Pine Creek

Watershed Conservation Plan

FINAL

DECEMBER 2010

Prepared for:

NORTH AREA ENVIRONMENTAL COUNCIL

Prepared by:

Mackin

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The Pennsylvania Rivers Conservation Program

Pine Creek Watershed Conservation Plan

Final

December 2010

Prepared for:

North Area Environmental Council

Prepared by:

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ACKNOWLEDGEMENTS

A sincere thank you to all the organizations, agencies, and individuals who dedicated their time and resources to make this plan a success. Our apologies to anyone we inadvertently omitted.

Stakeholder Organizations ~ Valuable guidance and information was provided by key personnel through personal interviews and questionnaires.

Allegheny County Parks Department
North Park
Pittsburgh Trails Advocacy Group
The Villa Association
Boy Scouts, Local Troup
Western Pennsylvania Conservancy
North Hills Community Outreach
Friends of North Park
Bradford Woods Conservancy
Pine Creek Land Conservation Trust
Audubon Society of Western PA
CSX Railroad
Allegheny Land Trust
Allison Park Sportsman's Club
North Allegheny Historic Museum
Venture Outdoors
Shaler Water Treatment Plant
PA Fish and Boat Commission
Hampton Township Environmental Advisory
Council
Etna Economic Development Corporation
North Allegheny School District
Penn Woods West Chapter of Trout Unlimited
PA Environmental Council

Study Committee Members ~ A group of individuals interested in the future of the watershed were called together to discuss the opportunity and need for a watershed conservation plan. These individuals provided guidance and information, and most importantly, dedicated their time to work toward a common goal—developing a plan that reflects their watershed and the many opportunities it presents.

Bill Moul
John Stephen
Amy Myers
Toby Cordek
Jen Novak
Brady Porter
Art Gazdik
Gary Rigdon
Mary Wilson
Jim Watenpool
Bill Baierl
Bruce Betty
Pat Hare
Ward Allebach

Municipalities ~ The townships and boroughs were kind enough to share their ideas, municipal space, and community days to help gather the public input for the watershed plan.

Bradford Woods
Etna
Fox Chapel
Franklin Park
Hampton
Indiana
Marshall
McCandless
O'Hara
Pine
Richland
Ross
Shaler
Sharpsburg

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Message from NAEC

FOREWORD

The Pine Creek Watershed Conservation Plan provides a comprehensive road map for future conservation and enhancement efforts in the watershed. It integrates already completed studies and additional information about the watershed's resources with input from diverse stakeholders to develop a list of community-driven goals for the watershed. The full suite of projects described in the Plan provides a vision for enormous enhancement to quality of life within the watershed. While many of the projects recommended in the Plan are outside the direct purview of the North Area Environmental Council, we are dedicated to helping advance them in any way within our means as a grassroots organization and member of the Pine Creek Watershed Coalition. We pledge to assist other organizations or individuals who want to undertake one of these projects.

The North Area Environmental Council (NAEC) is one of many organizations with an interest in the Pine Creek Watershed and that comprise the Pine Creek Watershed Coalition (PCWC). The formation of the PCWC was an outcome of an effort initiated by the Pennsylvania Environmental Council (PEC) in 2001 to promote intermunicipal communication and coordination centered around watershed management and conservation. The Pine Creek Watershed was identified as a possible site for piloting the idea in western PA because it had a history of flooding, it was a well known recreational resource for the community, the headwaters were being developed at a high rate of speed, and there were active groups working in the watershed. At roundtables hosted by PEC to explore the prospect of a collaborative effort, NAEC was identified as the organization best suited to lead the initiative due to its history of work in the watershed.

A selected NAEC history

In 1969, a group of individuals in northern Allegheny County formed the North Area Environmental Council (NAEC) – a non-profit 501(c)(3) organization that has about 200 current members. They were originally brought together by a series of environmental lectures at the North Hills Y.W.C.A. organized by Program Director, Pat McGuire, and related to the expected development 'boom' from the newly constructed McKnight Road.

Because of a growing concern about the quality and quantity of development in the North Hills, and its future effects on our environment, the group started organizing NAEC immediately after the last lecture, and they formed a Land Use Committee to begin a Pine Creek Watershed Study as their first project. This was completed by the committee in 1972, when both The Pine Creek Watershed Study report, in book form titled Our Lands, and the maps were published, with financial help from the North Pittsburgh Community Development Corporation (NPCDC). These were distributed to the watershed municipalities, along with a slide presentation in which the committee recommended protective regulations for the "Environmentally Critical Lands" – stream valleys and the adjoining steep hillsides which were subject to both earthflow and rock-

fall landslides – in order to: help hold back rain water; prevent erosion, landslides and stream sedimentation; and retain natural vegetated buffers to protect streams from both flooding and pollution. NAEC also made up a three-ring binder educational "tool kit" for each municipality, which included information on enabling legislation, mine subsidence issues, sample environmental ordinance regulations for water and open space resources, formation of Environmental Advisory Councils, etc..

This original Pine Creek Watershed Study was used by the Pennsylvania state agencies as the base for one of their two pilot watershed projects for the 1978 PA Stormwater Management Act. The Pine Creek Study was updated by NAEC in 1993, at the request of the NPCDC, after both the flooding from a disastrous 1986 storm, which claimed nine lives, and another major flooding in January 1993, which was the result of a smaller rainstorm falling on ground already saturated from snowmelt. A slide presentation and an upgraded "tool kit" were again given to each of the watershed municipalities, who now had a renewed interest in environmental controls on development because of the huge costs of the recent flood damage and necessary repairs.

With this work in its portfolio, NAEC was well suited to lead further work in the Pine Creek Watershed.

Recent Pine Creek Projects

Since the roundtables of 2001, extensive study and restoration work has taken place in the watershed. The enormous volume of work achieved is a tribute to the dedication of the many partners at the table and the extraordinary interest and dedication of the dozens of volunteers who have committed thousands of hours collectively to work in the watershed. Among the many achievements of the last decade are:

Research and Reports:

- Publication of Pine Creek Watershed Assessment (2005) encompassing results of chemical and biological monitoring of 16 sites over a two year period, comprehensive review of ordinances of 13municipalities related to water quality and sensitive lands, and recommendations related to further research, education, and restoration of the watershed.
- Publication of Pine Creek and You: A Partnership for the Future booklet with supplementary flyers and correlating tabletop exhibits highlighting the watershed's history and stormwater management options.
- The PCWC assisted PA DEP and US EPA- with a bacteriological study, testing the potential for a volunteer-staffed water monitoring program and providing data for a revised model for bacteriological monitoring.
- Publication of the Watershed Implementation Plan (PEC 2009) which outlines management targets and monitoring strategies to reduce pollutant loading from excessive stormwater. This plan makes related projects eligible for federal funding support.

- Publication of the Pine Creek Riparian and Stream Channel Assessment (2010) which summarizes the assessment of 56 linear miles of stream channel within the Pine Creek watershed, identifies key issues, and outlines priorities for restoration.

Restoration Projects

- Fawcett Field Streambank Restoration: 1,000 linear feet of eroded streambank are to be restored using natural stream channel design guidelines. This project is under the direction of the Penns Woods West Chapter of Trout Unlimited.
- Crouse Run Streambank Restoration: Plans to restore 2500 linear feet of streambank in the Crouse Run Valley are complete. This project is under the direction of the Pine Creek Land Conservation Trust.
- Bryant Road Streambank and Field Remediation: 500 feet of streambank and several acres of open field were remediated over a period of several years by projects of NAEC and of Trout Unlimited.
- A number of stream habitat and erosion prevention structures have been installed by volunteers from the Penns Woods West Chapter of Trout Unlimited in cooperation with the PA Fish and Boat Commission.
- A two acre streambank and wetland mitigation project was recently completed in North Park, which the Pine Creek Watershed Coalition helped facilitate when the Turnpike Commission requested assistance in finding sites for mitigating impacts from its expansion project.
- Two workshops about streambank restoration have been presented by the Allegheny County Conservation District to train municipalities and other parties in stream restoration techniques.
- 75 acres in the Irwin Run valley adjacent to North Park were purchased by the Allegheny Land Trust with significant assistance from the Friends of North Park and NAEC. This area, which is now titled a North Park Greenway, will continue to allow rain water infiltration, thus reducing the volume of water shed downstream.

Outreach:

- Three seminars by the Stroud Water Research Center were hosted by PCWC in 2004. Programs were provided for the general public, municipal managers, and teachers.
- PCWC developed a self-guided walking tour, “Walks in the Watershed”, that highlights six extraordinary sites hidden within the boundaries of the Pine Creek watershed.
- A Watershed Festival was held at North Park in May 2006 providing exhibits about rain gardens, rain barrels, kayaking, and other watershed related topics, plus a concert by the Highlanders.

- A Bioblitz was hosted by Latodomi Nature Center in North Park in August 2010 to survey the flora and fauna off the new wetland in North Park .
- The Pine Creek Watershed Coalition launched a web site at www.pinecreekwpa.org to showcase the various projects in the watershed.

Municipal Activities

The Pine Creek municipalities have been supportive of NAEC and PCWC activities and have been active in environmental protection and stormwater control. Land use ordinances continue to be strengthened as new information and procedures come to light and the 2009 Act 167 Update resulted in new stormwater ordinances in all of the communities that will significantly reduce the stormwater impacts of future development and redevelopment.

The extensive history of work within the watershed, from the early work of the North Area Environmental Council through the extensive recent and ongoing projects of the Pine Creek Watershed Coalition and our many partners, is a remarkable testimony to how deeply residents of the watershed appreciate the streams that run through our landscape. It is for their ongoing benefit and the benefit of the wildlife that shares the landscape with us that we seek to further enhance the health and protection of Pine Creek and its many tributaries.

Just as community input was critical in defining and prioritizing the goals outlined in this plan, so community participation is critical in the implementation of these goals. If you find a project that sparks your interest, we strongly urge you to contact us and find out how you can become involved. It is only through the ongoing involvement of local residents, businesses and elected officials that enhancement of Pine Creek and its surrounding environs will continue.

Bill Moul,
NAEC President and PCWC Chair

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NOTE: To see what NAEC has been doing in recent months, please see **Appendix A** to read some of their recent newsletters.

ACRONYMS

3R2N – Three Rivers 2nd Nature
ACCD – Allegheny County Conservation District
ACED – Allegheny County Economic Development
ACHD – Allegheny County Health Department
ACLA – Allegheny County Library Association
ACPD – Allegheny County Parks Department
ALCOSAN – Allegheny County Sanitary Authority
ALT – Allegheny Land Trust
AMD – Abandoned Mine Drainage
AML – Abandoned Mine Lands
APSC – Allison Park Sportsman's Club
ASA – Agricultural Security Areas
ASWP – Audubon Society of Western Pennsylvania
AVGWLF – ArcView Generalized Watershed Loading Function
BMP – Best Management Practices
CBC – Christmas Bird Count
CSO – Combined Sewer Overflow
CWA – Clean Water Act
CWF – Cold Water Fishery
CWP – Center for Watershed Protection
DCED – Department of Community and Economic Development
DCNR – Department of Conservation and Natural Resources
DEP or PADEP – Pennsylvania Department of Environmental Protection
DLM – Depreciation Lands Museum
DSD – Department of Sustainable Development – Organization of American States
EAC – Environmental Advisory Council
eFACTS – Environment, Facility, Application, Compliance Tracking System
EMS – Emergency Medical Services
EPA – Environmental Protection Agency
EQB – Environmental Quality Board
E&S – Erosion and Sedimentation
EV – Exceptional Value Waters
FEMA – Federal Emergency Management Agency
FISRWG – Federal Interagency Stream Restoration Working Group
FSC – Field Studies Council
GIS – Geographic Information Systems
HQ – High Quality Waters
HUC – Hydrologic Unit Code
IRRC – Independent Regulatory Review Commission
MS4 – Municipal Separate Storm Sewer Systems
N/A – Not applicable
NAEC – North Area Environmental Council
NAHM – North Allegheny Historical Museum
NFIP – National Flood Insurance Program
NH COG – North Hills Council of Government
NOAA – National Oceanic and Atmospheric Administration
NPDES – National Pollutant Discharge Elimination System

ACRONYMS

NPS – Non-point source
NR – National Register of Historic Landmarks
NRCS – Natural Resources Conservation Service
NTRL – Northern Tier Regional Library
NWI – National Wetland Inventory
NWS – National Weather Service
OSM – Office of Surface Mining
PACCW – Pennsylvania Campaign for Clean Water
PAFBC or PFBC– Pennsylvania Fish & Boat Commission
PCW – Pine Creek Watershed
PCWC – Pine Creek Watershed Coalition
PCWCP– Pine Creek Watershed Conservation Plan
PDA – Pennsylvania Department of Agriculture
PEC – Pennsylvania Environmental Council
PEM – Palustrine Emergent
PEMA – Pennsylvania Emergency Management Agency
PennDOT – Pennsylvania Department of Transportation
PFO – Palustrine Forested
PGC – Pennsylvania Game Commission
PHMC – Pennsylvania Historic Museum Commission
POW – Palustrine Open Water
PRC – Pennsylvania Resource Council
PSCE – Penn State Cooperative Extension
PSS – Palustrine Scrub Shrub
RCHA – Rachel Carson Homestead Association
RIDC – Regional Industrial Development Corporation
RTC – Regional Trail Corporation
SDWA – Safe Drinking Water Act
SR – State Route
SPC – Southwestern Pennsylvania Commission
SSO – Sanitary Sewer Overflow
SWM – Stormwater Management
SWPAHHW- Southwestern Pennsylvania Household Hazardous Waste
TMDL – Total Maximum Daily Load
TU – Trout Unlimited
TSF – Trout Stocked Fishery
USACE – United States Army Corps of Engineers
USDA – United States Department of Agriculture
USFWS – United States Fish & Wildlife Service
USGS – United States Geologic Survey
WHPP – Wellhead Protection Program
WPC – Western Pennsylvania Conservancy
WPCAMR – Western Pennsylvania Coalition for Abandoned Mine Reclamation
WWF – Warm Water Fishery

HOW TO USE THIS REPORT

As you are reading report, please note the following;

- This report is set up by resources—Land, Water, Biological, Recreation, and Cultural. An overview description of each resource is given in the Executive Summary; however, in depth details are provided in each resource's dedicated chapter.
- Within each section there are pictures that graphically depict key points or areas of the watershed that are discussed in the text. Typically these pictures are on the same page as the associated text; however, occasionally due to space constraints, the picture may be located on a previous or following page.
- Call Out Boxes, tables, and figures were also used to support the text. The call out boxes highlight key terms and definitions for easy reference for the reader. Any terms that are including in a call out box are dark brown, bolded, and underlined (i.e. **floodplains**) within the text.
- Acronyms are used throughout the report. Typically, when a word is first used the acronym is provided in parenthesis next to the word. Then, any time there after the acronym is used. A list of acronyms has been provided for your convenience.
- At the end of the report is the Management Strategy table. This table represents all of the management strategies of the plan based on focus items that were identified through public input. Based on these focus areas, overarching goals were developed followed by numerous management strategies to help reach each goal. Each management strategy is identified by the resource category that it addresses—land (L), water (W), biological (B), recreational (R), and cultural (C). For each management strategy, suggestions are made for a lead organization, potential partners, and funding sources; however, with most of the proposed strategies, a variety of combinations of partnerships and funding are possible.

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Pine Creek
Watershed Conservation Plan

Executive Summary

We will be known forever by the tracks we leave.

-Native American Proverb

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Project Background

In 1969, a group of individuals in northern Allegheny County formed the North Area Environmental Council (NAEC) - a non-profit 501(c)(3) organization that has about 200 current members. In 2005, NAEC and the Pennsylvania Environmental Council (PEC) completed a preliminary assessment of the Pine Creek Watershed and presented the results in the *Pine Creek Watershed Assessment*. Subsequently, NAEC completed the *Pine Creek Watershed Channel and Riparian Assessment and Restoration Plan* (March 2010).

Because of the successful completion of the previously identified projects and the committed and continuous level of activity by its members, the NAEC was awarded a planning grant through the PA Department of Conservation and Natural Resources Community Conservation Partnership Program. This program, which was developed from the Keystone Recreation, Park, and Conservation Fund Act of 1993, provided NAEC with funding to complete a River Conservation Plan (herein after referred to as watershed conservation plan) for the Pine Creek Watershed.

As part of this program, DCNR established the Pennsylvania Rivers Registry which recognizes completed and approved Rivers Conservation Plans. The registry serves to promote public awareness of completed plans while fostering support for future projects outlined in the plan.

Plan Purpose

The Pine Creek Watershed Conservation Plan was completed to address the following goals that were developed in response to high priority concerns identified during the planning process:

Pine Creek Watershed Conservation Plan Goals:

1. Encourage future development that protects the natural, cultural, and recreational heritage of the Pine Creek Watershed.
2. Manage the land, water, biological, and recreational resources within the Pine Creek Watershed to maintain their integrity for future generations.
3. Protect and improve the recreational resources within the Pine Creek Watershed.
4. Protect open space, green space, and wildlife habitat within the Pine Creek Watershed.
5. Protect and improve the waterways within the Pine Creek Watershed.
6. Protect the area surrounding the waterways and improve water quality within the Pine Creek Watershed.
7. Manage stormwater runoff within the Pine Creek Watershed.
8. Provide programs that control littering and educate the public about waste management.
9. Educate the public and public officials about the issues and opportunities within the Pine Creek Watershed.
10. Create or update municipal ordinances.

Over 120 management strategies have been recommended in this plan. The following tables present the high priority strategy recommendations. The full set of recommendations is included in *Section VIII Management Strategies by Goal* of the Pine Creek Watershed Conservation Plan.

Goal #1: Encourage future development that protects the natural, cultural, and recreational heritage of the Pine Creek Watershed.

Priority Recommendations
Enforce steep slope ordinances to prevent landslides.
Enforce E&S controls to protect water quality.
Create incentives for developers and contractors to use "Green" techniques in new developments (e.g. low-impact development, sustainable practices, smart growth principles, conservation subdivision).
Create incentives such as tax breaks to encourage the restoration of historic buildings; address regulatory problems that discourage reuse of historical buildings and sites.
Incorporate existing wetlands into new development plans as scenic opportunities and/or flood control measures.
Offer educational workshops for municipal officials and staff on enforcement of ordinances to protect the watershed.
Engage in a multi-phase cost/benefit analysis utilizing multiple build out scenarios that evaluate traditional versus conservation design for future development (*Phase I is complete*). Note: See the note at the bottom of page 7 referencing the Phase I report.

Goal #2: Manage the land, water, biological, and recreational resources within the Pine Creek Watershed to maintain their integrity for future generations.

Priority Recommendations
Develop a management plan to prevent sediment from entering or exiting North Park Lake.
Develop & enforce Best Management Practices (BMPs) for preserved woodlands, natural areas, and riparian zones to maintain them as wildlife habitat (i.e. wildlife habitat enhancements, sustainable timbering practices, etc.). Enforce BMPs through municipal ordinances.
Develop a wetland database to identify and assess the functionality of wetlands in the watershed, starting with hydric soil areas within the watershed. Assessment divided into subwatersheds for more manageable units.

Goal #3: Protect and improve the recreational resources within the Pine Creek Watershed.

Priority Recommendations
Construct the proposed trails--North Hills and Spur, and Millvale Trail, and coordinate with other organizations to incorporate these trails into the trail network. Obtain funding for trail development and maintenance. Continue to expand on the trail network by creating new trails, extending existing trails, and adding trailhead parking and restrooms.
Develop a recreational website that contains trail mapping, user information, and recreational guidance for the area (i.e. fishing, kay-aking, hunting, picnicking, trail users, etc.).
Identify publicly-owned areas of open space that can be utilized for passive recreation (i.e. soccer fields, model airplane, bocce ball, frisbee, picnicking, birdwatching etc.) or provide scenic views. Coordinate with landowner for opportunities to open these areas to public access.

Goal #4: Protect open space, green space, and wildlife habitat within the Pine Creek Watershed.

Priority Recommendations

Support the implementation of the recommendations from the Parks, Open Space, and Greenways Plan of the Allegheny County Comprehensive Plan--Allegheny Places--and Allegheny Land Trust's GREENPRINT.

Using the data from the Allegheny County Greenways Plan and ALT GREENPRINT, develop a coalition dedicated to each specific greenway to secure funding for land acquisition, identify property owners, and work with landowners to develop management plan.

