Within the report appendix is an article entitled *"Introduction to Riparian Buffers"* which provides further explanation relative to the importance of riparian buffers, and how they can be repaired, created, and maintained.

New Garden Township's zoning ordinance contains a Flood Hazard District that provides protections to the areas defined by the FEMA Flood Insurance Study map boundaries and alluvial soils as defined by the USDA Soil Survey as an 'overlay' zoning district. This ordinance does not apply to the remainder of the streams that do not have established floodplains or known alluvial soils, leaving them virtually unprotected from the effects of land development.

The establishment of a Riparian Corridor Conservation overlay district will provide added protection to all known tributaries found within New Garden's watersheds. This overlay district can be spatially defined as a 160' wide (75' to either side of the 10' wide tributary) minimum buffer to any and all mapped tributaries as defined by the Township GIS system. The suggested dimensions to this overlay district are based on an existing Riparian Corridor Conservation District currently enacted in Worcester Township, Montgomery County, PA which serves as the model for this proposed ordinance. The dimensions and uses defined in the ordinance may be modified to suit the Township.

Please refer to the Riparian Corridor Conservation exhibit at the end of this chapter for a graphic representation of the district, and the report appendix for a complete list of permitted and conditional uses and other information defining this corridor.

Former railroad bed along Phelps property looking north.

New Garden Airport, looking west.

New Garden Elementary School.

Implementation Plan

Implementation Priorities

Proceed with the proposed improvements within the White Clay Creek valley in conjunction with the Phelps/Szymanski improvements - The Township will need to acquire the land to make the connection between the Township-owned portion of the former railroad alignment north of Auburn Road and Township-owned Phelps/Szymanski properties. Due to the existing conditions of the properties affected by the proposed alignment, it is recommended that the Township acquire this land via fee simple purchase or by obtaining a perpetual easement. Next, the Township should pursue funding for the design, engineering, and development of the trail and proposed bridge crossings. If construction funding for all proposed improvements is not available, the trail surfacing should be completed first, with the trail bridges to follow in a later phase or phases as funding becomes available. Proposed improvements to the Phelps/Szymanski properties are outlined in the following chapter of this document.

Construct a 'Safe Routes to School' demonstration project. The Township should actively pursue funding for a project by preparing applications to both the PA DCNR Community Conservation Partnerships Program (C2P2) Development grants program administered by DCNR and the federally-funded Transportation Enhancements Safe Routes to School program administered by PennDOT. This project could be used to provide a safe bicycle/pedestrian connection between one, if not both the New Garden Elementary and Kennett Middle Schools and the surrounding residential neighborhoods. DCNR grant applications are due in April while Safe Routes to School applications are subject to when funding becomes available. Please refer to the 'Potential Funding Sources' section of this chapter for more information.

Include bicycle and pedestrian facilities in all new residential and/or commercial land development projects and as part of any roadway improvement project programming and design. The adoption of this Greenway Plan as a component to the Township's Comprehensive Plan will ensure that the proposed bicycle and pedestrian facilities outlined herein will be considered where the proposed alignments coincide with future land development and highway improvement projects. This action will result in the establishment of the greenway system over time and a considerable savings to the Township as the construction funding for these facilities will often be the responsibility of the land developer or included within the budget associated with roadway plans.

Keep an eye on the opportunities to provide connections to regional trails and/or bikeway systems beyond Township borders. Extending the Township-wide system beyond its municipal boundaries will provide greater transportation and recreation alternatives for all residents. These opportunities may be explored jointly by forming multi-municipal agreements with the adjacent municipalities involved with the potential connections.

Adopt this Greenway Plan as an addendum to the Township Comprehensive Plan. By doing so, the Township will be able to establish a more authoritative position relative to the proposed improvements, recommendations, and implementation priorities described herein. The township may also consider amendments to both the zoning and subdivision & land development ordinances as well as the creation of an 'Official Map' to assist in the implementation of the proposed trail system. The township should refer to the *Trail and Path Planning: A Guide for Municipalities* publication developed by Chester County Planning for the technical guidance associated with these ordinance amendments.

Adopt a Riparian Corridor Conservation Overlay Zoning District. The model ordinance and corresponding riparian buffers mapping as described in this report will provide additional protection to the Township's natural resources in its most sensitive locations.