Goal #5 Protect and improve the waterways within the Pine Creek Watershed.

Priority Recommendations

Implement the strategies from the Riparian Assessment that was conducted by the North Area Environmental Council.

Implement fluvial geomorphic-based restoration approaches such as Natural Stream Design to achieve channel and streambank stability, restore sediment transport, reduce erosion and sedimentation, and improve water quality and aquatic habitats.

Goal #6: Protect the area surrounding the waterways and improve water quality within the Pine Creek Watershed.

Priority Recommendations

Continue to protect and manage Pine Creek as a Trout Stocked Fishery.

Continue improvement projects on area waterways to maintain or expand fisheries and fishing opportunities (i.e. rock deflectors, log vanes, fish ladders, riparian plantings/improvements, etc.).

Goal #7: Manage stormwater runoff within the Pine Creek Watershed.

Priority Recommendations

Create tax incentives for private landowners who implement conservation practices, such as rain gardens, freedom lawns (no chemical treatments), rain barrels, compost bins, invasive species management, etc.

Complete Phase II of the Act 167 Updates

Identify areas of consistent flooding (waterways overflow their banks) and determine if plantings, wetland creation, or other natural flood control measures may assist with slowing and curbing flood waters.

Enforce stormwater management BMPs for new construction to reduce stormwater volumes and improve water quality.

Conserve large tracts of woodlands in the upper reaches of watersheds as a natural way to intercept rain water before it becomes stormwater.

Develop a multi-municipal strategy for identifying and removing downed trees and/or potential obstructions and debris from streams to alleviate flooding.

Identify and restore degraded or impaired habitats, including wetlands, floodplains, riparian buffers. Update FEMA Mapping.

Goal #8: Provide programs that control littering and educate the public about waste management.

Priority Recommendations

Encourage public participation in programs/events such as Adopt-A-Highway, Great PA Cleanup, Adopt-A-Park (County Parks program), Adopt-A-Stream, Allison Park Sportsman's Club annual clean-up.
Continue to support "Hard to Recycle" events for electronics, household hazardous wastes, etc., as well as free drop-off locations to make it convenient and affordable for area residents.

Goal #9: Educate the public and public officials about the issues and opportunities within the Pine Creek Watershed.

Priority Recommendations

Offer educational programs for the public and municipal officials about watersheds and the importance in protecting streamside areas such as riparian buffers, wetlands, and floodplains.
Organize public stream corridor, park, greenway, and trail clean-up/maintenance days, which also provide opportunities for education.
Organize a Leave No Trace public education campaign to encourage a "carry-in, carry-out" ethic for park users to discourage littering. Add to contract for pavilion rentals.
Continue to offer ecological restoration activities for the public to assist, such as tree planting, removal of invasive species, planting native species, and bank stabilization.
Offer homeowner education about natural alternative ways of lawn care and pest control, and the effects of the overuse of fertilizers, pesticides, and herbicides on the watershed.
Utilize and promote local environmental education centers, such as Latodami Nature Center in North Park and Beechwood Farms Reserve, that educate the public about environmental stewardship.
Develop partnerships between schools, local environmental groups, and park naturalists to utilize local resources and environmental education centers as environmental education opportunities.
Encourage community support of small "family" farms through "Buy Local" campaigns and Farmer's Markets to promote agricultural heritage.
Develop/update local history booklets by municipality to engage and educate the public about local cultural and historical resources.
Identify historic resources through interpretative signs/historical markers posted along hiking/biking trails and highways to increase awareness of local waterway history.
Incorporate local history into history classes taught in local school districts.
Offer public education program about Marcellus Shale extraction, associated wastewater issues, how to report violations, and how to research permit information. Educate the public about the laws to protect surface owner's rights and property from damage caused by subsurface mineral rights owners' access and resource extraction operations.

Goal #10:	Create or update municipal ordinances.

Priority Recommendations

By using tax incentives and municipal ordinances, encourage reuse/redevelopment of abandoned sites instead of new development to prevent forest fragmentation.
Update/create municipal ordinances that encourage low-impact, context-sensitive, and green design developments.
Update/create ordinances to protect ecologically-sensitive areas (i.e. wooded steep slopes, stream headwaters, wetlands, flood-plains, BDAs, critical habitat, and other natural areas). Make mapping of these areas available at all municipal meetings when land use development plans are to be discussed. The EAC should be involved in discussions.
Update/create natural resource protection ordinances to protect wetlands and streams, including a designated buffer of a minimum of 50 feet; Natural resource protection ordinances to protect headwater areas, including a designated buffer--150 feet recommended, but a minimum of 50 feet.
Update/create natural resource protection ordinances for timbering, clear-cutting, and revegetation (with native species) to protect forested areas.
Update/create municipal ordinances and policies regarding landscaping recommendations; use native species by developing a model native species list for the municipalities to distribute.

Overall, this plan serves as a guide to improving the Pine Creek Watershed and its surrounding region. Partnerships for priority projects and funding are paramount to successful project implementation. For each management strategy, suggestions are made for a lead organization, potential partners, and funding sources; however, with most of the proposed strategies, a variety of combinations of partnerships and funding are possible. In addition, the report contains the complete list of recommended management strategies.

The extensive history of work performed within the watershed, from the early work of the North Area Environmental Council through the extensive recent and ongoing projects of the Pine Creek Watershed Coalition and our many partners, is a remarkable testimony to how deeply residents of the watershed appreciate the streams that run through our landscape. It is for their ongoing benefit and the benefit of the wildlife that shares the landscape with us that we seek to further enhance the health and protection of Pine Creek and its many tributaries.

Just as community input was critical in defining and prioritizing the goals outlined in this plan, so community participation is critical in the implementation of these goals. If you find a project that sparks your interest, we strongly urge you to contact us and find out how you can become involved. It is only through the ongoing involvement of local residents, businesses and elected officials that enhancement of Pine Creek and its surrounding environs will continue.

Note: Phase I of the *Pine Creek - An Alternative Vision* Report has been completed. The goal of this two phase project is to evaluate the economic and environmental impacts of traditional versus alternative development principles (i.e., conservation by design and those strategies recommended in the Pine Creek Watershed Conservation Plan) . Phase I generated multiple build out scenarios based on traditional neighborhood development and various conservation by design principles; Phase II will evaluate the costs and benefits of utilizing these alternative development scenarios.

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CHAPTER I —
PROJECT AREA CHARACTERISTICS

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1. Location and Size

The Pine Creek ***Watershed*** is located in western Pennsylvania in northern Allegheny County, a few miles northeast of the City of Pittsburgh (**Figure I-1 Location Map**). The total land area of the watershed is 67.3 square miles (43,072 acres) and the boundary encompasses portions of 14 municipalities including Bradford Woods Borough, Etna Borough, Franklin Park Borough, Fox Chapel Borough, Hampton Township, Indiana Township, Marshall Township, McCandless Township, O'Hara Township, Pine Township, Richland Township, Ross Township, Shaler Township, and Sharpsburg Borough (**Figure I-2 Pine Creek Watershed and Table I-1 Municipalities**). With a length of 22.8 miles, Pine Creek is a significant tributary to the lower Allegheny River.

The Allegheny River is approximately 325 miles long and drains a watershed of 11,580 square miles. The river joins with the Monongahela River to form the Ohio River at Point State Park in the City of Pittsburgh. The Allegheny River is the northeastern most drainage watershed of the Mississippi river. The headwaters of the Allegheny River are located in Potter County, Pennsylvania.

A watershed is an area of land that water flows across or under on its way to the lowest point—usually a stream, lake, or river. On its way, the water travels over the surface and across farm fields, forest land, suburban lawns, city streets, etc., or it seeps into the soil and travels as ground water.

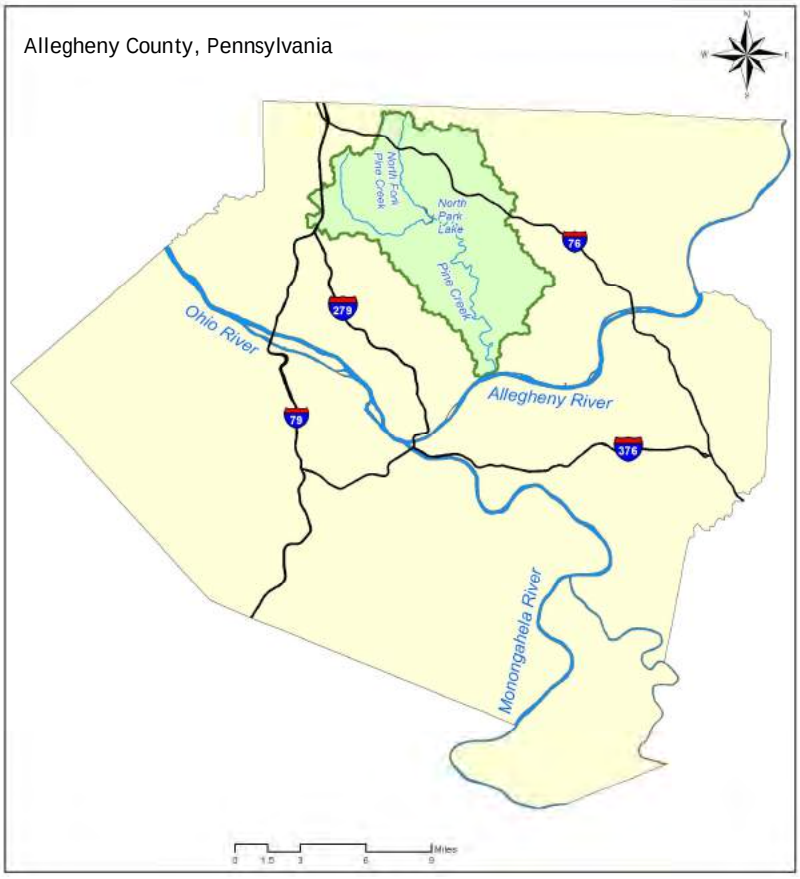


Figure I-1 Location Map

Figure I-2 Pine Creek Watershed

II. Topography

The Pine Creek Watershed characteristically exhibits smooth to irregular rolling hills and narrow, relatively shallow stream valleys (DCNR, 2000). The waterways of the Pine Creek Watershed flow in a dendritic, or branch-like, drainage pattern, which is characteristic of streams in the Allegheny River Watershed. The highest point within the watershed is approximately 1,360 feet above sea level and is located in the upper reaches of the watershed in Pine Township. The lowest point occurs at the confluence of Pine Creek and the Allegheny River and is approximately 715 feet above sea level.

The rock types underlying the Pine Creek Watershed consist of shale, claystone, siltstone, sandstone, limestone, and coal. The steep valley slopes of the watershed combined with underlying rock and soil types make this area highly susceptible to landslides (DCNR, 2000). The

Municipality	Total Municipal Acres	Acres within Watershed	% of Municipality within the Watershed	% of Watershed
Hampton	10,368	9,524	91.8%	22%
Etna	506	432	85.3%	1%
McCandless	10,578	8,318	78.6%	19%
Pine	10,786	7,889	73.1%	18%
Shaler	7,173	5,054	70.4%	12%
Bradford Woods	590	350	59.3%	1%
Richland	9,362	4,191	44.7%	10%
O'Hara	2,248	890	39.5%	2%
Franklin Park	8,670	2,495	28.7%	6%
Indiana	11,256	2,062	18.3%	4%
Ross	9,257	948	10.2%	2%
Marshall	9,874	623	6.3%	1%
Fox Chapel	5,025	181	3.6%	1%
Sharpsburg	415	7	1.6%	1%

Table I-1 Municipalities

soils in the watershed vary in thickness, composition, and porosity. Generally, the soil on the uplands is well drained and underlain by shale, while the floodplains are poorly drained (PEC, 2005).

All of the municipalities in the watershed have regulations for protecting steep slopes, particularly for the landslide-prone slopes that occur throughout much of this area. The main difference between the local ordinances is whether they consider “very steep” slopes to be 25% or 40%. Most of these slopes abut a stream valley or watercourse, and maintaining undisturbed hillsides fully covered in a wide variety of native vegetation is crucial to preventing land slides, erosion, stream siltation, and costly damages in the future.

Please refer to the Land Resources section of this report for further details regarding the geology of the Pine Creek Watershed.

III. Climate

The Pine Creek Watershed is located within the humid continental climate region featuring mild to warm summers and cold winters. According to the Natural Resources Conservation Service (NRCS) for

the Pittsburgh WSCMO2 AP, PA6993 weather station, the average winter (November – April) temperature is 37.1°F; the average summer (May–October) temperature is 64.7°F (NRCS, 2009).

Precipitation occurs year round within the humid continental climate region. According to the NRCS, Pittsburgh, the total annual precipitation is 37.83 inches with a yearly winter average of 17.83 inches and a yearly summer average of 20.0 inches (WSCMO2 AP, PA6993 TAPS data set) (NRCS, 2009). According to the Automated Flood Warning Systems website, two rain gauges are located within the Pine Creek Watershed: North Hills gauge and Hampton Township Municipal gauge (NWS and NOAA, 2009). As a stormwater management plan, the Act 167 Plan contains more specific information on rainfall data within the watershed.

IV. Municipalities

The Pine Creek Watershed includes portions of 14 municipalities, all of which are located in Allegheny County (**Table I-2 2000 Census Municipal Data**). Below is a description of each municipality.

Bradford Woods

Bradford Woods, originally settled as a summer getaway location, was incorporated as a borough on May 3, 1915 from Marshall Township (PHMC, 2009); a Home Rule Community government was established in 1974. The Borough is presently governed by seven elected council members and an elected mayor (Borough of Bradford Woods, 2009). The 0.90 square mile (576 acre) borough is located approximately 18 miles north of the city of Pittsburgh and is easily accessible via I-279 North and I-79 North.

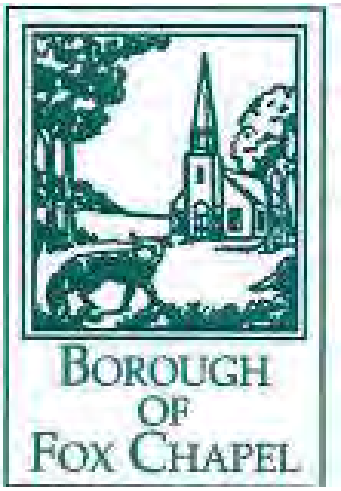
Etna

Once a mill town, Etna has re-emerged over the past twenty years as a residential community with a highly diversified business base. Currently within its borders are more than 160 businesses ranging from large industrial firms to smaller, family-

Municipality	Population	Households	Families
Bradford Woods	1149	464	373
Etna	3924	1749	981
Fox Chapel	5436	1875	1600
Franklin Park	11364	3866	3284
Hampton	17526	6253	4899
Indiana	6809	2347	1829
Marshall	5996	1944	1676
McCandless	29022	11159	7921
O'Hara	8856	3248	2537
Pine	7683	2411	2120
Richland	9231	3353	3492
Ross	32551	13892	8811
Shaler	29757	11932	8687
Sharpsburg	3594	1748	893

Table I-2 2000 Census Municipal Data

owned retail and consumer outlets (Etna Borough, 2009). Etna is governed by nine-member Borough Council, elected to serve a four-year term (Etna Borough, 2009). The 0.75 square mile (480 acres) borough is located along the Allegheny River, six miles northeast of downtown Pittsburgh via S.R. 28 North.



Fox Chapel

Fox Chapel was originally part of O'Hara and Indiana Townships until August 3, 1934, when the court ordered the incorporation of Fox Chapel Borough. The name "Fox Chapel" comes from John Fox, who emigrated from Germany in 1831 and farmed the land around the present Faith United Methodist Church until his death in 1889. Shortly after his death, his daughter, Eliza Fox Teats, donated land to the Methodist Protestant Church for a chapel to be named in her father's honor (Fox Chapel Borough, 2009). The Borough is presently governed by an elected council and mayor (Fox Chapel Borough, 2009). The 7.84 square mile (5,018 acres) borough is located approximately 12 miles west of downtown Pittsburgh via S.R. 28 North.

Franklin Park

The land that is Franklin Park Borough was originally part of Ohio Township; however, in 1823, Franklin Township was the first of several North Hills communities to secede from Ohio Township. Franklin remained a second-class township until 1961 when the area became the Borough of Franklin Park. Today, Franklin Park is a growing community governed by six elected Borough Council members, elected to serve four-year terms (Franklin Park Borough, 2009). The 13.59 square mile (8,698 acres) borough is located approximately 18 miles north of the City of Pittsburgh, accessed via I-279 North.

Hampton

Hampton Township was incorporated in 1861 by the Honorable Moses Hampton, LLD, a well respected judge and member of Congress. At this time, the land area of the township encompassed all of its current holdings plus portions of present-day Indiana, McCandless, and West Deer Townships. The township experienced steady immigration throughout the late 19th through 20th centuries. Presently, Hampton is a governed by a five-member Township Council, elected to serve four-year terms (Hampton Township, 2009). The 16.05 square mile (10,272 acres) township is located approximately 13 miles northeast from downtown Pittsburgh via S.R. 28 North and S.R. 8 North.

Indiana

Indiana Township was incorporated in 1805. Presently, Indiana Township is governed by an elected five-member Board of Supervisors (Indiana Township, 2009). The 17.72 square mile (11,341 acres) township is located approximately 12 miles northeast of the City of Pittsburgh via S.R. 28 North, S.R. 8 North, and Dorseyville Road.

Marshall

Originally a part of Franklin Township, Marshall Township was incorporated on June 3, 1863 and named for Thomas Mercer Marshall, a famous trial lawyer who practiced law in Allegheny County. Today, Marshall Township is governed by an elected five-member Board of Supervisors (Marshall Township, 2009). The 15.60 square mile (9,984 acres) township is located in the far northwestern corner of Allegheny County, a short 18-mile drive north of the City of Pittsburgh via I-279 North.

McCandless

Originally founded in 1851 as the town of Taylor, McCandless Township was officially incorporated in 1857 by the District Judge Wilson McCandless. Throughout the 1800's the land was primarily used for farming; however, the concurrent development in the 1900's of the Harmony Line commuter railroad and the oil boom resulted in rapid development of the area. McKnight Road was built in the mid 1950's and became the primary access to the township. McCandless Township adopted a home rule charter in 1975 and became the Town of McCandless. Presently, the town is governed by a Town Council consisting of seven members. The 16.65 square mile (10,656 acres) township is located in northern Allegheny County, approximately 11 miles north of the City of Pittsburgh, accessed via McKnight Road and U.S. Route 19 North.

O'Hara

O'Hara Township was incorporated on June 8, 1875, but included lands that are today recognized as Aspinwall, Blawnox, and Fox Chapel. By 1951, the other communities had seceded, resulting in present-day O'Hara Township. The completion of S.R. 28 North in the 1960's dramatically improved the township's connectivity to the city and neighboring employment centers, resulting in a population boom. Today, O'Hara Township is governed by a Township Council consisting of seven members, each serving a four-year term (O'Hara

Township, 2009). The 7.34 square mile (4,698 acres) township is located approximately 6 miles northeast of downtown Pittsburgh, accessed via S.R. 28 North and Kittanning Street/Pike.

Pine

Pine Township was established in 1796 and at that time it included the whole acreage of eleven current townships and parts of three others. Today, Pine is a home-rule municipality governed by five elected Supervisors, who are responsible for the overall operation of the Township (Pine Township, 2009). The 16.80 square mile (10,752 acres) township is located along the northern boundary of Allegheny and Butler Counties, approximately 18 miles north of the city of Pittsburgh via I-279 North, I-79 North, and S.R. 910 East.

Richland

Originally part of Pine Township, Richland Township is approximately 14.55 square miles (9,312 acres), located in northern Allegheny County adjacent to Pine Township, approximately 15 miles from the City of Pittsburgh via S.R. 8 North. Presently, the township is governed by a Board of Supervisors, consisting of five elected members (Richland Township, 2009).

Ross

Ross Township was formed in 1809 from Pine Township and named for a prominent Pittsburgh attorney, James Ross. On January 1, 1922, Ross Township became a First Class Township and today is governed by a board of nine elected commissioners (Ross, 2009). The 14.43 square mile (9,236 acres) township is located approximately 7.5 miles from downtown Pittsburgh via U.S. Route 19 North and Babcock Boulevard.

Shaler

Shaler Township originally formed in 1847 and was named after Charles Shaler, a prominent mid-19th century Pittsburgh area judge. At this time, Shaler Township encompassed all of its current holdings plus the boroughs of Etna, Millvale, and a large tract of Ross Township. By 1900, the other boroughs had seceded and Shaler was re-incorporated as a first-class township. Presently, Shaler is governed by a board of seven elected commissioners (Shaler Township, 2009). The 11.19 square mile (7,162 acres) township is located less than six miles from the City of Pittsburgh via S.R. 28 North.

Sharpsburg

Historically, Sharpsburg Borough was an industrial town that manufactured iron, brick, and glass goods that were transported via the canal that bisected the borough and connected with the Allegheny River. Sharpsburg Borough was incorporated on March 14, 1842. Today, the borough is governed by seven elected council members (Sharpsburg Borough, 2009). The 0.65 square mile (416 acres) borough is located along the Allegheny River adjacent to Etna Borough, approximately five miles northeast of the City of Pittsburgh via S.R. 28 North.

V. Land Use / Land Cover

The most recent comprehensive land use data available for the Pine Creek Watershed region was obtained from the Southwestern Pennsylvania Commission (SPC, 2009).

Tree crown closure, also known as canopy cover, is a term used in forestry and defined as the percent of tree canopy overlying the forest floor.

Land uses in the Pine Creek Watershed range from industrial and residential uses to commercial districts and farmland. The existing land use datum reveals that the two largest land use categories in the watershed are residential and mixed forest, covering approximately 48% (20,577 acres) and 32% (13,949 acres) of the total watershed land area, respectively, as shown in **Table 1-3 Land Use Coverage and Figure I-3 Land Use Coverage.** SPC defines residential land use to include low, medium, and high density residential areas as well as rural subdivisions. The mixed forest land use designation includes all forest types and is defined as an area comprised of ten percent ***tree crown closure*** or more (areas that have been cleared to less than ten percent but are not being used for a different land use were also included).

Land Use	Acreage	% of Watershed
Residential	20,577.40	48
Mixed Forest	13,949.50	32
Other Urban	3,318.80	8
Commercial Services	2,248.90	5
Crop / Pasture / Orchards / Groves	1,325.80	3
Mixed Rangeland	543.00	1
Transitional Barren	413.90	0.75
Transportation / Communication / Utilities	402.00	0.75
Industrial	110.10	0.50
Reservoirs / Ponds	108.40	0.50
Industrial / Commercial Complex	21.60	0.25
Mixed Barren	5.70	0.25

Table I-3 Land Use Coverage

Forested/vegetated land, as opposed to impervious areas, contributes to improved water

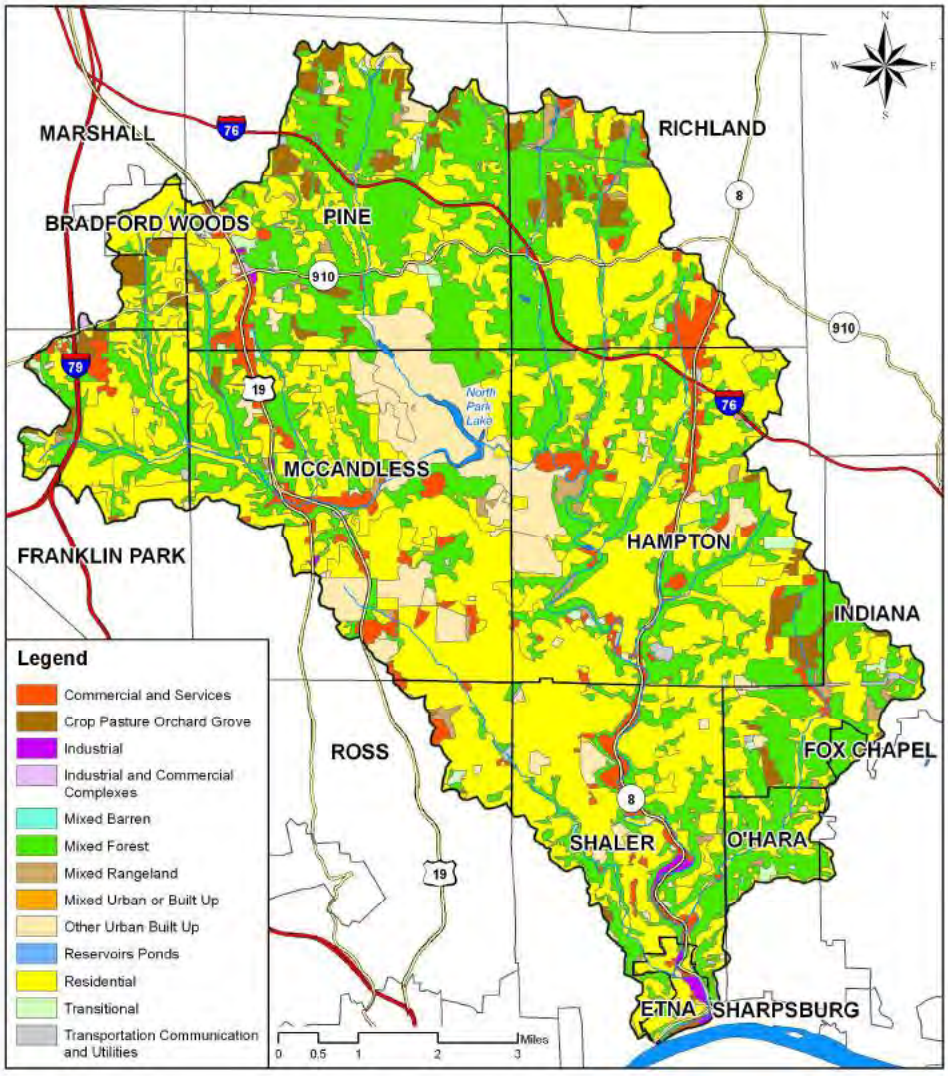


Figure I-3 Land Use Coverage

quality because of its innate ability to filter sediments and pollutants, reduce erosive flows, and provide shade cover to buffer temperature fluctuations. This is of particular importance to the land use adjacent to streams and waterways. Generally, the subwatersheds in the northern and northeastern parts of the watershed and headwater region of the main stem Pine Creek are predominantly forested with pockets of agricultural/pasture land and low density residential. As Pine Creek flows southeast towards Etna, the watershed becomes predominantly medium to high density residential and commercial and industrial.

Mixed Forest Land Use

Other Urban is the third largest land use category in the Pine Creek Watershed, covering approximately 8% (3,319 acres) of the total watershed land area. The SPC defines this land use category as including golf courses, driving ranges, urban parks, zoos, cemeteries, and other open space that does not fit into any other land use category.

The Commercial Services, Industrial, and Industrial and Commercial Complex land use categories cover 5% (2,249 acres), 0.50% (110 acres), and 0.25% (22 acres) of the watershed, respectively. The SPC defines commercial services land use as including urban central business districts, shopping centers, and strip developments that are adjacent to major highways and access routes to cities; junkyards; and resorts. Industrial land use includes properties that most likely border residential, agricultural, or forest zones and contain warehouses, large parking lots, freight trains, trucks, or cars, and may be adjacent to water resources or highway access ramps. Industrial and commercial complexes are distinguished as properties that contain buildings, warehouses, and other structures that are found in close proximity to one another, forming "Industrial Parks." Most of the commercial and industrial development in the Pine Creek Watershed is situated along S.R. 8 in Shaler and Etna and along the McKnight and Perry Highway (U.S. Route 19) corridor in McCandless.

Mainstem Pine Creek

More recent commercial development has and continues to occur near the Wexford interchange of Interstate 79. However, the *2002 Route 8 Economic Development Plan* produced by the Route 8 Partnership seeks to strengthen the regional marketplace of the Route 8 Corridor to attract and diversify development. Considering the lower portion of main stem Pine Creek flows adjacent to S.R. 8, future development in the corridor, if not properly planned, has the potential to significantly impact the health of the creek.

VI. Major Tributaries

The headwaters of main stem Pine Creek originate in the Borough of Bradford Woods within the Bradford Woods Reserve property. From this location, main stem Pine Creek flows south/southeast through the municipalities of Marshall, Franklin Park, and McCandless, where the main stem joins with North Fork Pine Creek to form North Park Lake. Upon

Table I-4 Major Tributaries

Tributary	Drainage (square miles)	PADEP Water Use*
Crouse Run	11.0	TSF
East Little Pine Creek	6.8	TSF
Fish Run	2.4	CWF
Gourdhead Run	4.9	TSF
McCaslin Run	1.0	TSF
Montour Run	5.4	TSF
North Fork Pine Creek	10.0	CWF
Pine Creek	67.3	CWF/TSF
Rinaman Run	1.6	CWF
West Little Pine Creek	6.1	TSF
Wexford Run	2.2	CWF
Willow Run	4.5	TSF

** PADEP Chapter 93 Water Quality Standards Abbreviations include: CWF - Cold Water Fishery; TSF - Trout Stocked Fishery*

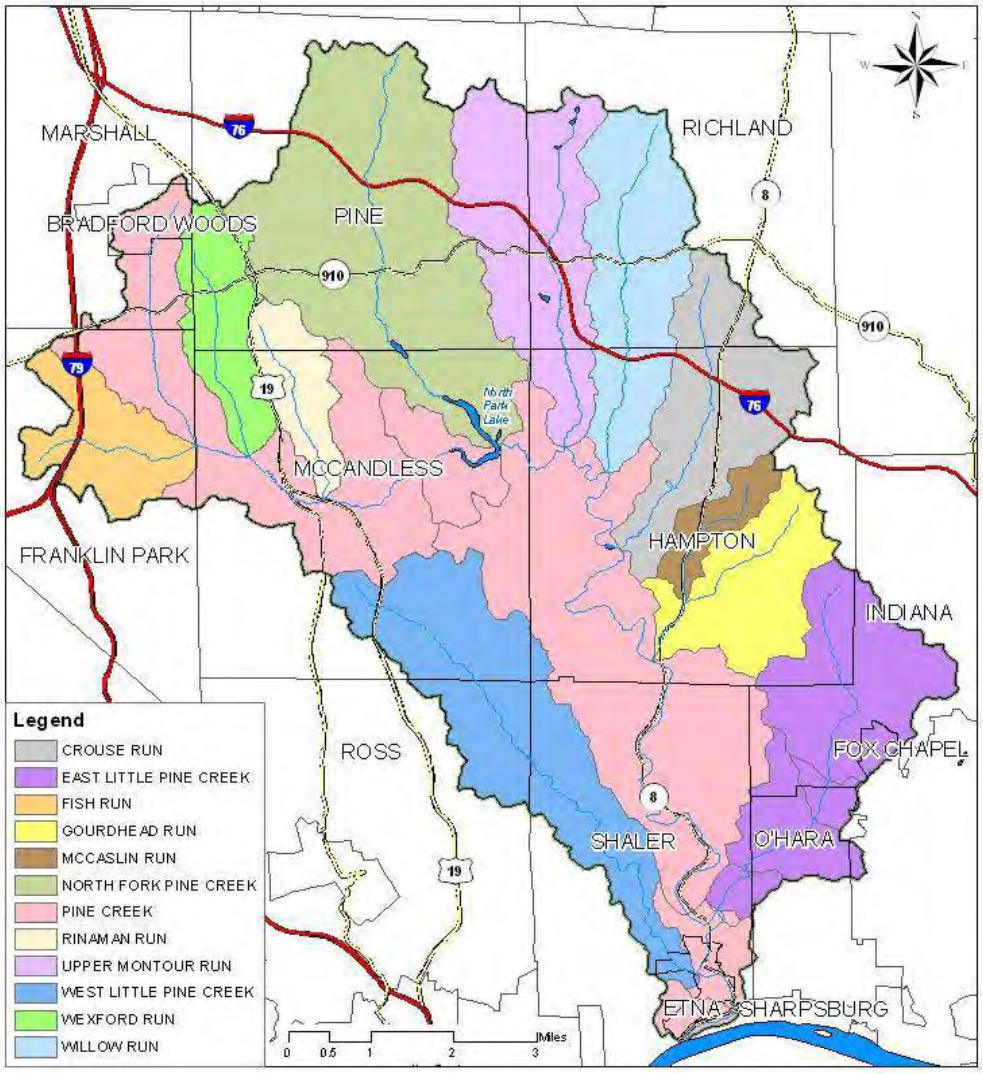


Figure I-4 Sub-Watersheds

leaving North Park Lake, main stem Pine Creek flows southeast through Hampton Township, Shaler Township, and eventually into Etna Borough where it empties into the Allegheny River. Please refer to the Water Resources section for further details regarding the Pine Creek Watershed tributaries.

Figure I-4 Sub-Watersheds depicts the eleven named tributaries within the Pine Creek Watershed that, combined with main stem Pine Creek, account for approximately 128 river miles (PEC, 2009). The largest subbasin of the Pine Creek Watershed is North Fork Pine Creek which drains an area of 10.0 sq. mi; the smallest subbasin is McCaslin Run, which drains an area of 1.0 sq. mi. (**Table I-4 Major Tributaries**). The other larger subbasins of the watershed are: West Little Pine Creek (6.8 sq. mi.), East Little Pine Creek (6.1 sq. mi.), and Montour Run (5.4 sq. mi.).

The principal adjacent watersheds are Big Sewickley Creek to the west, Brush Creek and Breakneck Creek to the north, Deer Creek to the east, and to the south are numerous small watersheds that drain into the Allegheny River (The Land Use Committee, 1972).

VII. Demographics

Population

Allegheny County's population growth decreased between 1990 and 2000, with a loss of 4.1% (54,783 residents). According to the *Allegheny County Comprehensive Plan, Allegheny Places* (ACED, 2008), 97 of 130 municipalities lost population in the 1990's. As depicted in **Table I-5 Percent Population Change**, during the 10 years between 1990 and 2000, six of the fourteen municipalities partially located in the watershed experienced a population loss and eight municipalities experienced population gain (positive number). The largest percentage loss (-13.5%) occurred in Bradford Woods, while the largest percentage gain (89.80%) occurred in Pine Township. None of the other municipalities experienced significant losses; however, Marshall township experienced a significant percent gain of 49.53%.

Municipality	1990 Population	2000 Population	% change	Estimated 2008 Population	Estimated % change
Bradford Woods	1329	1149	-13.54	1077	-6.27
Etna	4200	3924	-6.57	3560	-9.28
Fox Chapel	5319	5436	2.20	5138	-5.48
Franklin Park	10109	11364	12.41	12172	7.11
Hampton	15568	17526	12.58	17216	-1.77
Indiana	6024	6809	13.03	7034	3.30
Marshall	4010	5996	49.53	6595	9.99
McCandless	28781	29022	0.84	27298	-5.94
O'Hara	9096	8856	-2.64	9500	7.27
Pine	4048	7683	89.80	10244	33.33
Richland	8600	9231	7.34	10146	9.91
Ross	33482	32551	-2.78	30552	-6.14
Shaler	30533	29757	-2.54	27941	-6.10
Sharpsburg	3781	3594	-4.95	3263	-9.21
Totals:	**164,880**	**172,898**	**4.86**	**171,736**	**-0.67**

Table I-5 Percent Population Change by Municipality

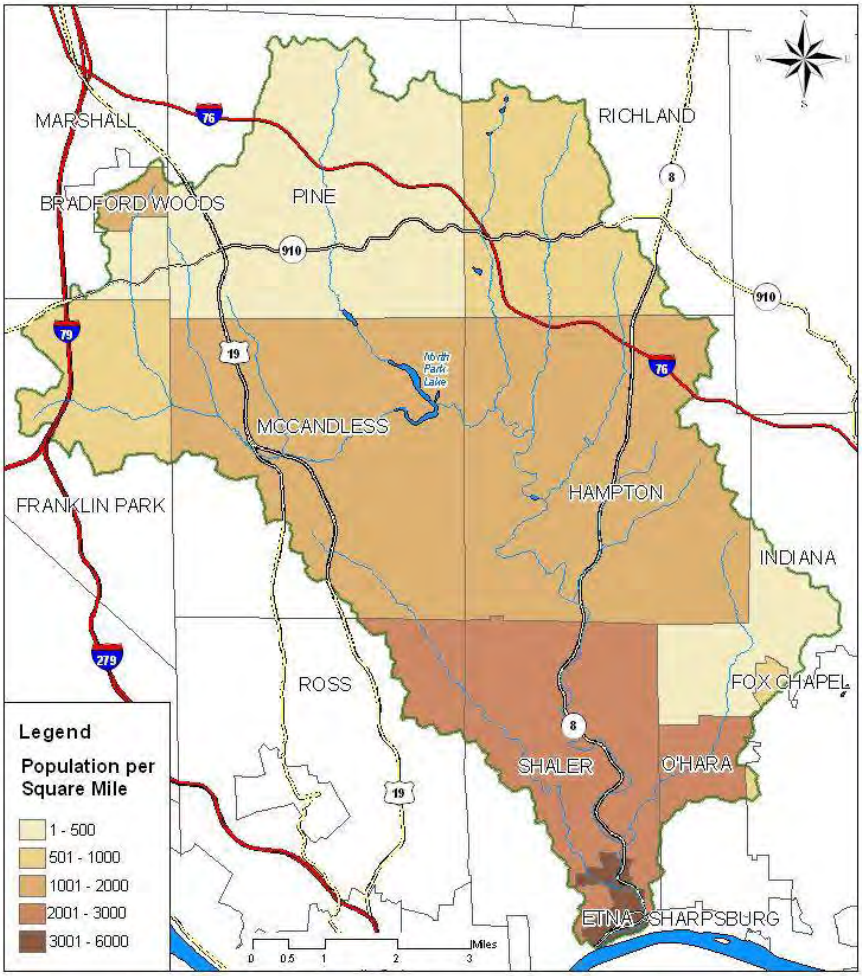


Figure I-5 Population Density

The total estimated population within the boundaries of the Pine Creek Watershed is 91,000 (PEC, 2009). The communities located in the southern portion of the watershed—Etna, Shaler, and Sharpsburg Boroughs—have the most dense population distribution; while, the communities in the headwaters section of the watershed—Bradford Woods Borough, Pine Township, Richland Township, Indiana Township—have the less dense population distribution (**Figure I-5 Population Density**).

According to the Pine Creek Watershed Assessment, Protection, and Restoration Plan (PEC, 2005) and the *Allegheny County Comprehensive Plan, Allegheny Places* (ACED, 2008), the rural communities and farmlands are under transformation to suburban communities and commercial districts. This shift in land use from rural farmland and forest to suburban development was also mentioned through the public survey. Respondents identified lack of conservation of green spaces as the top vegetation and wildlife issue in the watershed. In addition, respondents identified wildlife habitat protection and conservation as the one of the top priorities to address after flooding and water quality. In addition to population changes, this shift in land use can also be examined by looking at the increase in housing units in the northern municipalities of the watershed (**Table I-6 Housing Units**).

An analysis of the population characteristics of the study area was completed to identify which communities and segments of the population could be impacted by policies regarding future development. The age cohort breakdown is important to consider because of the specialized needs and demands exerted upon various municipal and county services by the different age groups. Making up the labor force of the municipality, the "wage-earners" group (ages 18-64), utilizes many community facilities and services, but also supports them through income and property taxes.

The other age groups, those under the age of 18 and over the age of 65, are more likely to require specialized services and the majority is not part of the labor force. Individuals over the age of 65 are of retirement age and many of these individuals require frequent medical services and have specialized housing needs. On the flip side, the senior population represents a significant potential of active watershed volunteers.

Municipality	# of Housing Units 1990	# of Housing Units 2000	Change
Bradford Woods	476	478	+2
Etna	1,876	1,934	+58
Fox Chapel	1,887	1,942	+55
Franklin Park	3,420	3,973	+553
Hampton	5,526	6,627	+1,101
Indiana	2,208	2,457	+249
Marshall	1,382	2,018	+636
McCandless	10,933	11,697	+764
O'Hara	3,377	3,381	+4
Pine	1,514	2,500	+986
Richland	3,201	3,508	+307
Ross	14,124	14,422	+298
Shaler	11,830	12,334	+504
Sharpsburg	1,864	1,911	+47

Table I-6 Housing Units by Municipality

The residents under the age of 18 may require specialized child services such as day care. As these children get older they will enroll in the public education or private education system. Working with school districts to incorporate watershed science in the curriculum will expose children to the importance of improving and preserving watershed health, in turn creating watershed stewards at a young age.