Project Partners

The following is a listing of project partners identified by the study committee and the public participation process.

- New Garden Township
- Chester County
- Schools
- Land Developers
- State Agencies (DCNR, PennDOT, DCED)
- Local Businesses
- White Clay Watershed Association
- Delaware Trail Spinners

Each of these entities will likely be involved with the promotion, funding, and/or implementation of the Township Greenway system. The Township will need to continue to lead the implementation process by applying for and securing grant funds for an initial demonstration project.

The Schools may also contribute to the early implementation projects associated with any Transportation Enhancements 'Safe Routes to School' program applications by offering their support and/or potential matching funds. Schools may also be used to promote the greenway through a 'walkabout' or a signage art program. A walkabout is where students and

residents can gather to demonstrate not only the greenway's contribution to providing safer routes to school, but also the greenway's recreational and interpretive educational opportunities.

Developers will be instrumental in the construction of the proposed trails where alignments are to be located within land tracts currently under land development review. Trails should be included within the development plans as required by the Township.

State agencies such as DCNR and DCED will be important sources for design/engineering and construction funding. PennDOT should be involved with the highway-related improvements projects. Local recreation groups and businesses can contribute through fund raising and/or by applying for funding as non-profit agencies.

Volunteer groups and associations play a very important role in the establishment of a greenway system as these local grass roots efforts are the ones that will help the Township to maintain, monitor, promote, and perhaps even develop many of the proposed trails. Approximately 25% of the near 100 public meeting attendees for the presentation of the DRAFT Greenway Plan recommendations indicated that they would be interested in joining a volunteer 'Friends of the Trail' type of organization.

Maintenance

Maintenance responsibilities for off-road trail sections could be assumed by volunteer 'Friends of the Trail' or similar groups, homeowners associations, or possibly by Township staff. Each of the trail operation and maintenance agreements will need to be developed on an individual basis by location and will determine the most appropriate entity to perform these tasks. Annual operations, maintenance and security guidelines for a typical trail can be found in the report appendix.

Maintenance costs are difficult to estimate as they vary greatly depending on the specific existing conditions associated with each trail. Good design and implementation techniques can significantly reduce maintenance costs.

The Rails to Trails Conservancy has published a document entitled 'Rail-Trail Maintenance & Operation' where over 100 rail-trails were surveyed for their maintenance requirements and costs. The report concluded that average annual maintenance costs are $2,000 per mile for a government run trail, $1,500 per mile for an average trail, and $700 per mile for a volunteer run trail. (weblink: http://www.railtrails.org/resources/documents/resource_docs/maintenance_operations_report.pdf).

Given these averages and the proposed length of multi-use trails proposed within this plan (12.5 miles), the annual maintenance costs could range

between $8,750 and $25,000. As with the development costs, it is not envisioned that these costs will be solely the burden of the Township as volunteer groups and/or homeowner associations are expected to contribute.

Estimate of Probable Development Costs

Below is a summary of the conceptual-level cost estimates to develop the proposed Township-wide bicycle and pedestrian facilities. These costs were developed by taking measurements from the GIS mapping/database and applying them to the unit costs as described in the section entitled 'Proposed Greenway Connections'.

Multi-Use Trail - (65,725 LF @ $50/LF) 12.5 mi. +/-	$3,290,000
Bridges (2)	$410,000
Hiking Trails – (65,980 LF @ $3/LF) 12.5 mi.+/-	$200,000
On-Road Bike Routes – (121,000 LF @ $3/LF) 23 mi. +/-	$365,000
Intersection Improvements – (17 @ $10,000 Each)	$170,000
Subtotal Improvements:	$4,435,000
Contingency (10%)	$444,000
Improvements Total:	$4,879,000
Design & Engineering (20%)	$976,000
GRAND TOTAL:	**$5,855,000***

**These costs do not include acquisition of properties and are based on estimated construction costs for 2008 including standard prevailing wage rates associated with the public sector. Costs will need to be adjusted at a rate of 3-4% for each year following to account for the general rate of inflation.*

It is not expected that the burden for funding these improvements will be the sole responsibility of the Township. In fact, many if not most of the proposed improvements should be developed as part of the land and/or roadway development processes where the funding is borne by the specific project budget and/or private land developer. The remainder of improvements can be funded through grant programs whereby the Township can leverage their municipal funds to achieve the maximum amount of improvements per Township dollar.