The study area municipalities saw a increase of 14.8% in their over 65 population between 1990 and 2000; the 18-65 population decreased slightly by approximately 0.4%, and the under 18 population increased by 12.5% (US Census Bureau, 2000). It is important that government leaders are aware of the current population trends. This will enable them to properly plan for the future including additional schools or assisted living facilities.

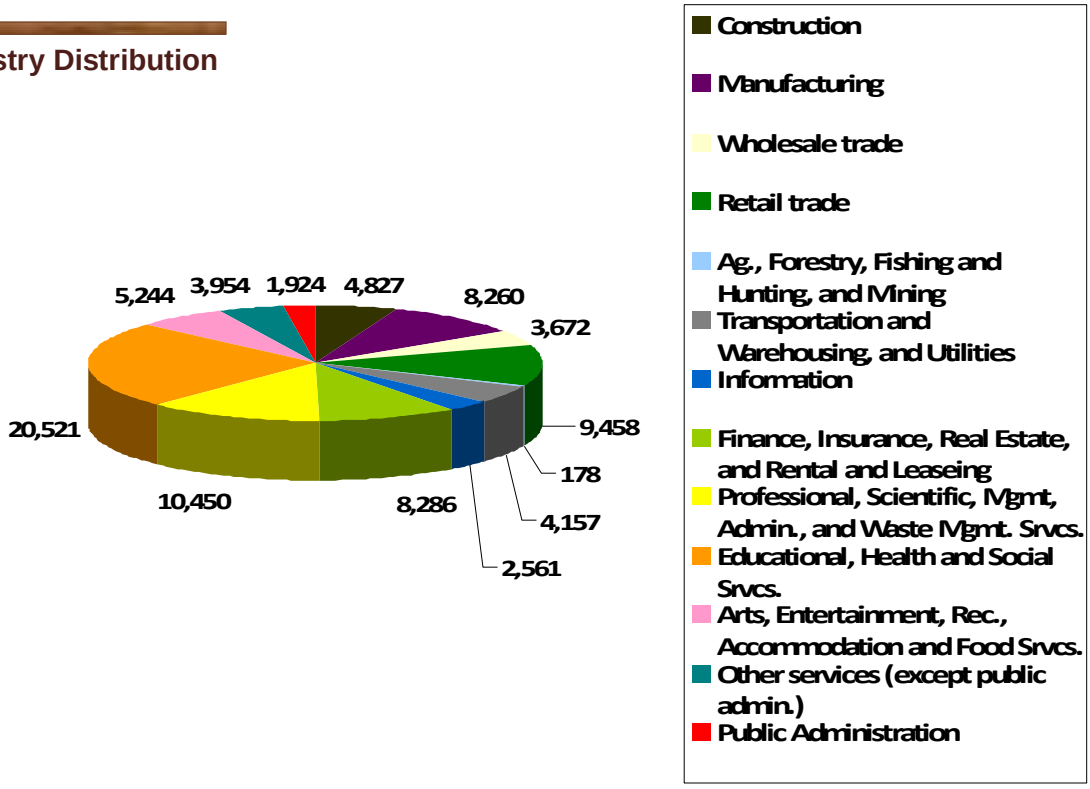
Major Sources of Employment

Data from the 2000 census (US Census Bureau, 2000) were utilized to breakdown the employment within the municipalities in the Pine Creek Watershed. The largest employment sectors, which combine to make up over 48% of employment in the watershed, are educational, health and social services; professional, scientific, management, administration and waste management services; and retail trade.

Figure I-6 Industry Distribution depicts the distribution of employment sectors within the municipalities of the Pine Creek Watershed.

Allegheny County is the region's employment center and attracts a significant number of workers from adjacent counties and states to fill jobs within its borders. While manufacturing remains an important sector of our economy, it is no longer the most significant generator of regional income. Today, our economy is led by the 'meds and eds'; that is, the prominent and prestigious medical and educational institutions located here. The University of Pittsburgh Medical Center (UPMC) is a leading American health care provider and institution for medical research (ACED, 2008).

Figure I-6 Industry Distribution



VIII. Socioeconomic Profile

Community Planning

County and local government land use planning efforts such as comprehensive plans, zoning ordinances, and subdivision and land development ordinances provide guidelines and regulations regarding land use. The Allegheny County Municipal Subdivision & Land Development Ordinance was adopted on May 1, 1998 and a County

Municipality	Comprehensive Plan	Zoning Ordinance	Subdivision and Land Development Ordinance	Joint/Multi Municipal Plan	Municipal Flood Plan
Bradford Woods	Yes (1974)	Yes (2003)	Yes (2003)	No	No
Etna	Yes (1981)	Yes (1997)	No	No	No
Fox Chapel	Yes (1987)	Yes (1989)	Yes (1983)	No	No
Franklin Park	Yes (1993)	Yes (1995)	Yes (1995)	No	No
Hampton	Yes (1995)	Yes (2003)	Yes (2000)	No	No
Indiana	Yes (2001)	Yes (1985)	Yes (1973)	No	No
Marshall	Yes (2004)	Yes (1999)	Yes (1995)	No	No
McCandless	Yes (1978)*	Yes (1969)	Yes (1990)	No	No
O'Hara	Yes (1993)	Yes (2002)	Yes (2004)	No	Yes (1980)
Pine	Yes (2003)	Yes (2005)	Yes (2005)	No	No
Richland	Yes*	Yes (1977)	Yes (1991)	Yes (2004)	No
Ross	Yes (1996)	Yes (2002)	Yes (1998)	No	No
Shaler	Yes (1991)	Yes (1972)	No	No	No
Sharpsburg	No	Yes (1968)	Yes (1991)	No	No

Table I-7 Municipal Plans and Ordinances ***Currently being created/updated**

Comprehensive Plan titled *Allegheny Places* was adopted on November 5, 2008. **Table I-7 Municipal Plans and Ordinances** lists the municipalities within the watershed and the status of their comprehensive plans, zoning ordinances, subdivision and land development ordinances, multi-municipal plans, and municipal flood plans.

Municipalities are authorized to establish environmental advisory councils (EACs) through Act 177 of 1996, originally Act 148 of 1973 (EAC Network, 2009). EACs are appointed volunteers that work to help local officials make sound environmental decisions within and across municipal boundaries. Councils are formed for an individual municipality or could encompass several municipalities.

In accordance with Act 177, EACs are authorized to:

- Identify environmental problems and recommend plans and programs to protect and improve the quality of the environment;
- Make recommendations about the use of open land;
- Promote a community environmental program;
- Keep an index of all open space areas to determine the proper use of such areas;
- Review plans, conduct site visits, and prepare reports for municipal officials; and
- Advise local government agencies about the acquisition of property.

Four of the fourteen municipalities in the Pine Creek Watershed have established EACs: Fox Chapel Borough, Franklin Park Borough, Hampton Township, and Pine Township.

Comprehensive Planning

Comprehensive plans are created to help municipalities understand how to best meet the needs and desires of the local citizenry while preserving the most desirable aspects of their communities. A comprehensive plan serves as a guide for actions and decisions to ensure the development of public and private property which supports the greater good of the community. Without formal plans, municipalities and counties may be vulnerable to undesirable land uses through uncontrolled industrial, commercial, or residential development. All of the municipalities in the watershed except Sharpsburg have an adopted comprehensive plan.

Zoning

Zoning is a legal mechanism by which governmental bodies, for the sake of protecting public health, safety, morals, and the general welfare, can limit a landowner's right to use privately owned land. Zoning ordinances divide a town, city, village, or county into separate residential, commercial, and industrial districts, thereby preserving the desirable characteristics of each type of setting. Zoning helps city planners bring about orderly growth and change, control population density, and create attractive residential areas. In addition, zoning helps assure property owners and residents that the characteristics of nearby areas will remain stable (Farlex, 2009).

Zoning laws vary from one municipality to the next and, therefore, because municipal boundaries have no correlation to watershed boundaries, the Pine Creek Watershed is comprised of a widely varying mixture of zoning classifications. Although not currently used, Watershed Based Zoning (WBZ) is a land use planning process that utilizes subwatershed boundaries as the basis for future land use decisions. WBZ involves defining watershed conditions, measuring current and potential future impervious cover, classifying subwatersheds based on the amount of future imperviousness, and most importantly, modifying master plans and zoning to shift the location and density of future development to the appropriate subwatershed management categories (Center for Watershed Protection, 2009).

Additional information regarding watershed based zoning will be presented in the Water Resources Section of the report.

Subdivision Regulations

Subdivision regulations address the pattern of development and provision of facilities within a community. The regulations authorize a planning commission or review board to review and approve how land is divided to accommodate different land uses, how facilities such as roads and sewer lines are extended to serve newly subdivided lots, and how those lots are developed. This process ensures proper stormwater management and erosion control, protection of natural resources from fragmentation, and preservation of a community's special character and sense of place.

Twelve of the fourteen municipalities partially located within Pine Creek Watershed currently utilize subdivision regulations and/or land development ordinances. All municipalities should utilize subdivision regulations to proactively address the establishment of new development in their municipalities.

Municipal, Fire, Medical, and Police Emergency Services

In every community, there are various groups and individuals who perform (or could perform) necessary services in an emergency. Police officers, firefighters, emergency medical personnel, and public works department personnel are common examples. However, none of these emergency service groups or individuals have the legal responsibility to organize the various safety services to ensure that the needs of the citizens are met for a safe day-to-day environment and that the collective response of all emergency response groups will be effectively coordinated during a disaster.

Allegheny County Police and Fire Training Academy

As a result, the Pennsylvania Emergency Management Services Act, P.L. 1332 was enacted in 1978 and requires each county, city, borough and township in the Commonwealth to select an individual to serve as its emergency management coordinator (EMC). The municipal coordinator has a major role to play in helping the community and residents achieve the proper level of preparedness, response, recovery, and mitigation activities for whatever may affect the municipality. In addition, the EMC must create interest, motivate, and involve the community in these activities and keep elected officials informed and involved with these preparations (Lycoming County, 2009).

Fire and police services are provided by municipal departments across the Pine Creek Watershed. The fire departments are fully volunteer departments funded through a combination of municipal funds, state funds, and fundraising contributions from the members of the community. Police departments are based out of the municipal building and funded entirely through municipal funds. For the municipalities of Bradford Woods, Marshall, Pine, and Richland, there is one police form that oversees these areas and its called the Northern Regional Police. Emergency Medical Services (EMS) are provided by a number of local EMS companies located within or near the watershed, most of which service multiple municipalities. EMS providers are not supported in any way by tax dollars and rely solely on funding provided through Subscription Plans, community donations, and insurance payments.

Although all of the municipalities in the Pine Creek Watershed are adequately equipped with highly trained emergency staff, everyone must remember that the first step in the emergency system is the preparedness of the residents of the community. Dialing 911 from any residential or cellular phone will directly contact emergency dispatchers that will contact the appropriate emergency staff within the municipality.

Table I-8 School District Enrollment

School District	Enrollment 2009-2010
Pine Richland	4,439
Hampton	3,063
North Allegheny	8,040
North Hills	4,539
Shaler	5,141
Fox Chapel	4,552

Education

Portions of six school districts are included within the Pine Creek Watershed. La Roche College is the only college or university within the watershed. **Figure 1-7 School Districts, Colleges, and Universities** depicts the location of the school districts and secondary education facilities. The combined total enrollment of the school districts for the 2009-1010 school year is 29,774 students (Education.com, 2010) **(Table I-8 School District Enrollment)**.

Libraries

There are a number of public libraries available to residents in the Pine Creek Watershed—Northland Public Library, Hampton Community Library, and Shaler North Hills Library.

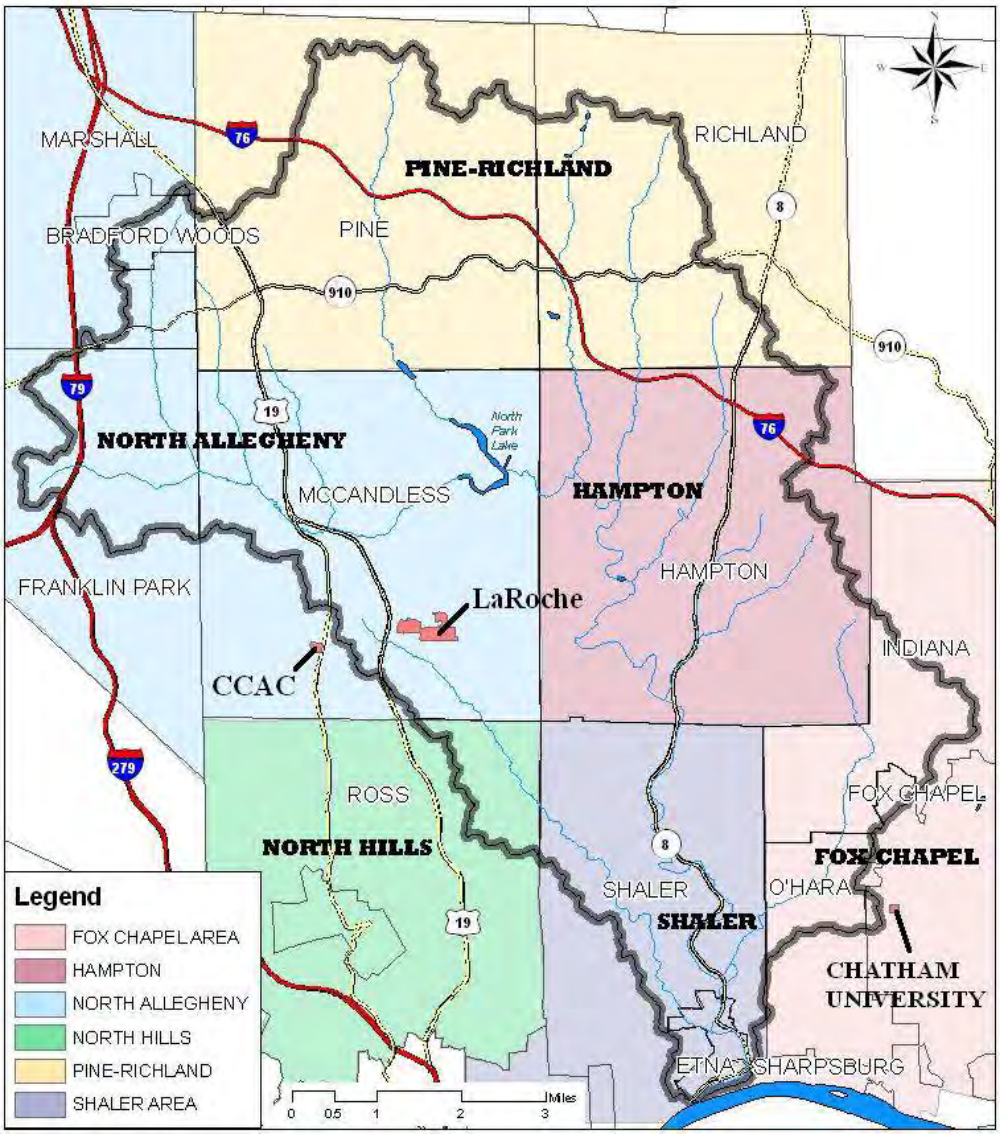


Figure I-7 School Districts, Colleges, and Universities

The Northland Public Library is supported by and serves the communities of Bradford Woods, Franklin Park, Marshall, McCandless, and Ross, but welcome all Allegheny County residents. The Northland Public Library offers many free services to make access to materials convenient and provides other services to further their mission as a community resource for informational and recreational reading materials. The library has approximately 175,000 items in their collection (Northland Public Library, 2007).

The Hampton Community Library (HCL) is located in Allison Park along McCully Road and is the success story of a number of Hampton residents who worked hard to bring a library to the community. Open to the public in September 1990, it is supported by volunteers, as well as by generous individual contributors and businesses. HCL is a full-service ACLA public library, free of charge. HCL is a participant in the Electronic Information Network for Public Libraries in Allegheny County (Hampton Community Library, 2010).

Located in Glenshaw along Mount Royal Boulevard, the Shaler North

Hills Library offers local residents the access to many resources including books, computers, and continuing education courses and programs (Shaler Library, 2010).

The Community Center and Library Association (CCLA) oversee the Lauri Ann West Memorial Library which services the communities of Fox Chapel, Indiana, O'Hara, Sharpsburg, and all other Allegheny County residents. Their mission is to cultivate a community of lifelong learners (Lauri Ann West Memorial Library, 2007).

The Allegheny County Library Association (ACLA) is a federated library system that pursues, provides and promotes the highest quality public library service possible for all residents of Allegheny County through collaboration, cooperation, and coordination (ACLA, 2009).

The Northern Tier Regional Library's (NTRL) mission is to provide resources that inspire, inform, educate, and entertain the public. The library's main location is in Richland, the branch location is in Pine, and the book mobile serves residents from the communities of Pine and Richland. The Northern Tier Regional Library's collection of materials is designed to service children, teens, and adults (NTRL, 2009).

IX. Transportation Facilities

The vitality of a community is often dictated by the mobility and access afforded by the local and regional transportation system. The roads, bridges, parking lots, traffic signals, and public transportation system, which make up the transportation infrastructure, augment the revitalization of commercial areas and improve the quality of life.

The Pine Creek Watershed has a well-maintained and well-established transportation network. The project area contains several major roadways and is also interconnected with numerous arterial roadways

Roadway Inventory

Regionally important interstates, state highways, and secondary roads provide automobile access to the Pine Creek Watershed. In particular, the watershed is exceptionally well connected with respect to interstates and turnpike roads (**Figure I-8 Transportation**).

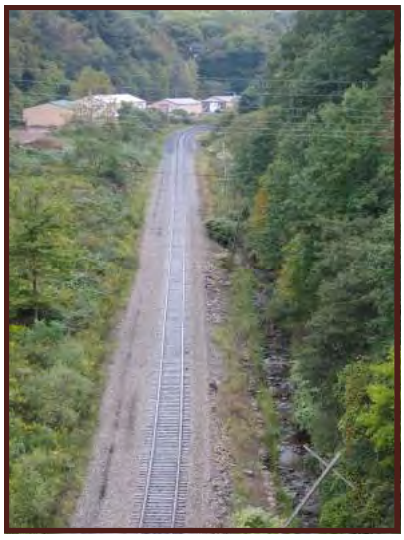
There are a total of 30 miles of Interstate/Turnpike highway, 531 miles

of State Routes, and 1,717 miles of local roads in the Pine Creek Watershed that provide residents with the means to travel efficiently from home to work and to access services. Interstate 76 is the original Pennsylvania Turnpike, and is the major east-west automobile corridor connecting the major cities of Philadelphia and Pittsburgh in southern Pennsylvania. Other regionally important routes that bisect the watershed are I-79, U.S. Route 19, PA State Route 8, and PA State Route 910. Most of the commercial and industrial development in the watershed has been focused along S.R. 8 in Shaler and Etna and along U.S. Route 19 (McKnight Road/Perry Highway) in McCandless.

Interstate 79 near Wexford

Figure I-8 Transportation Figure

Other Traffic Routes



CSX Railroad

Rail

There are several regional railroad lines that cross through the Pine Creek Watershed. The Buffalo and Pittsburgh Railroad as well as the Rochester and Southern Lines connect with major U.S. railroads serving the east (CSX Transportation and Norfolk Southern) in addition to Canada's transcontinental railroads (Canadian National and Canadian Pacific. These lines handle a wide variety of products, typically coal, petroleum and forest products.

Another regional railroad includes the Allegheny Valley Railroad (AVR). The AVR started operations in 1995 and operates approximately 70 miles of tracks, with lines extending from Pittsburgh through Etna to Allison Park. These regional railroad lines contain multiple connections with the North American rail system allowing the transport of basic goods throughout the United States (Carload.com, 2010).

Within the lower portion of the watershed, the CSX Railroad corridor is currently leased to the Allegheny Valley Railroad until 2023. Due to heavy flooding in 2004, this line was heavily damaged and required repair.

Air

No major airports lie within the Pine Creek Watershed boundary. The only major international airport within close proximity is Pittsburgh International Airport, approximately 30 miles southwest of the watershed. The Allegheny County Airport is located approximately 20 miles south of the watershed in West Mifflin, PA.