Potential Funding Sources

Surface Transportation Program (STP):
Eligible projects include the construction of bicycle transportation facilities; construction of pedestrian walkways; bicycle safety brochures, maps and public service announcements. Any bicycle project must be primarily a transportation project and STP projects should encourage desirable traffic patterns. Additionally, STP projects should sensitize people to environmental and social concerns. The Federal Highway Administration (FHWA) administers this program.

Ten percent of STP funds are set aside for Transportation Enhancements (TE). STP projects are not required to demonstrate impacts on traffic or transit.

Transportation Enhancements (SAFETEA-LU):
On August 10, 2005, the President signed into law the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The bill allocates approximately $244 billion nationwide over six years and includes funding for recreational trails and parks. In Pennsylvania, the Department of Transportation (PennDOT) administers several SAFETEA-LU bicycle and pedestrian related programs. Grant awards in excess of $1 million are not unreasonable for trail projects.

Typically, a non-federal match is required to be 20% of the grant award. A strategy preferred by PennDOT is to require the local partner to prepare construction documents and obtain necessary environmental clearances, property control documents and utility relocations plans as the local match for these “pre-construction” tasks - so that the project is ready for construction using the TE funding. The costs to prepare these documents can be the non-federal match to the TEA-21 funds, and does not necessarily need to be exactly 20% if all needed documentation can be completed for less. More information about this program can be found at the following link: http://www.fhwa.dot.gov/safetealu/summary.htm

PA Department of Transportation (PennDOT) Transportation Enhancements, Home Town Streets and Safe Routes to School Programs:
The PA Department of Transportation (PennDOT) “Hometown Streets & Safe Routes to School” program is to fund pedestrian and bicycle-related improvements in communities to improve safety, connectivity, and aesthetics for children to walk to school.

The program is an eligible project category of the “Transportation Enhancements” (TE) program with the funds originating from the Federal Highway Administration and administered through PennDOT in cooperation with the regional planning organizations across the state.

This program, like all FHWA programs requires that all federal and state environmental compliance regulations be met.

This funding program is not a grant program, but is a "reimbursement" program that does not necessarily require the local client to advance payments before being reimbursed. Projects as large as $1M in federal dollars may be reasonable (equivalent to up to 80% of the total project cost). The 20% matching share can be from non-FHWA federal sources, state, county, local or private sources. The Regional Planning Organization (RPO or MPO) should be consulted.

The application materials and guidance are available online at:
http://www.dot.state.pa.us/penndot/Bureaus/CPDM/Prod/Saferoute.nsf

Legislative Funding:
State and federal elected officials can often include items into legislation for worthy projects in their districts. A conversation between county and municipal officials and legislators is the way to begin this process. This type of funding should be targeted toward capital improvement projects.

PA Department of Recreation and Natural Resources (DCNR) Community Conservation Partnership Program (C2P2):
A bond issue approved in a statewide referendum initially funded this program. Perennial funding is through a dedicated percentage of the statewide real estate transfer tax.

Funding from the program is dedicated toward recreation, environmental and cultural heritage resources throughout the state. Trails are eligible. Roadway projects are generally not eligible. Several agencies distribute funds through competitive grants, including: the PA Fish and Boat Commission, PA Historic and Museum Commission, and the PA Department of Conservation and Natural Resources (DCNR). DCNR funding application rounds were revised in 2007, so that most development grant applications are due in April. Consult with the DCNR Regional Advisor. State funds can be used for discrete projects or as a match to federal funds. DCNR requires a 50-50 match (cash or in kind) to its grant awards for trails. More information on this program can be found at:
http://www.dcnr.state.pa.us/brc/grants/

Recreational Trails Program:
This program provides funding to states to make grants for trail and trail-related projects. Funding to this program is provided to the Commonwealth through the Federal Highway Administration (FHWA) and the Intermodal Surface Transportation Act (ISTEA) of 1991 which included the Symms National Recreational Trails Act (NRTA), and the National Highway System Designation Act of 1995 (NHS Act).