There are a few local airports within close proximity of the watershed: Butler County Airport in Adams Township, Butler County, located approximately 20 miles northeast, is a 230 acre public airport owned by the Butler County Airport Authority that contains one asphalt paved runway and predominantly services general aviation; Rock Airport of Pittsburgh, LLC is a privately owned airport located in West Deer Township, Allegheny County, approximately 20 miles east; and the 240 acre Zelienople Municipal Airport located 15 miles northeast in Butler County, is a public general aviation facility owned by the Zelienople Borough and managed by the Zelienople Municipal Authority.

River

Pine Creek drains into the Allegheny River near Rivermile (RM) 4.6, down river of the 62nd Street Bridge. Lock and Dam No. 2 located near Sharpsburg, PA is the first of eight navigation facilities on the Allegheny River (Port of Pittsburgh, 2010).

Allegheny River

This Lock and Dam, constructed in 1932 to 1934, began operations in 1934, is listed on the National Register of Historical Places. From 2000 to 2007, Lock 2 averaged 1,486 commercial tows and 2.2 million tons of cargo, the principal of which would be coal. Other commodities transported through the Lock would be petroleum, chemicals, raw materials, manufacturing goods, farm products, manufacturing machinery and other commodities (Port of Pittsburgh, 2010).

Recreational opportunities are numerous on the Allegheny River. During the summer months, the Allegheny River is busy with recreational boaters and jet skis. Lock 2 averaged 5,912 recreation vessels passing through the locks from 2000 to 2007 (Port of Pittsburgh, 2010). The river provides a unique way to see the City of Pittsburgh as well as provide transportation to sporting and other events at Heinz Field and PNC Park.

The Pittsburgh Regatta features extreme water sports, freestyle motocross, powerboat racing, children's activities, national-act concerts, and dramatic Fourth of July fireworks. Attracting over 400,000 annually, the Pittsburgh Regatta is the region's largest community event and the largest inland regatta in the United States. The Regatta consistently fills Point State Park (as well as the North Shore) year after year (About.com, 2010).

The opportunities for fishing are also abundant with the reports of good water quality for the most part on the Allegheny. Preliminary results of a study conducted by the Pennsylvania Department of Environmental Protection (PADEP) indicate that 59 different species of fish were located from Pittsburgh to East Brady, PA and 18 species of mussels were identified from Pittsburgh to Kittanning, PA (Pittsburgh Tribune Review, 2010).

X. Infrastructure

Sanitary sewers, stormwater management, and public water supply are discussed in the Water Resources section of this report.

XI. Important Areas

North Park Lake—October 2009

There are significant undeveloped or green areas (forests and grasslands) throughout the watershed. Some of this can be explained by steep forested slopes, which are unable to be developed, as well as managed recreation areas, such as North Park (PEC, 2009).

Please refer to the Biological and Recreation Resources sections of this report for further details regarding Important Areas in the Pine Creek Watershed.

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CHAPTER II—
LAND RESOURCES

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1. Soil

Soil is a complex mix of ingredients: minerals, air, water, and organic matter (both dead and alive), forming at the surface of land. The soil performs many critical functions in almost any terrestrial ecosystem (i.e. a farm, forest, prairie, or suburban watershed) (Soil Society of America, 2009). Understanding the soils within the Pine Creek Watershed is valuable to local government, municipal planners, developers, and farmers, among others so that effective land use practices and appropriate development can occur. Soil associations have many different characteristics based on their composition, physiographic location, and permeability making each one better suited for a specific land use.

Due to the extensive size of the watershed, a diversity of soil types exist, thus only soil associations will be discussed in detail. Soil associations reflect the influence of parent material weathered from geologic formations and coincide with various topographic features such as floodplains, seeps and springs, and headwater ridges. According to the Soil Survey of Allegheny County (Newbury, et. al., 1981), the following soil associations are found within the watershed; a brief description of each and their appropriate land use is provided.

Gilpin-Upshur-Atkins association contains moderately deep and deep, well drained soils underlain by red and gray shale on uplands and deep, poorly drained soils on floodplains. This association occurs in mostly wooded areas and on steep and very steep sides of valleys, but also includes narrow, nearly level floodplains. Due to steep slopes and hazard of flooding, uses in this association are severely limited other than as wooded area or wildlife habitat.

This association occurs along the floodplain and valley of East Little Pine Creek and West Little Pine Creek within the watershed.

Gilpin-Weikert-Atkins association contains shallow and moderately deep, well drained soils underlain by gray shale on uplands and deep, poorly drained soils on floodplains. Similar to the aforementioned association, Gilpin-Weikert-Atkins association occurs in mostly wooded areas and on steep and very steep sides of valleys, but also includes narrow, nearly level floodplains. Due to steep slopes and hazard of flooding, uses in this association are severely limited other than as wooded area or wildlife habitat.

This association occurs along the floodplain and valley of the main

stem of Pine Creek, North Fork Pine Creek, and Montour Run within the watershed.

Gilpin-Wharton-Upshur association contains moderately deep and deep, well drained and moderately well drained soils underlain by red and gray shale on uplands. This association occurs on undulating to hilly uplands and is highly dissected by small streams and drainageways. This association is dominant in the northern section of Allegheny County. Regarding land use, this association has been cleared and farmed, but in more current times is under continuing suburban development, mixed with idle lands and areas used for recreation.

This association occurs throughout the majority of the watershed outside of the stream valleys and floodplains.

Urban land-Philo-Rainsboro association contains deep, moderately well drained soils and Urban land on floodplains and terraces. Located on nearly level bottom land adjacent to major streams, this association is used for residential, commercial, and major industrial developments as well as major highway and railroad routes.

This association occurs in the southern section of the watershed along the Allegheny River, CSX Railroad, and S.R. 28.

Hydric Soils

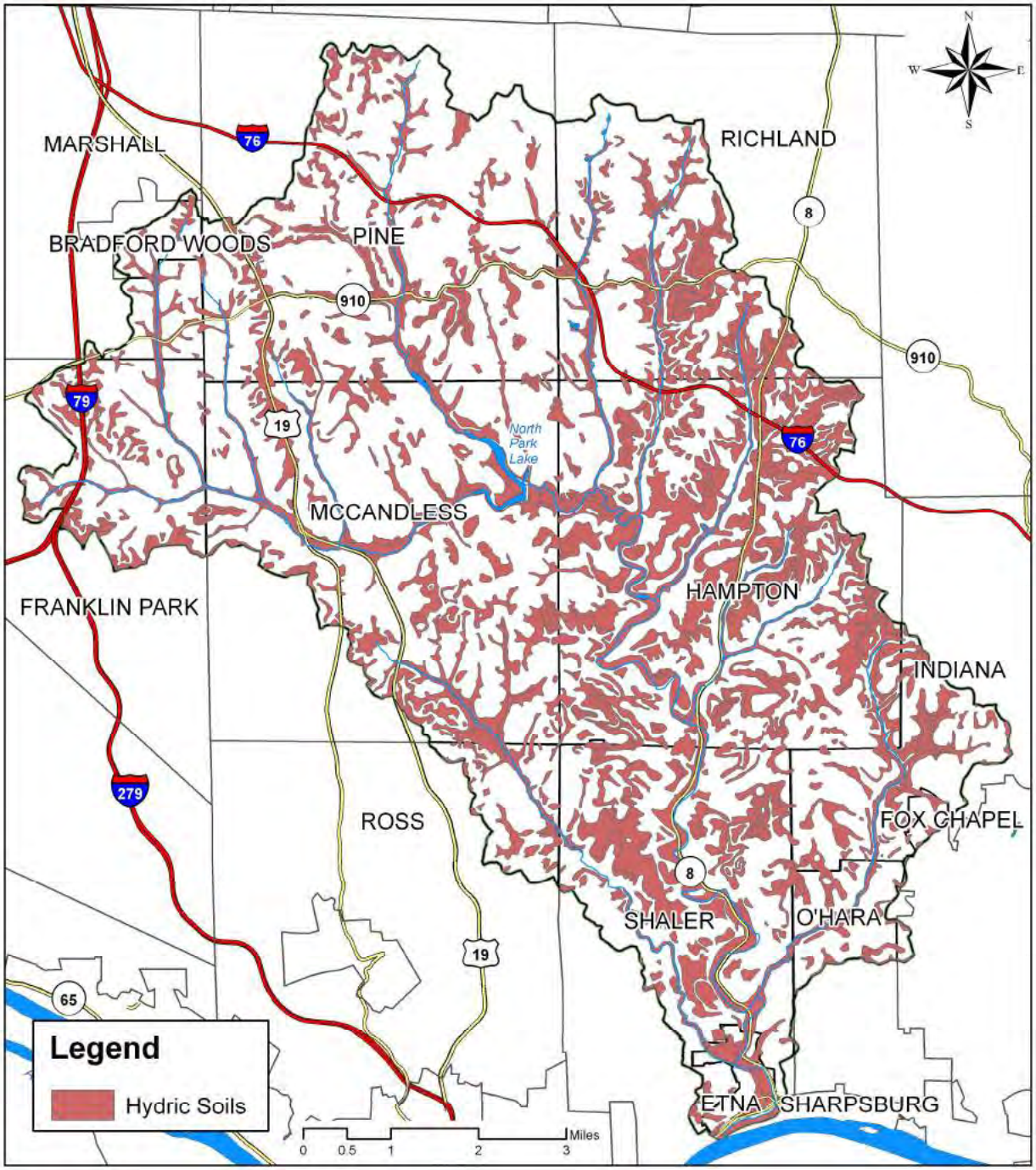
As defined by the National Technical Committee for Hydric Soils (NTCHS), ***hydric soils*** are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil. Under natural conditions, hydric soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. Hydric soils are typically associated with wetlands or wet areas and are one of the three criteria—hydrophytic vegetation, hydric soils, and wetland hydrology—necessary to classify an area as a wetland (Environmental Laboratory, 1987). Hydric soils comprise 32% of soils within the Pine Creek Watershed and are summarized in **Table II-1 Hydric Soils** and shown in **Figure II-1 Hydric Soils**.

Hydric soils are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil.

Wetland within the Pine Creek Watershed

Due to their association with typically wet areas or wetlands, hydric soils are found in floodplains, valleys, and depressional areas where water collects. The high moisture content of these soils does not make them well suited for development or roadways because of frost action, during which the water expands and contracts. This action can cause

Figure II-1 Hydric Soils within the Pine Creek Watershed



cracks and stress on construction materials. Likewise, areas where hydric soils typically occur are prone to flooding and have a high water table; thus land uses that would benefit from such conditions are best suited for these areas. For example, wildlife habitat, green space, and natural flood control are some congruent land uses (Newbury, et. al., 1981).

Soil Name	Soil Symbol(s)
Atkins silt loam	At
Brinkerton silt loam	BrB
Soils with Hydric Inclusions	
Cavode silt loam	CaB, CaC
Clarksburg silt loam	CkB, CkC
Dormont silt loam	DoB, DoC, DoD
Dumps, coal waste	Du
Dumps, industrial waste	Dw
Ernest silt loam	ErB, ErD
Ernest-Vandergrift silt loam	EvB, EvC
Guernsey silt loam	GuB, GuC
Guernsey-Vandergrift silt loam	GvB, GvC
Gullied land	Gx
Huntington silt loam	Hu
Library silty clay loam	LbB, LbC
Lindside silt loam	Ln
Newark silt loam	Ne
Philo silt loam	Ph
Rainsboro silt loam	RaA, RaB, RaC
Strip mines	SmB, SmD
Urban Land	UB
Urban Land-Culleoka complex	UCB
Urban Land-Guernsey complex	UgB
Urban Land-Rainsboro complex	UrB
Urban Land-Wharton complex	UwB
Wharton silt loam	WhB, WhC

Table II-1 Hydric Soils

II. Geology

Geologically speaking, the Pine Creek Watershed is located within the Appalachian Plateau Physiographic Province. The Appalachian Plateau is the most extensive physiographic province in the Commonwealth, extending from Greene and Somerset Counties in the southwest, to Erie County in the northwest, and to Wayne and Pike Counties in the northeast. Characterized by highlands, the Plateau over time has been carved by water drainage patterns, forming the typical Pennsylvania landscape of rolling hills, deep valleys, and extensive stream systems (DCNR, 1996).

The watershed lies within the Pittsburgh Low Plateau Section, which is characterized by the smooth, undulating upland areas, cut by narrow and relatively shallow valleys. During the Pennsylvanian period (299 – 318 million years ago), the bulk of the bituminous coal was formed along the upland areas of this physiographic section. Today, the landscape reflects the history of the mining industry—operating surface mines, old strip mined areas, and reclaimed strip mined areas. Elevation throughout the section varies from 660 to 1,700 feet. Due to the steepness of the valley sides, some areas in the southwestern part of the section are susceptible to landslides (DCNR, 2009).

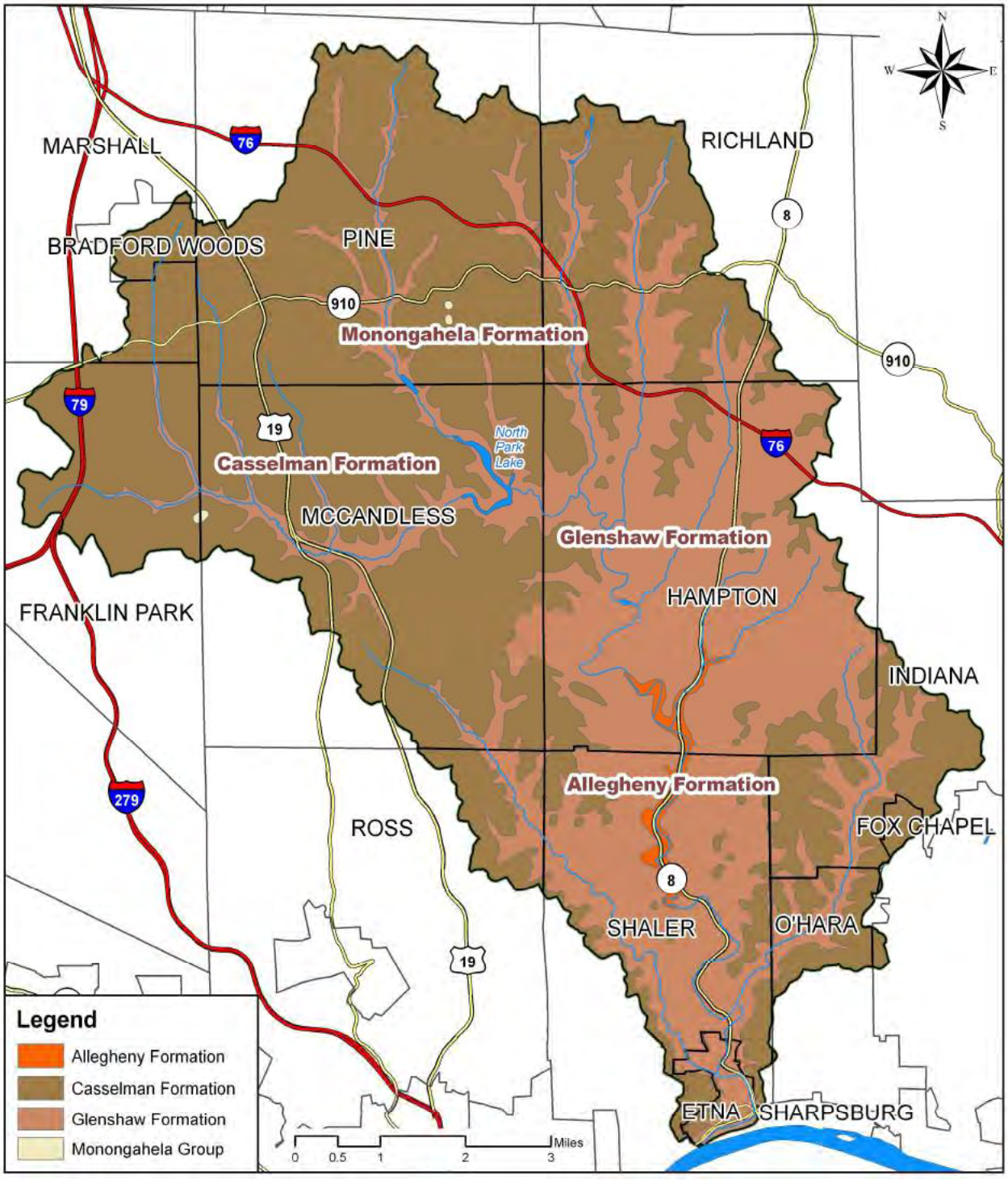
Four different formations of the Pittsburgh Low Plateau section comprise the Pine Creek Watershed (**Figure II-2 Geology of the Pine Creek Watershed**). The Casselman and Glenshaw formations underlie the majority of the watershed. The Casselman formation consists of cyclic sequences of shale, siltstone, sandstone, red beds, impure limestone, and non-persistent coal. The Glenshaw formation consists of cyclic sequences of shale, sandstone, red beds, thin limestone, and coal. The red beds of these two formations are associated with landslides that occur within the region. The Monongahela and Allegheny formations underlie the watershed in very few areas. Rocks of the Monongahela formation consist of cyclic sequences of limestone, shale, sandstone, and coal. Commercial coal—Pittsburgh coal seam—is present in this formation. The Allegheny formation is present in a limited area surrounding the main stem Pine Creek valley and consists of sandstone, shale, limestone, clay, and coal. This formation contains valuable clay deposits, Vanport limestone, and Freeport, Kittanning, and Brookville-Clarion coal (DCNR, 2009).

Significant Geologic Features

Identified in the Allegheny County Natural Heritage Inventory (WPC,

1994), Cold Valley was noted as being an area of significant geologic features. Due to its geologic formation, the walls of the narrow valley channel and trap cool air currents, thus keeping the valley bottom cool throughout the year. Cold Valley extends from Sample Road north to

Figure II-2 Geology of the Pine Creek Watershed



the vicinity of the Hampton Cemetery and is located within the Crouse Run Biological Diversity Area (BDA) (Existing Resources—Biological, Page IV-15).

III. Agriculture

Bauerle's Farm & Greenhouse Sign

As briefly discussed (Project Area Characteristics – Land Use / Land Cover), agriculture is not a major land use component within the Pine Creek Watershed. According to SPC land use data (2006), only approximately 1,800 acres or 4% of the watershed is agricultural land—rangeland, pasture, groves, crop, and orchards.

Prime Agricultural Soils

Prime agricultural soils, also known as prime farmland soils, are those soils that meet certain physical, chemical, and slope characteristics. The criteria typical of these soils are level to near level slopes, a well-drained structure, deep horizons, an acceptable level of alkaline or acid components, and the capacity for producing food or crops. The soils are identified by the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) for each county and

Symbol	Soil Name	Description / Slope Characteristics
AgB	Allegheny silt loam	Coarse subsoil variant 2-8% slope
CkB	Clarksburg silt loam	3-8% slope
CmB	Clymer silt loam	3-8% slope
CuB	Culleoka silt loam	3-8% slope
CwB	Culleoka-Weikert shaly silt loams	3-8% slope
GlB	Gilpin silt loam	2-8% slope
GpB	Gilpin-Upshur complex	3-8% slope
HaB	Hazleton loam	
Hu	Huntington silt loam	
Ph	Philo silt loam	
RaA	Rainsboro silt loam	0-3% slope
RyB	Rayne silt loam	2-8% slope
WhB	Wharton silt loam	2-8% slope

Table II-2 Prime Farmland Soils

Figure II-3 Prime Farmland Soils

have been determined to be the best suited for producing the highest crop yields with minimal input of energy and economic resources (Newbury, et. al., 1981). Prime agricultural soils comprise 17% of soils and are located throughout the watershed. Prime agricultural soils identified within the Pine Creek Watershed are summarized in **Table II-2 Prime Farmland Soils** and shown in **Figure II-3 Prime Farmland Soils.**

IV. Farmland Preservation

Corn Fields

As Pennsylvania's leading industry, agriculture and its associated land provide economic, social, and environmental benefits to the surrounding local community. Relative to the Pine Creek Watershed, agricultural lands produce locally grown produce and products, provide wildlife habitat, create local jobs and tourist attractions, and protect soil from erosion. Open farm land and forested areas also allow for the recharge of ground water in our communities.

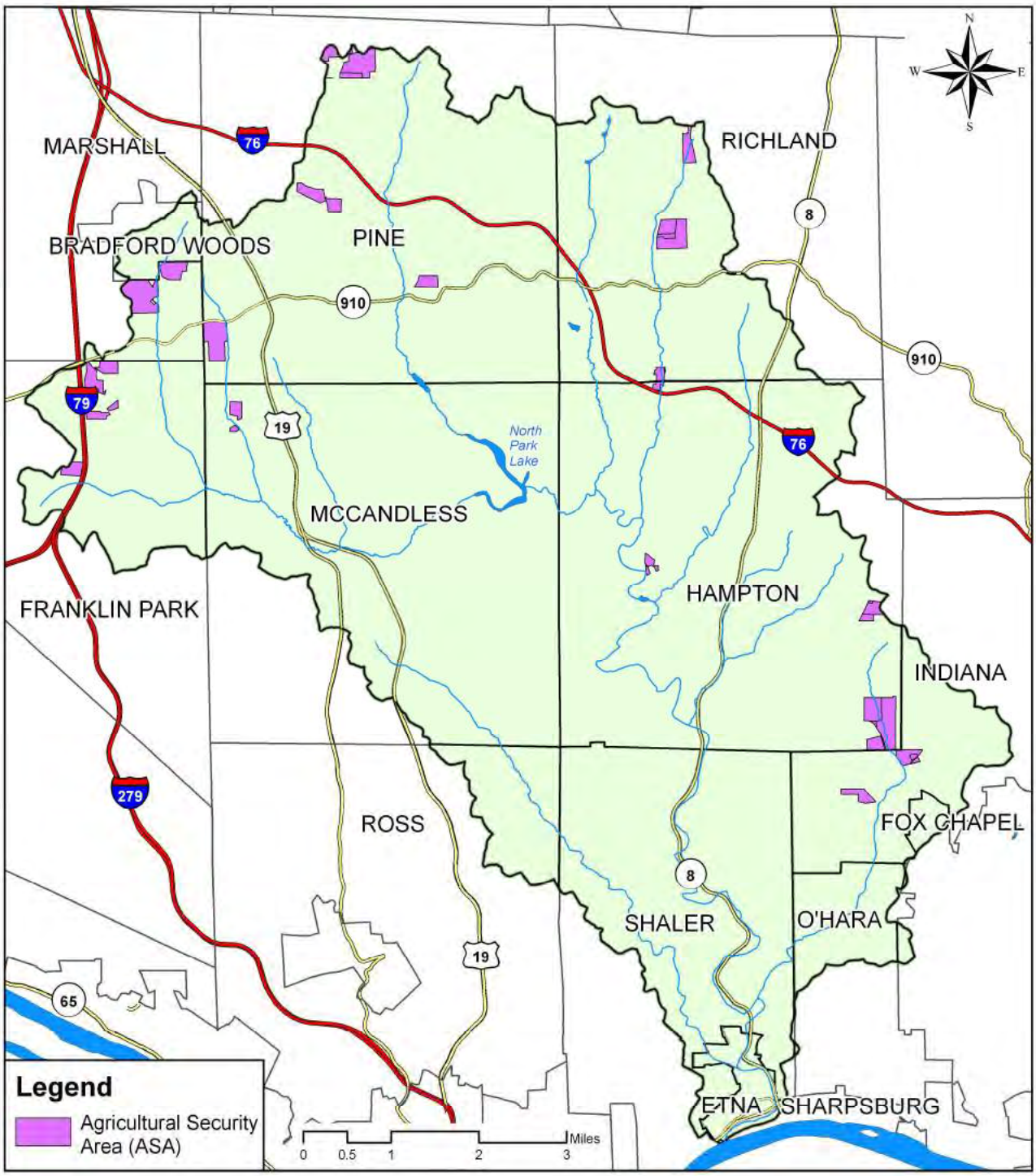
Due to the many benefits of agricultural land, the Commonwealth has been aggressively pursuing farmland preservation to protect this resource from increasing development pressure. In 1988, the Farmland Preservation Program was developed and the Bureau of Farmland Preservation was empowered to protect this valuable resource. Since the program's inception, more than 407,000 acres have been approved for permanent preservation through 3,701 agricultural conservation easements. Pennsylvania is first in the country in number of acres preserved and continues to preserve farmland at a faster rate than any other state; 308 farms were preserved by permanent agricultural easements in 2008, which matched 2001 as the second highest number of farms preserved in a year (PDA, 2008). To qualify for the Farmland Preservation Program, farms must first be designated in Agricultural Security Areas (ASA).

Agricultural Security Areas

Agricultural Security Areas (ASA) are lands enrolled in a statewide designation program that was established to promote and conserve agricultural land as well as the agricultural lifestyle and heritage across the Commonwealth.

Agricultural Security Areas (ASAs) are lands enrolled in a statewide designation program that was established to promote and conserve agricultural land as well as the agricultural lifestyle and heritage across the Commonwealth. Local municipalities work in cooperation with land owners to secure the land and the right to farm. An ASA can be comprised of several different farms, but each farm must be 10 acres each (they do not need to be adjacent), and collectively, the ASA must meet a minimum of 250 acres. To be considered part of an ASA, the

Figure II-4 Agricultural Security Areas



Local Farmer's Market

land must be viable agricultural land including pasture, woodland, and cropland. ASA properties are reviewed every seven years to validate their eligibility. Twenty-two farm properties, which total 735 acres, are enrolled in the ASA program within the Pine Creek Watershed. All the farm properties are part of the designated North Hills ASA. **Figure II-4 Agricultural Security Areas** shows ASA locations within the watershed.

The ASA designation offers many benefits to the landowners including:

1. a municipal agreement to not create "nuisance laws", including noise and odor ordinances, that would limit agricultural practices
2. limitations on the ability of government to condemn ASA land for roads, parks, and other infrastructure projects
3. landowners are eligible to voluntarily sell the development rights of their farm as a conservation easement to the Commonwealth of Pennsylvania or Allegheny County. A conservation easement would ensure that the land would be available for agricultural use indefinitely (PA Farmland Preservation Association, 2009).

Clean and Green Program

The Clean and Green Program is another way the state protects agricultural lands. This program provides incentives to landowners to preserve agricultural lands and forestland by offering real estate tax breaks and taxing the land based on its "use value" rather than its market value. Landowners who either own 10 or more acres of qualifying land or earn an annual gross income of more than $2,000 from farming can apply for the program (PDA, 2009). In total, 101 parcels comprising approximately 2,276 acres of land, are enrolled in the Clean and Green Program within the Pine Creek Watershed.

Private residence within the watershed

V. Land Ownership

The majority of the land within the Pine Creek Watershed is privately-owned, which includes residential areas, farms, forested areas, commercial property, and industrial property. Some private land owners have conservation easements associated with their land. A conservation easement is a voluntary deed restriction that the property owner places on their land to protect the natural resources present.

Lands under conservation easements remain privately owned; however, the government or nonprofit conservation organization holds the easement. The property owner authorizes the easement holder to monitor and enforce restrictions set forth in the agreement.

Some of the land within the Pine Creek Watershed is publicly-owned, which includes public recreational parks, schools, universities, municipal parks, and random tracts of municipal properties. The largest tracts of publicly-owned land are North Park and Hartwood Acres, both county-owned parks. All of North Park is located within the watershed, whereas only a portion of Hartwood Acres is within the project area. Publicly owned land comprises 4,322 acres or 10% of the watershed. The county parks and recreational facilities are covered in more detail in the Existing Resources-Recreation section (Pg. V-4).

VI. Landfills

According to the Allegheny County Comprehensive Plan (ACED, 2008), there are no private nor municipal landfills located within the Pine Creek Watershed.

Waste and Recycling Services

All of the municipalities offer curbside trash pickup and all of the municipalities except the Borough of Sharpsburg offer curbside recycling services for their residents. In most municipalities, residents are mandated to participate in these services through municipal ordinances. In addition, half of the municipalities also offer leaf and yard waste collection for recycling as well as events and/or information on how to dispose of hard to recycle items such as appliances, electronics, batteries and Household Hazardous Waste (HHW) such as old paints, pesticides, and cleaners. Residents can also recycle office paper, magazines, junk mail, newspaper, and acceptable paper items at Abitibi paper retriever recycling bins throughout the region.

Abitibi Paper Retriever Recycling Bin

VII. Hazard Areas

Hazardous areas can have profound, negative impacts on land resources as well as land use. These areas can degrade the immediate and surrounding natural and human environments, while excluding desirable land uses. The various types of hazardous areas located within the project area are described below.

CERCLIS Waste Sites

The Comprehensive Environmental Response Compensation Act (CERCLA) provides broad federal authority to respond directly to releases of hazardous substances that may endanger public health or the environment.

Enacted in 1980, the ***Comprehensive Environmental Response Compensation and Liability Act (CERCLA)***, also known as the Superfund Act, provides broad federal authority to respond directly to releases of hazardous substances that may endanger public health or the environment. As part of the Superfund program, the Environmental Protection Agency (EPA) identifies, investigates, and remediates former industrial and hazardous waste sites. Superfund sites are prioritized for cleanup on the National Priority List. CERCLIS is the abbreviation of the CERCLA Information System, which is a comprehensive database and data management system that inventories and tracks releases addressed or needing to be addressed by the Superfund program. According to the EPA, there are no CERCLA or Superfund Sites located within the project area (EPA, 2009).

On a state level, the Pennsylvania Department of Environmental Protection (PADEP) created the Land Recycling Program, commonly known as Act 2, which encourages voluntary cleanup and reuse of brownfield sites. The program was developed based on four cornerstones that breakdown redevelopment obstacles to create new economic and environmental opportunities: uniform cleanup standards; liability relief; standardized reviews and time limits; and financial assistance.

In 2004, the PADEP also developed a joint program with EPA called the "Once Cleanup Program", which ensures that brownfields recovered under the state's brownfield program meet federal cleanup standards. According to the Allegheny County Comprehensive Plan, no brownfield sites are located within the Pine Creek Watershed (ACED, 2008).

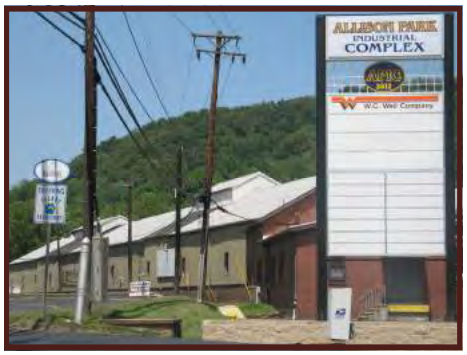
RCRIS Waste Sites

The Resource Conservation and Recovery Act (RCRA) regulates transportation, handling, storage, and disposal of solid and hazardous waste materials.

The ***Resource Conservation and Recovery Act (RCRA)*** regulates transportation, handling, storage, and disposal of solid and hazardous waste materials. To comply with this law, regulated facilities and haulers must obtain permits, identify and list hazardous waste, adhere to proper procedures when transporting or disposing of waste, develop risk management plans, and maintain records of all documentation. RCRA also regulates underground storage tanks and includes requirements for cover tank design, operation, cleanup, and closure.

RCRIS is the abbreviation of the RCRA Information System, which is a comprehensive database and data management system that

inventories and tracks releases of hazardous waste and sites addressed by RCRA. According to the EPA, one identified RCRA site, formerly Anvil Products in Allison Park, Hampton Township, is located within the watershed. Historically, Anvil Products purchased the site in 1928 and manufactured threaded steel pipe couplings for the oil and gas industry from 1930 to 1985 and bomb plugs during World War II. The main buildings located on the site include Anvil's former plating plant (adjacent to the road), wastewater treatment plant (middle building), and warehouse and machine shop processing area (adjacent to main stem Pine Creek). As of December 2008, the property was owned by Haber Associates, who purchased the site in 1988. The site is now known as the Allison Park Industrial Complex and is leased to several tenants that generate no hazardous wastes (EPA, 2008).



Allison Park Industrial Complex

An Environmental Indicator (EI) inspection conducted in July 2003 determined that Anvil's past hazardous waste handling practices were unlikely to impact human health and the environment; however, more information would be needed to confirm this determination.

One former hazardous waste site, the Roessing Bronze / Concast Metal Company, has been remediated. Roessing Bronze is headquartered in Mars, Pennsylvania, but had off-site locations along Bryant Road within the watershed. From the late 1960's to 1980's, the approximately 38 acre off-site location was used to reclaim metals from bronze smelting. As a result, problem materials identified on site included copper, zinc, and some lead. Three lagoons or ponds were located on the property. The company has remediated the area to the required level for the land to be used as wildlife habitat.

Remediated Roessing Bronze Site

After the company remediated the property, the North Area Environmental Council (NAEC) and Trout Unlimited coordinated additional improvements at the site. These organizations with the help of volunteers planted native plants and trees along Pine Creek to improve riparian buffers and create wildlife habitat. Mainstem Pine Creek flows along the backside of this property. These remediation efforts helped to revive this stream valley as a quiet retreat for fisherman and outdoor enthusiasts alike (NAEC, 2009).

Stream Deflector placed in Pine Creek near Roessing Bronze Site

TRI

Enacted in 1986, the Emergency Planning and Community Right-to-Know-Act (EPCRA) was established with the purpose to inform communities and citizens of chemical hazards being released in their local community. EPCRA requires businesses to report the locations and quantities of chemicals stored on-site. Section 313 of EPCRA

requires EPA and the States to annually collect data on releases and transfers of certain toxic chemicals from industrial facilities, and make the data available to the public in the Toxics Release Inventory (TRI). TRI is a publicly available EPA database that contains information on toxic chemical releases and waste management activities reported annually by certain industries as well as federal facilities. A review of the 2007 TRI for Allegheny County showed the toxic releases of 77 facilities, which totaled 16,051,626 pounds of waste disposed of on and off-site (EPA, 2009).

Municipality	Location
Hampton Township	Montour Road Site 1
Hampton Township	Montour Road Site 2
Hampton Township	Wildwood Road Site 1
Hampton Township	Felicity Avenue
Hampton Township	Allison Park RR House on Route 8
Hampton Township	East Elfinwild near Balsam Drive
Hampton Township	Route 8 Site 1
Hampton Township	McCully Road
Hampton Township	Wildwood Road Site 3
Hampton Township	Wildwood Sample Road Site 1
Hampton Township	Wildwood Sample Road Site 2
Hampton Township	Wildwood Sample Road Site 3
Hampton Township	Wildwood Sample Road Site 4
Hampton Township	Wildwood Sample Road Site 5
Hampton Township	Royal View & Sample Road
Hampton Township	Wildwood & Hardt Road
Hampton Township	Harts Run and Middle Road
Hampton Township	Route 8 Site 2
Hampton Township	Route 8 Site 3
McCandless Township	Irwin Road Site 1
McCandless Township	Irwin Road Site 2
McCandless Township	Wildwood Road Site 2
McCandless Township	Babcock Boulevard
Shaler Township	Little Pine Creek Road

Table II-3 Illegal Waste Dumps

Illegal Dumping

The Pine Creek Watershed, like many other watersheds located in semi-rural areas, has a problem with illegal dumping of residual waste. Instead of properly disposing of unwanted items, some people dispose of their trash at old refuse piles, hillsides, or streambeds in remote areas. What's more, 75% of the respondents to the public survey developed for this plan noted trash and debris as an important issue to address in the Pine Creek Watershed Conservation Plan.

Illegal Dumpsite along Main Stem Pine Creek

The Pittsburgh Chapter of PA CleanWays or Allegheny CleanWays works with local businesses and organizations to fight against litter and illegal dumping. Allegheny CleanWays identified 24 dumpsites within the Pine Creek Watershed during a county survey in 2005 (**Table II-3 Illegal Waste Dumps**) (PA CleanWays, 2005). The study was completed soon after Hurricane Ivan and extensive flooding had occurred in the region, thus, the majority of these "illegal waste areas" are believed to have been debris piles as a result of flooding. Based on recent informal inspections, Allegheny CleanWays representatives have confirmed that all of the sites in Hampton have been cleaned up since the 2005 report was published. However, one new site off of Montour Road has been identified. Currently, there are no formal plans to update the 2005 Illegal Dump Survey for Allegheny County (PA CleanWays, 2009).

Abandoned Mines/Quarries

Coal mining has been a part of Pennsylvania's history and economy since the late 1700's, and remains a prominent industry today. Despite its economic benefits, the widespread use of coal throughout the state has not come without serious cost to the environment. Early coal mining companies took little voluntary action to protect natural resources. As a result, in 1971, Pennsylvania enacted the Surface Mining Conservation and Reclamation Act to curb the long-term environmental impacts of mining—abandoned mine drainage (AMD), disruption of groundwater resources, soil erosion, and scarring of the land. In 1977, the federal government followed suit and enacted the Surface Mining Control and Reclamation Act, which modeled the Pennsylvania regulation. These regulations provide guidelines and mining standards for current and future mining activities (PADEP, 2009).

Abandoned piles of waste material left behind from coal mining and coal processing remain within Allegheny County. These piles, also called Abandoned Mine Lands (AML) are hazardous impediments to

development and include dangerous highwalls, impoundments, embankments, slides, gob piles, hazardous or explosive gas build-ups, and hazardous equipment or facilities. According to the Reclaimed Abandoned Mine Land Inventory System (RAMLIS), four AML areas (**Figure II-5 Mining and Oil & Gas Well Locations**) are located within in the watershed, all of which have been reclaimed (WPCAMR, 2007):

- A 12-acre abandoned refuse pile with a subsidence prone area located in North Park Heights, Pine Township was reclaimed in November 2002.
- A 41-acre refuse pile located in Hampton Township near the Wildwood Mine was reclaimed in 1993.
- Two structures that were affiliated with the abandoned Wildwood Mine, Hampton Township, were removed and the area reclaimed.
- In November 1995, mine subsidence occurred along Bluestone Road in Shaler Township, which resulted in structural damage to three residences in the area. This area was associated with a reclaimed AML; a residential area and a ballfield were constructed on the reclaimed site. The area was stabilized and fully reclaimed as of October 2005.

AMD Treatment System Outflow

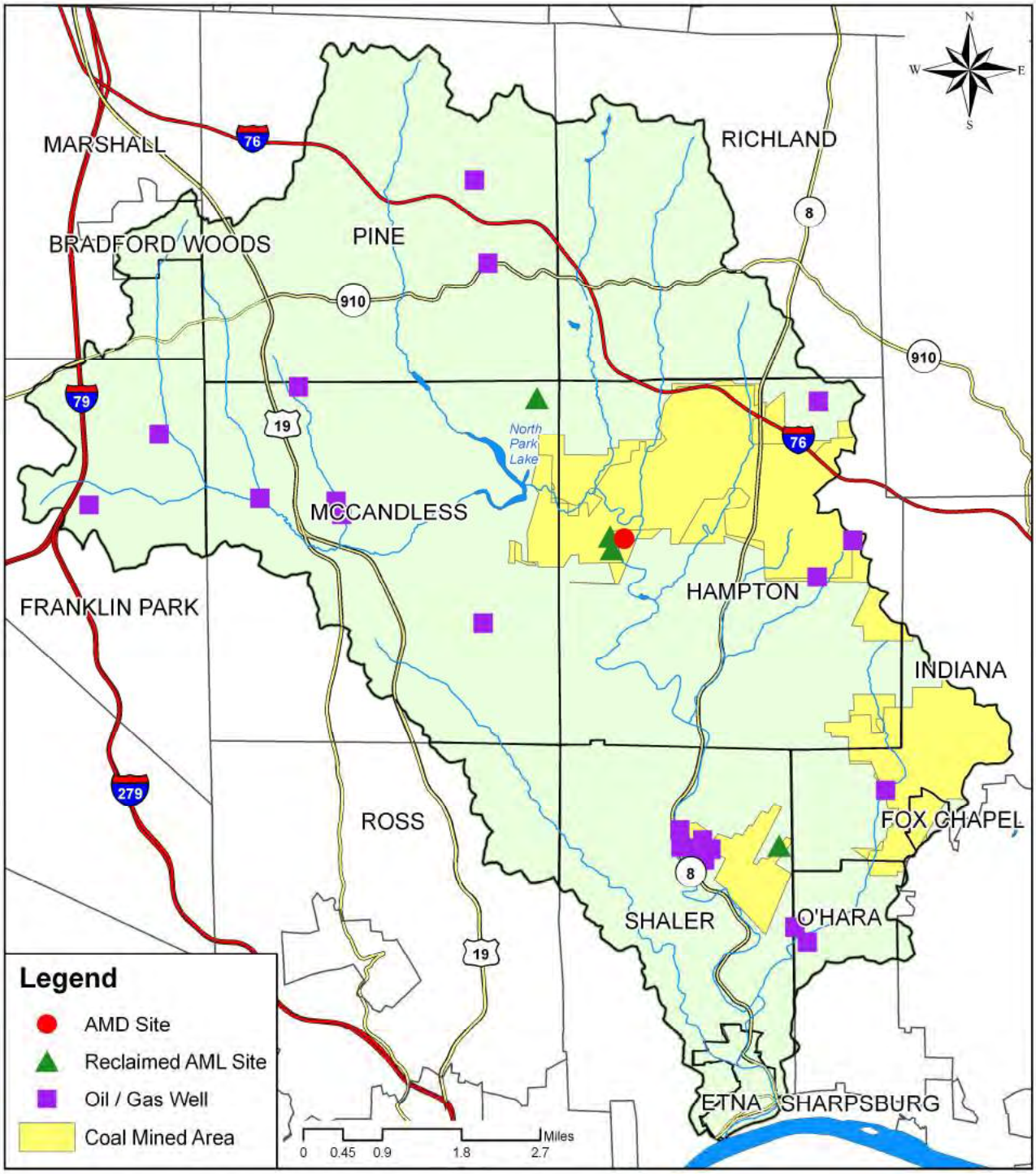
Abandoned mine drainage (AMD) is another common problem associated with abandoned mining operations, both deep and surface. AMD results when metal sulfides (often pyrite) oxidize within rock and coal overburden after it is exposed to air and water. Through natural processes, polluted water from abandoned coal mines then seeps into streams, disrupting the ecology and water quality of the stream. AMD is toxic to aquatic life and can render a stream lifeless. Only one known AMD discharge is located within the Pine Creek Watershed. The AMD discharge is being treated through an on-site passive AMD treatment system, which is located just north of Wildwood Bridge over Willow Run (Existing Resources—Water, Pg. III-29).