The monies may be used for the development of urban trail linkages near homes and workplaces; maintenance of existing recreational trails; development of trail-side and trail-head facilities; provision of features which facilitate the access and use of trails by persons with disabilities; acquisition of easements for trails, or for trail corridors identified in a State trail plan; acquisition of fee simple title to property from a willing seller; and construction of new trails on state, county, municipal, or private lands. Note: This program is one of the only to fund trail maintenance. This fund can be used for motorized (snowmobile) trails. More information on this program can be found at:
http://www.fhwa.dot.gov/environment/rectrails/

DEP PA Growing Greener:
The Growing Greener Program signed into law by Governor Tom Ridge in 1999 invested millions to preserve farmland and protect open space; eliminate the maintenance backlog in State Parks; clean up abandoned mines; restore watersheds; and provide new and upgraded water and sewer systems.

In 2002, the state legislature added additional monies to the program due to its great popularity. Four different agencies are involved in helping communities "grow greener" under the Environmental Stewardship & Watershed Protection Act: Departments of Environmental Protection, Agriculture, Conservation and Natural Resources and PENNVEST. Of these four agencies, projects that may be applicable to trail development will most likely be funded by the Department of Conservation and Natural Resources. In 2007, the PA Department of Environmental Protection (DEP) administered a large portion of the Growing Greener funds – with target programs for stormwater treatment and clean water demonstration projects.

The Act authorizes grants through DEP for acid mine drainage abatement, mine cleanup efforts, abandoned oil and gas well plugging and local watershed-based conservation projects. These projects can include: watershed assessments and development of watershed restoration or protection plans, implementation of watershed restoration or protection projects, storm water management wetlands, riparian buffer fencing and planting, stream bank restoration and agricultural best management practices (BMPs). Grants are available to a variety of eligible applicants, including: counties, authorities and other municipalities; county conservation districts; watershed organizations; and other organizations involved in the restoration and protection of Pennsylvania's environment. These grants support local projects to clean up “non-point” sources of pollution throughout Pennsylvania. Since many of the proposed trails and greenways include areas along waterways, there will be many opportunities for re-establishment of riparian buffers. It may be possible to blend Growing Greener grants with other grants for trail construction. This funding source would be most applicable to greenway corridors along Township creeks.

DCED Community Revitalization Funds:
The Department of Community and Economic Development (DCED) Community Revitalization Fund is a state program that supports local initiatives to improve the stability of communities and enhance local economies. This agency has four application periods throughout the year. Applications are submitted online. The grant program covers a wide range of eligible uses including: acquisition of land, buildings, and right-of-ways; recreation projects; programs and developments that build capacity of the local community and relevant local organizations to better serve the needs of the community, and other reasonable and necessary expenses related to community-based activities. Active support of the district's state senator and / or state representative is critical in a successful grant application. More information on this program can be found at: http://www.newpa.com/programDetail.aspx?id=72

PennDOT:
The Pennsylvania Department of Transportation may provide assistance with any on-road cycling route that is proposed on state highways or through TE funding. PennDOT may provide signs and installation of "share the road" markings and, if any shoulder widening is necessary, the local district may provide these improvements through its "Betterment Program" maintenance funding.

New Garden Township:
Some grant programs allow "in-kind" services in place of cash to count as a local match. It is strongly suggested that the Township immediately begin to keep a detailed inventory of municipal staff and/or official time spent on the greenway project. Occasionally, grantors may allow time spent to date to count as part of the in-kind match for funds. This record will also demonstrate a continuing commitment on the part of the Township to the successful implementation of the master plan. The Township may in some cases choose to invest municipal funds in specific aspects of the Greenway development as "leverage" to secure funding from other partners.

Private Foundations:
There are corporations and foundations that support public works such as trail development. The competition for these funds is brisk, but the opportunities should be researched. Funding is often to non-profit organizations.

Schools:
Local schools may also be of assistance in several ways. The student body might get involved with clubs, fundraising events, and trail cleanup days. The faculty could incorporate the trail into various curricula with students helping to develop and possibly maintain the trail as part of a classroom assignment or after school club. While the amounts of funds raised may be relatively small, this process builds constituents and support that is critical to the long-term success of the greenway and trail system.