According to the PCW Riparian study (NAEC, 2010), there is also an indication of AMD in the Gourdhead Run valley below McCully Road. No in-depth studies on this site have been conducted at the time of this report.

Active Mines/Quarries

According to the Allegheny County Comprehensive Plan (ACED, 2008), there are no active underground coal mining or strip mines

Figure II-5 Mining and Oil & Gas Well Locations



within the Pine Creek Watershed. Moreover, no industrial mineral mining facilities, such as sandstone, shale, clay, or slag, exist within the watershed.

Sinkholes

Sinkhole

A sinkhole is a hole or depression in the ground that results from surface material moving into subsurface pathways, either by gradual subsidence to form a depression in the landscape or by collapse to form an abrupt break in the soil. Natural physical and chemical weathering as well as subsurface mining, groundwater extraction, and subsurface erosion can all lead to sinkholes on the land surface. More commonly, however, sinkholes are associated with areas where subsurface mineral extraction has occurred (Kochanov, 1999).

According to DEP, underground coal mining has occurred in the following municipalities within the Pine Creek Watershed: Indiana, Hampton, Fox Chapel, McCandless, O'Hara, Pine, and Shaler (PADEP, 2009). Sections of these municipalities where subsurface coal mining has occurred may be susceptible to sinkholes and subsidence (**Figure II-5 Mining and Oil & Gas Well Locations**).

Due to legal confidentiality agreements, the PADEP District Mining office could not release information on sinkholes claims; however, the federal Office of Surface Mining files revealed three claims of mine subsidence within the watershed, all of which have been remediated. Mine Subsidence Insurance is available to residents of Pennsylvania and can be purchased to protect their properties.

Oil and Gas Exploration

In addition to coal, shallow oil and gas fields within the region provide additional economically viable resources for extraction. In 2008, PADEP issued 110 gas permits and two oil drilling permits within Allegheny County (PADEP, 2008). According to SPC GIS data, there are 22 oil and gas wells within the Pine Creek Watershed (**Figure II-5 Mining and Oil & Gas Well Locations**).

Marcellus Shale Formation

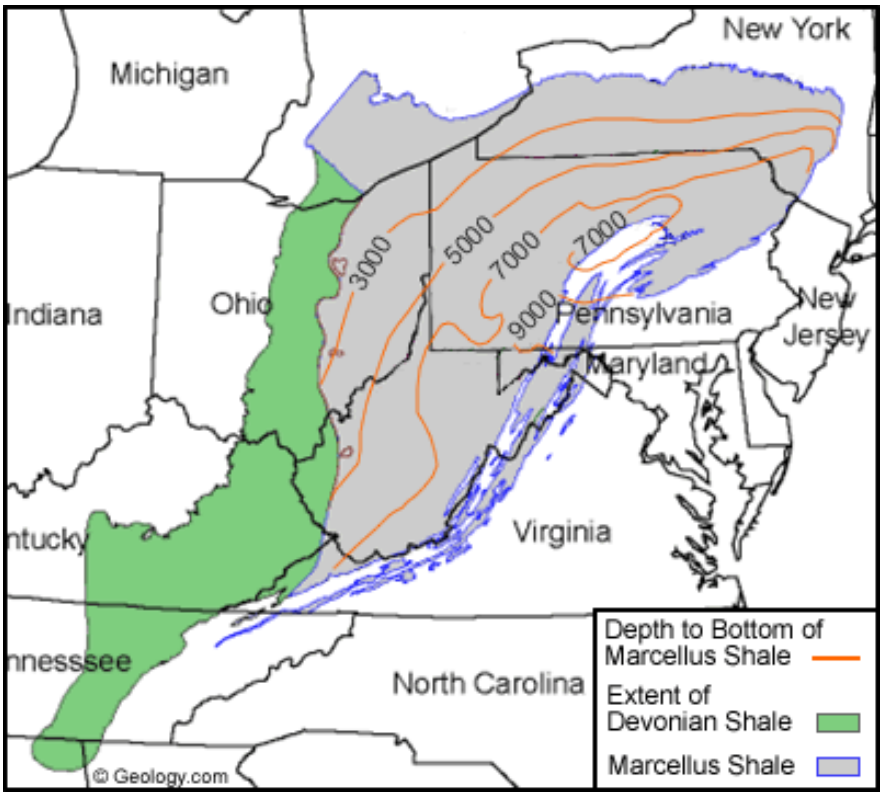
Marcellus Shale is a rock formation that underlies approximately 2/3 of Pennsylvania and portions of New York and West Virginia at a depth of 5,000 to 8,000 feet (**Figure II-6 Marcellus Shale Location Map**). The formation is believed to hold trillions of cubic feet of natural gas, which until recently has been considered prohibitively expensive to access. Recent advances in drilling technology and rising natural gas

prices, however, have rejuvenated interest in this previously untapped formation. The geology of the Marcellus formation suggests that areas in southwestern, northcentral, and northeastern regions of Pennsylvania that have not traditionally seen much gas well drilling may be especially productive (PADEP, 2008).

As of October 30, 2009, only one Marcellus shale well was permitted and drilled within Allegheny County. That well is located in the southern most tip of the county (PADEP, 2009).

Marcellus shale extraction and the proper disposal of wastewater has been a topic of concern throughout the state in recent months. Currently, the PADEP is responsible for reviewing and approving permits to drill new wells and for waste water treatment and discharges.

Figure II-6 Marcellus Shale Location Map



VIII. Critical Areas

Critical areas are lands that require special consideration and are limited in some way from development. Critical areas include steep slopes; ridge tops; unique natural features; floodplains; wetlands;

protected or biologically diverse areas; or areas that contain plant or animal species that are threatened, endangered, or of special concern. Landslides are discussed below in detail. For discussion of the other critical areas, please see Existing Resources, Water and Biological Sections.

Earthflow landslide

Landslides

Landslides are common in Pennsylvania because of the hilly terrain, geologic formations, soil types, and steep slopes. Located within the Pittsburgh Low Plateau physiographic region, the majority of the Pine Creek Watershed is underlain with Casselman and Glenshaw formations, both of which consist of cyclic sequences of Pittsburgh red beds. Pittsburgh red beds are a thick, 40- to 60-foot rock layer that consists of a series of mostly reddish, greenish, and grayish claystones and shales. Red beds tend to weather deeply where they occur on hillsides throughout large portions of western Pennsylvania (**Figure II-7 Redbeds Location within the Region**). Consequently, areas underlain by red beds are prone to earthflow landslides.

Rockfall landslide

There are two types of landslides common within the watershed: earthflow and rockfall. Earthflow landslides are caused by the removal of vegetation on steep slopes, which allows water to seep into the underlying soils. When water seeps down to red bed soils, the entire seam releases and "flows" downhill as if on ball-bearings. Whole trees, houses, roads, etc. can thus end up still standing, but located down slope from their original location. Rockfall landslides typically occur on steep slopes with loose soils or old debris, which is then triggered by ground movement and gravity, causing a sudden shift and instability in earthen material.

Soil Name	Soil Symbol	Description	Risk Potential
Upshur Silty Clay Loam	UaB	3-8% slopes	Moderate
Upshur Silty Clay Loam	UaC	8-15% slopes	High
Gilpin-Upshur Complex	GpB	3-8% slopes	Moderate
Gilpin-Upshur Complex	GpC	8-15% slopes	High
Gilpin-Upshur Complex	GpD	15-25% slopes	High
Guernsey-Vandergrift Silt Loam	GvB	3-8% slopes	Moderate
Guernsey-Vandergrift Silt Loam	GvC	8-15% slopes	High
Guernsey-Vandergrift Silt Loam	GvD	15-25% slopes	High
Ernest-Vandergrift Silt Loam	EvB	3-8% slopes	High
Ernest-Vandergrift Silt Loam	EvC	8-15% slopes	High
Ernest-Vandergrift Silt Loam	EvD	15-25% slopes	High

Table II-4 Landslide Prone Soils

Many factors can contribute to landslides such as stream erosion, weakened or fractured rock, soil characteristics, earthwork, mining activities, and excess weight on a slope from precipitation and/or ice (Pittsburgh Geological Society, 2009).

Soil types can also play a role in the probably of landslides. The two highest risk soils for

landslides in the watershed are:

GrE—Gilpin-Vandergrift Silt Loams, Slumped

GQF—Gilpin-Upshur Complex

For these soils, municipal ordinances suggest that slopes are not steeper than three horizontal to one vertical. All fourteen municipalities within the Pine Creek Watershed have steep slope restrictions for development to prevent landslides. **Table II-4 Landslide Prone Soils** lists other soils prone to landslides within the watershed (Hampton Township, 2000). Proper land use development, planning, and geological testing can prevent most landslides from occurring. However, unpredictable natural weather events and constantly changing conditions can add an element of uncertainty to identifying prone areas and preventing landslides. **Figure II-8 Steep Slope Areas** shows steep slopes (greater than 25% slopes) and landslide prone areas within the watershed .

Pittsburgh Red Beds are a thick, 40-60-foot rock layer that consists of a series of mostly reddish, greenish, and grayish claystones and shales. This layer tends to weather deeply where they occur on hillsides and consequently are prone to earthflow landslides.

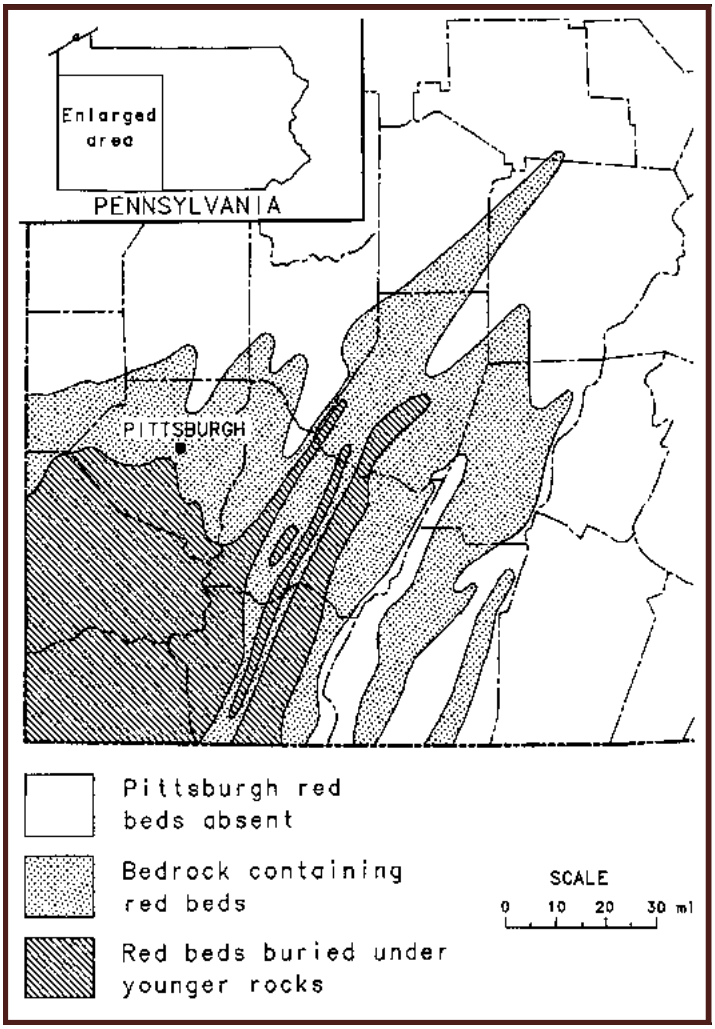
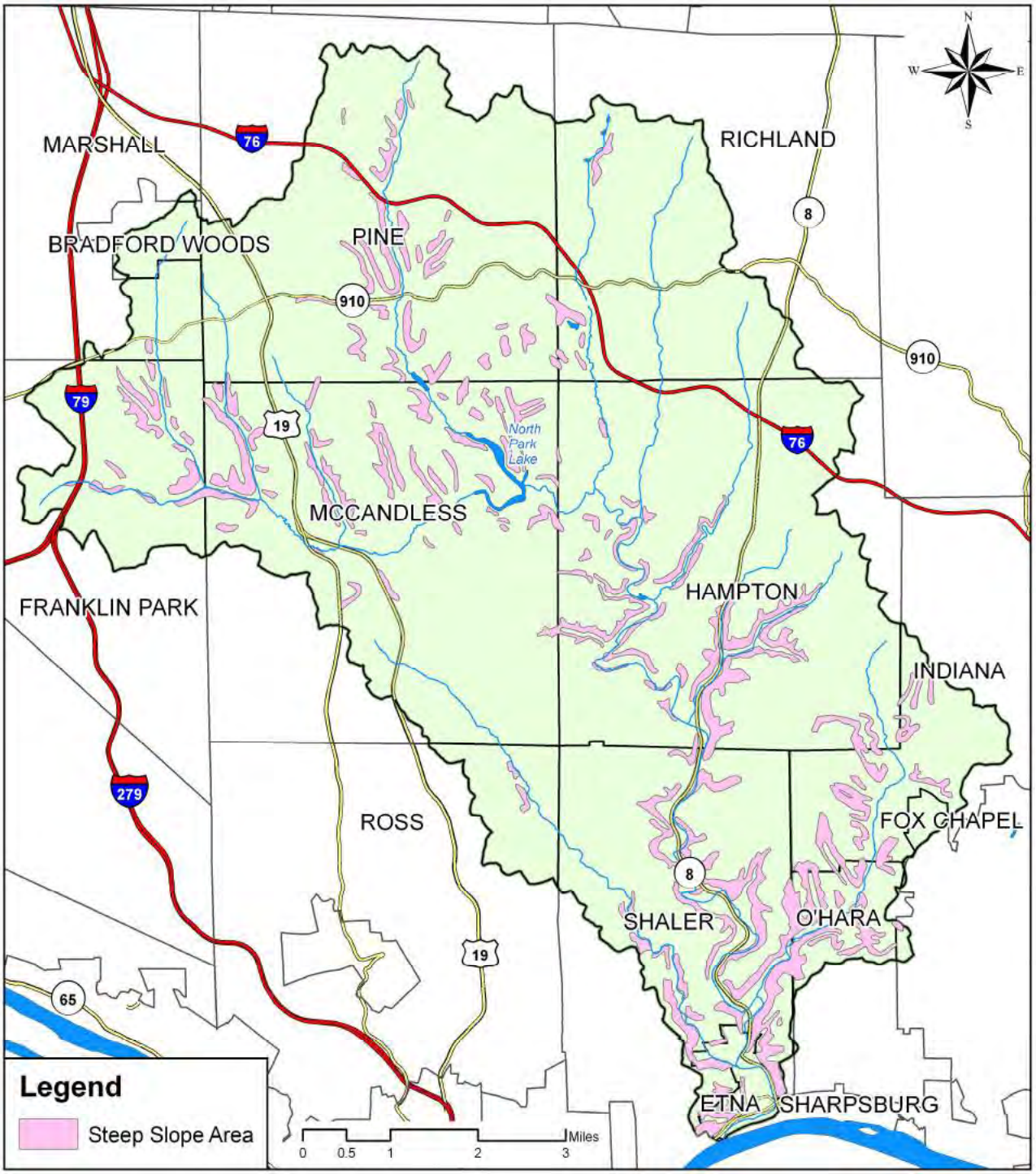


Figure II-7 Redbeds Location within the Region

Figure II-8 Steep Slope Areas



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Chapter III—Water Resources

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I. Introduction

Main Stem Pine Creek

Pine Creek and its tributaries have been central to the history and livelihood of the residents of the 67.3 square mile watershed. Settlements and towns developed along the length of Pine Creek and its tributaries to utilize the creek for drinking water, farming, industry and commerce, and transportation, resulting in drastic modifications to the landscape. Unfortunately, most of the state and federal regulations that exist today to protect waterways were not developed until the 1970s, long after the development of industry. Today, the watershed is still recovering from the historical lack of protections to govern development, timbering, natural resource extraction, agricultural practices, floodplain encroachment, and other activities. The challenge for the future will be to restore the degraded areas and to protect the existing natural areas of high quality.

II. Hydrology

Precipitation is water that falls from the sky as rain or snow. The amount, duration, and location of precipitation across the watershed strongly influences the movement of the water. While much of the precipitation evaporates directly back into the atmosphere, some infiltrates the soil or flows over the earth's surface as runoff.

Infiltration refers to water flow from the land's surface to the subsurface and possibly to the groundwater below.

Transpiration is a normal plant metabolic process that draws subsurface water up through the roots, stems, or trunks, and into leaves; much of this water then evaporates from the leaves into the atmosphere (evapo-transpiration).

Percolation refers to water that moves downward through the soil below the water table.

The amount and rate of ***infiltration*** depends upon vegetation, land cover, texture and porosity of the soil, steepness of the slopes, and intensity and duration of the precipitation event. Upon infiltrating into the soil, the subsurface water is either absorbed by the roots of vegetation or it continues to move and becomes part of the groundwater system (FISRWG, 1998).

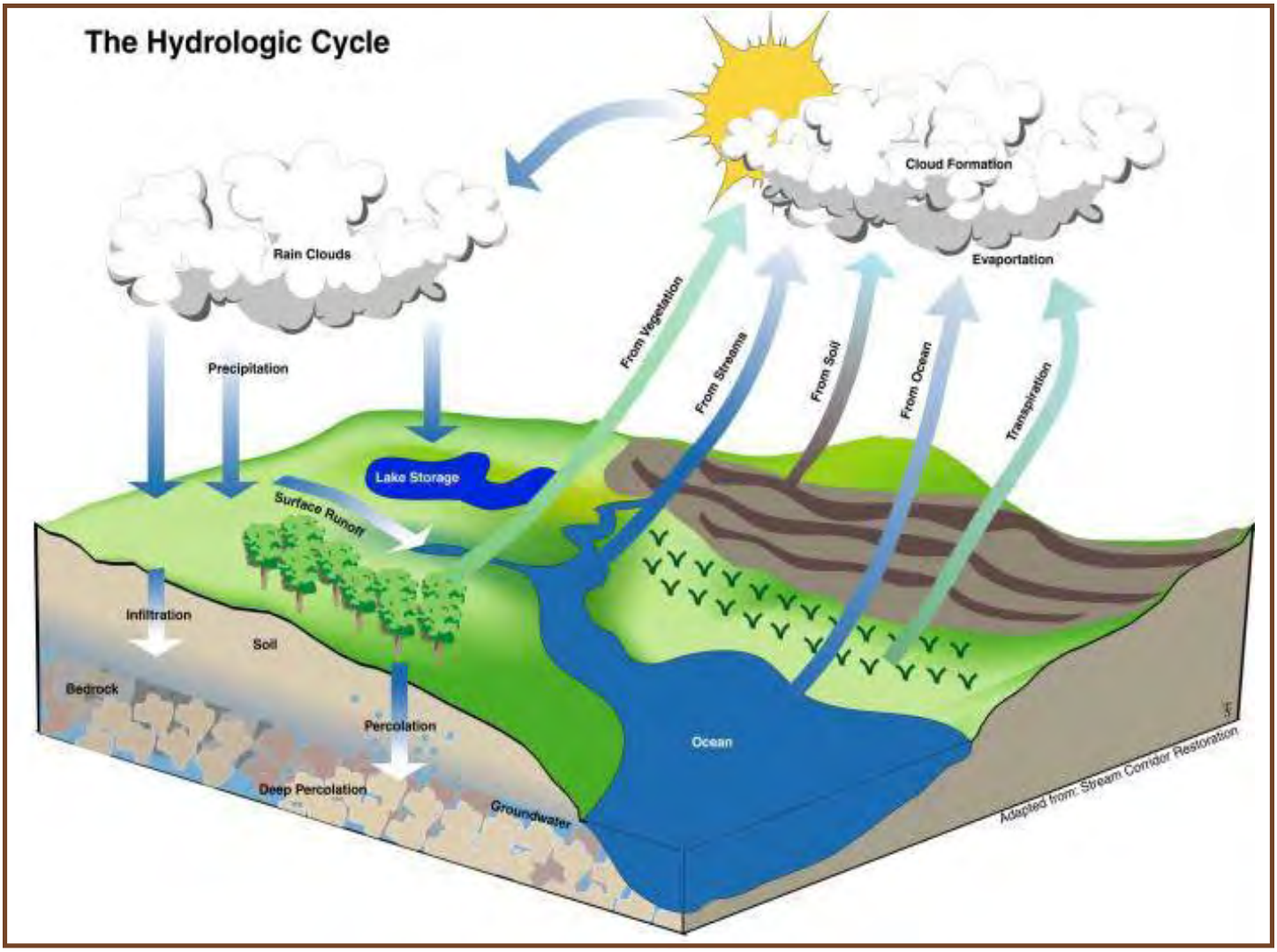
The water that is absorbed by roots travels through the plant and ***transpires***, which cools the air as it becomes available for condensation and cloud formation. This amount is not insignificant as the average mature shade tree releases between 34 and 70 gallons of water each warm weather day. This capability to remove subsurface water is useful when planning for stormwater infiltration because an area planted with trees or other vegetation will be able to accommodate more stormwater volume than an area without trees—efficiently putting the water back into the atmosphere (FISRWG, 1998).

The precipitation that is *not* absorbed by plant roots ***percolates*** through the soil and fills the porous rock layers beneath the earth's

surface, flowing into our groundwater supply. The differing geologies of watersheds determines the volume of the groundwater that is stored; this stored water serves to recharge and supply wells, seeps, springs, streams, and rivers. This flow of water through the watershed is depicted in **Figure III-1 The Hydrologic Cycle.**

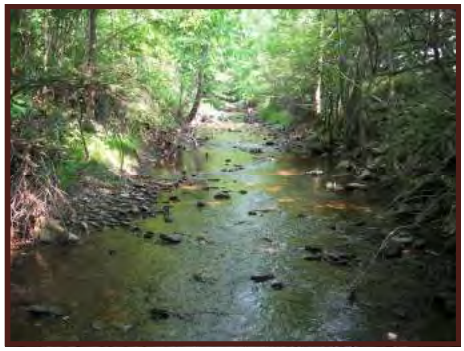
The movement of water through a watershed strongly depends upon the precipitation in the region and the conditions across the landscape. Precipitation occurs year round within the humid continental region. According to the Natural Resource Conservation Service (NRCS), for Pittsburgh, the total annual precipitation is 37.8 inches with a yearly winter average of 17.13 inches and a yearly summer average of 20.0 inches (WSCM02 AP, PA6998 TAPS data set). There are exceptions, however, such as the very wet years of 2003–2004 and the drought years of 2001–2002.

Figure III-1 The Hydrologic Cycle



III. Surface Water

Watersheds



Gourdhead Run

Watersheds are delineated based on topography and ridgelines. Every river, stream, and tributary has an individual watershed; however, these individual watersheds are grouped together to form larger watersheds. The Pine Creek Watershed covers 67.3 square miles and includes eleven sub-watersheds (**Figure III-2 Subwatersheds)**.

The largest subwatershed is Crouse Run, which drains an area of 11.0 sq. mi; the smallest subwatershed is McCaslin Run, which drains an area of 1.0 sq. mi. **Table III-1 Subwatersheds** lists the drainage areas of the subwatersheds to Pine Creek.

The principal adjacent watersheds are Big Sewickley Creek to the west, Brush Creek and Breakneck Creek to the north, Deer Creek to the east, and to the south are numerous small watersheds that drain into the Allegheny River (The NAEC Land Use Committee, 1972).

Table III-1 Subwatersheds

Subwatershed	Drainage (square miles)	Protected Water Use*
Crouse Run	11.0	TSF
East Little Pine Creek	6.8	TSF
Fish Run	2.4	CWF
Gourdhead Run	4.9	TSF
McCaslin Run	1.0	TSF
Montour Run	5.4	TSF
North Fork Pine Creek	10.0	CWF
Pine Creek	67.3	CWF / TSF
Rinaman Run	1.6	CWF
West Little Pine Creek	6.1	TSF
Wexford Run	2.2	CWF
Willow Run	4.5	TSF

** Water uses which shall be protected, and upon which the development of water quality criteria shall be based. Accepted by PADEP*

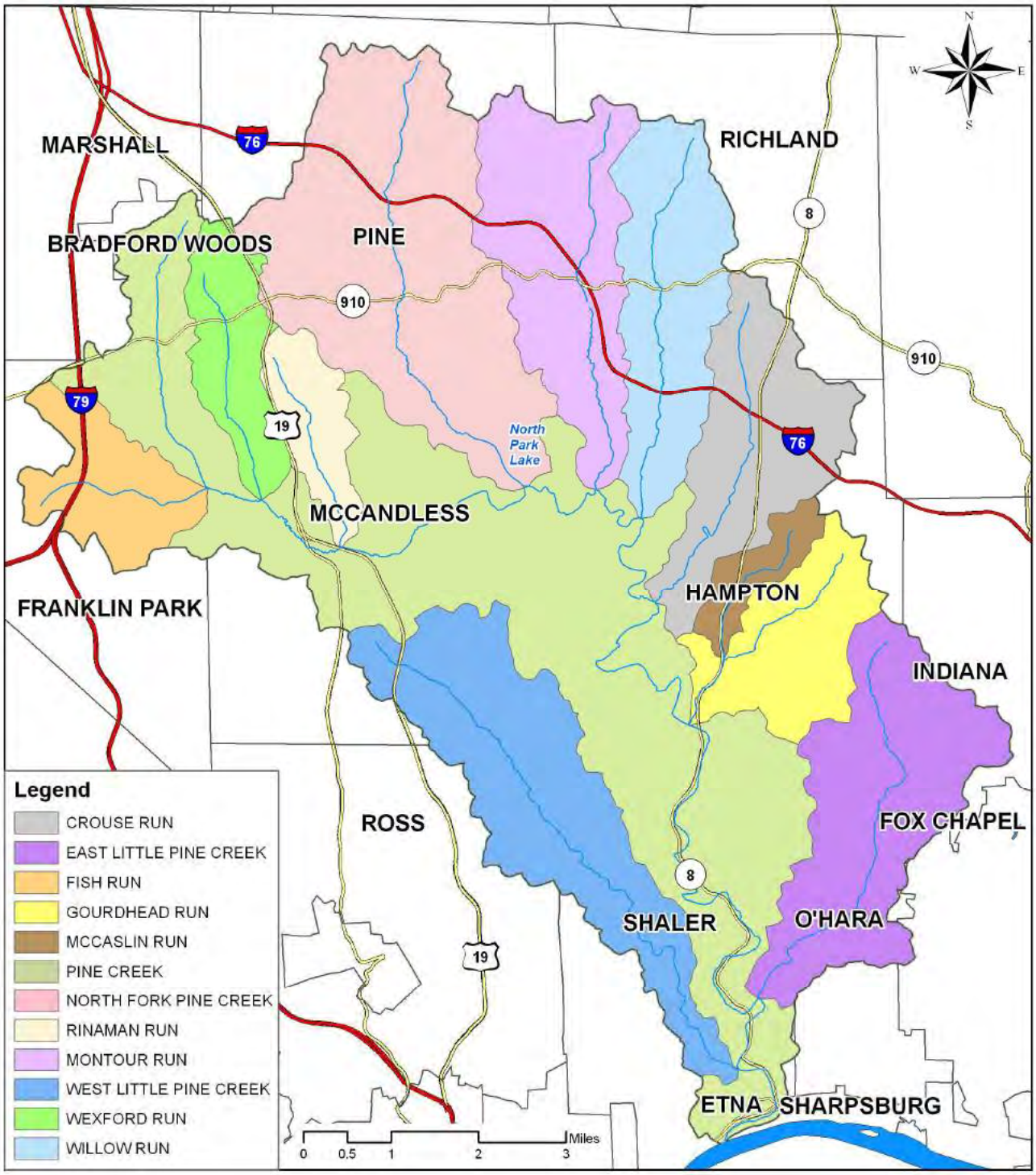
The United States Geological Service (USGS) developed a system for organizing the watersheds of the United States by dividing the country into successively smaller units based on watershed boundaries. Four levels categorize the units: regions, sub-region, accounting units, and cataloguing units. As a result, each watershed is assigned a unique hydrologic unit code (HUC) consisting of two to eight digits, depending on the level of categorization. The HUC code pertaining to the Pine Creek Watershed is 05010009 and breaks down into the following categories:

Region: 05 Ohio
Sub-region: 01The Allegheny River Basin
Accounting Unit: 00 Allegheny
Cataloging Unit: 09 Lower Allegheny

The Pennsylvania Department of Environmental Protection (PADEP) also has a categorization system, specific to the watersheds within Pennsylvania. The Pennsylvania State Water Plan, originally developed in the 1970's, divided Pennsylvania's major river basins into 20 smaller units or subbasins, then further divided

into watershed areas (designated “A”, “B”, “C”, etc.) that range in size from about 100 to 1000 square miles. The PADEP identification assigned to the watershed area containing the Pine Creek Watershed is 18A or Ohio Basin, Subbasin 18,-Lower Allegheny, Watershed A (PADEP, 2009).

Figure III-2 Subwatersheds



Rivers, Steams, and Tributaries

The Pennsylvania Code, Chapter 93 sets forth water quality standards for the surface waters of Pennsylvania, including wetlands. The standards are regulated by the PADEP and are based upon water uses, which are to be protected and are considered by the Department in implementing its authority under the ***Clean Streams Law*** and other statutes that authorize protection of surface water quality (The Pennsylvania Code, 2010).

Under Chapter 93, streams are assigned a protected water use. Included as sub-categorizations under the aquatic life protected water use are Warm Water Fishes (WWF), Cold Water Fishes (CWF), and Trout Stock Fishery (TSF). As the name *warm* suggests, WWF are those waters containing fish and other aquatic species indigenous to a warm water habitat; CWFs contain species indigenous to a cold water habitat; and TSF are streams that are conducive to stocking with trout by the ***Pennsylvania Fish and Boat Commission (PFBC)*** and typically contain species indigenous to a cold water habitat. Unlike WWFs and CWFs, impacts to TSF typically require coordination beyond the standard with the PFBC during permitting processes.

The special protection uses of Exceptional Value Waters (EV) and High Quality Waters (HQ) are also included under Chapter 93. EV and HQ designated streams meet a number of health and biotic integrity criteria, including specific water quality and biological standards. EV and HQ streams receive extra protection under PADEP regulations.

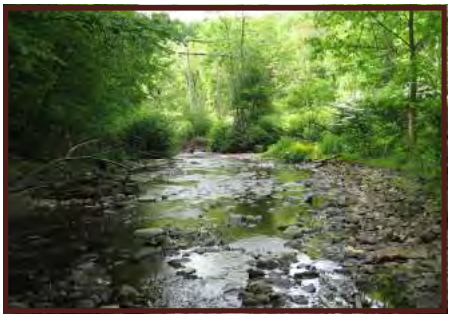
The Pennsylvania Code recognizes three stream types that are protected under the Clean Streams Law of 1931, which gave the state the power to enact legislation and regulations pertaining to the protection of all streams. The three (3) stream types are:

> Ephemeral – "a water conveyance which lacks substrates associated with flow waters and flow only in direct response to precipitation in the immediate watershed or in response to melting snow pack and which is always above the local water table."
>
> Intermittent – "a body of water flowing in a channel or a bed composed of substrates primarily associated with flowing water, which during periods of the year is below the local water table and obtains its flow from both surface runoff and groundwater discharges."
>
> Perennial – "a body of water flowing in a channel or bed composed primarily of substrates associated with flowing water

The Pennsylvania **Clean Steams Law** was created in 1937 to regulate the discharge of sewage, industrial waste or any substance, which causes or contributes to pollution, into the waters of the Commonwealth of Pennsylvania. The law was amended several times, including in the 1960s to add water quality standards. In the late 1970s and 1980, the Clean Streams Law was amended to align its requirements more closely with the federal **Clean Water Act** (Three Rivers Wet Weather, 2009).

The **Pennsylvania Fish and Boat Commission** stocks about 4 million legal-sized trout each year in about 5,000 miles of coldwater streams and over 100 trout lakes. PA trout season in runs from mid-April to the end of February. A license, is required by all people 16 years of age and older. A current Pennsylvania trout/salmon permit (stamp) is required to fish for trout in Pennsylvania waters.

and is capable, in the absence of pollution or other manmade stream disturbances, of supporting a benthic macroinvertebrate community composed of two or more recognizable taxonomic groups of organisms which are large enough to be seen by the unaided eye, and live at least part of their life cycles within or upon available substrates in a body of water or water transport system."

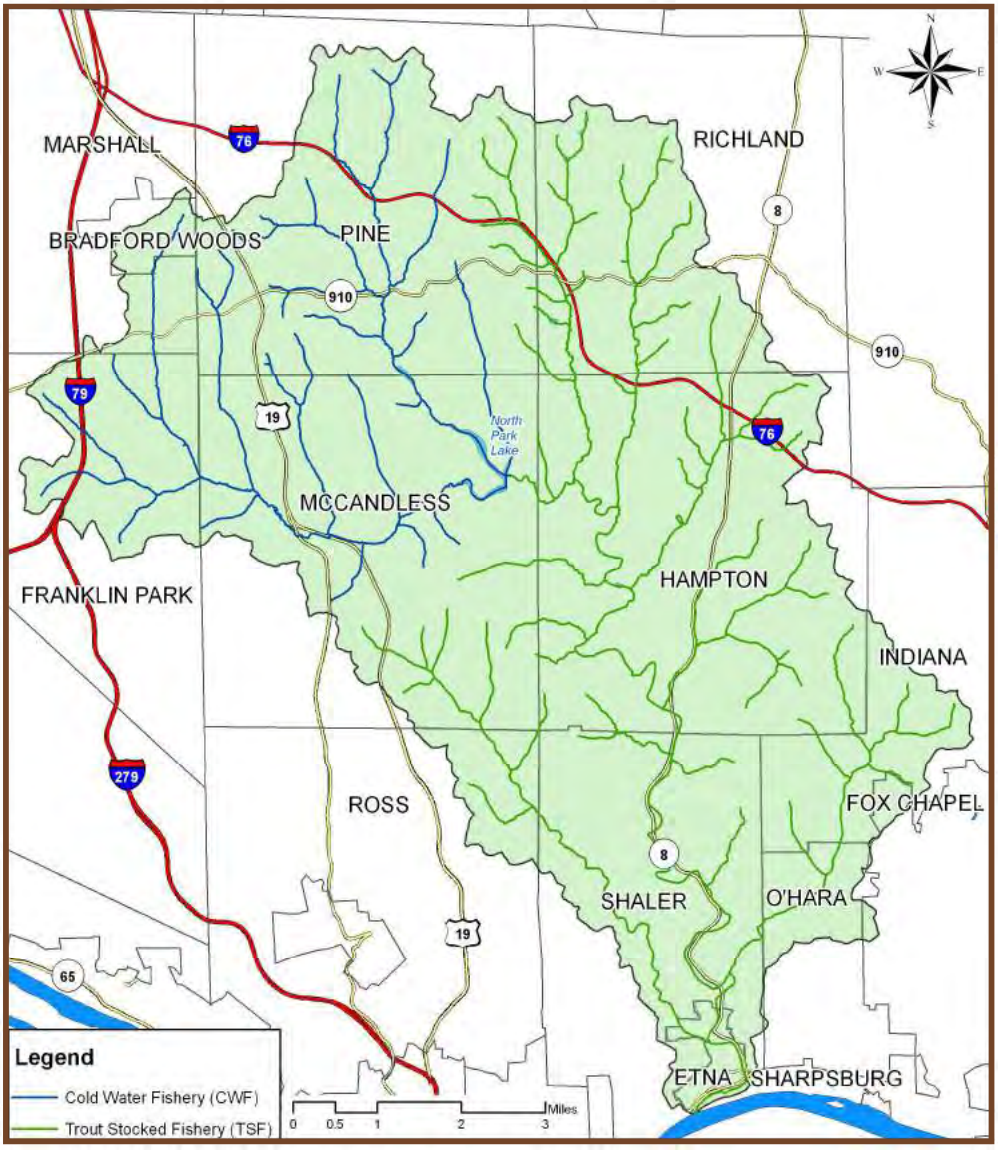


West Little Pine Creek

Main stem Pine Creek and its eleven (11) tributaries are perennial streams that support flow year-round; however, there are many other unnamed tributaries within the watershed that do not support year-round flow, resulting in varying stream characteristics. The watercourses discussed in this plan are all perennial and account for approximately 128 river miles (PEC, 2009).

Figure III-3 Chapter 93 Protected Water Use

Pine Creek is designated as a Cold Water Fishery (CWF) for aquatic life from its source to North Park Lake Dam and a Trout Stocked Fishery (TSF) from the North Park Lake Dam to its mouth in the Borough of Etna. **Table 3-I Subwatersheds** depicts the PA Code designated use for the major tributaries and **Figure III-3 Chapter 93 Protected Water Use** depicts the division of the two classifications between the northern and southern portions of the watershed.



Pine Creek

Pine Creek is a 22.8 mile long tributary to the Allegheny River. The headwaters of main stem Pine Creek originate in the Borough of Bradford Woods within the Bradford Woods Reserve property. From this location, main stem Pine Creek flows south/southeast through the municipalities of Marshall, Franklin Park, and McCandless, where the main stem joins with

North Fork Pine Creek to form North Park Lake. Upon leaving North Park Lake, main stem Pine Creek flows southeast through Hampton Township, Shaler Township, and eventually into Etna Borough where it empties into the Allegheny River. Pine Creek has been officially designated as an "Approved Trout Water" by the PFBC, indicating that the waterway meets the water quality criteria that qualifies it to be stocked with trout by the PFBC. Refer to the Biological Resources section of the report for additional info about PFBC trout stocking in the Pine Creek Watershed.

Lakes, Ponds, and Reservoirs

Lakes and ponds are inland bodies of water that form through natural processes such as geologic events that disrupt the flow of a river. In the United States, most natural lakes formed thousands of years ago when the advance of the glaciers caused great depressions to form and, over time, fill with water. Natural lakes and ponds are uncommon and occur only in the northwestern and northeastern portions of Pennsylvania. Instead, reservoirs, or impoundments, involve the "impounding" of a stream or river by a man-made dam and are common in Pennsylvania. Although they are not true natural forming lakes, reservoirs share many of the features of lakes and ponds and are often referred to as such.

There is no clear-cut difference between a lake and pond, however lakes tend to have more visible waves, are deeper, have rooted plants that are only able to grow close to shore, and water temperatures vary based on the depth.

The different uses of these features result in varying protections and regulations associated with the lake, pond, or reservoir. If properly maintained, all three can provide valuable habitat for plants, fish, and aquatic organisms, and are used for recreational purposes such as swimming, fishing, and boating; however, in addition, a reservoir may supply a community's drinking water.

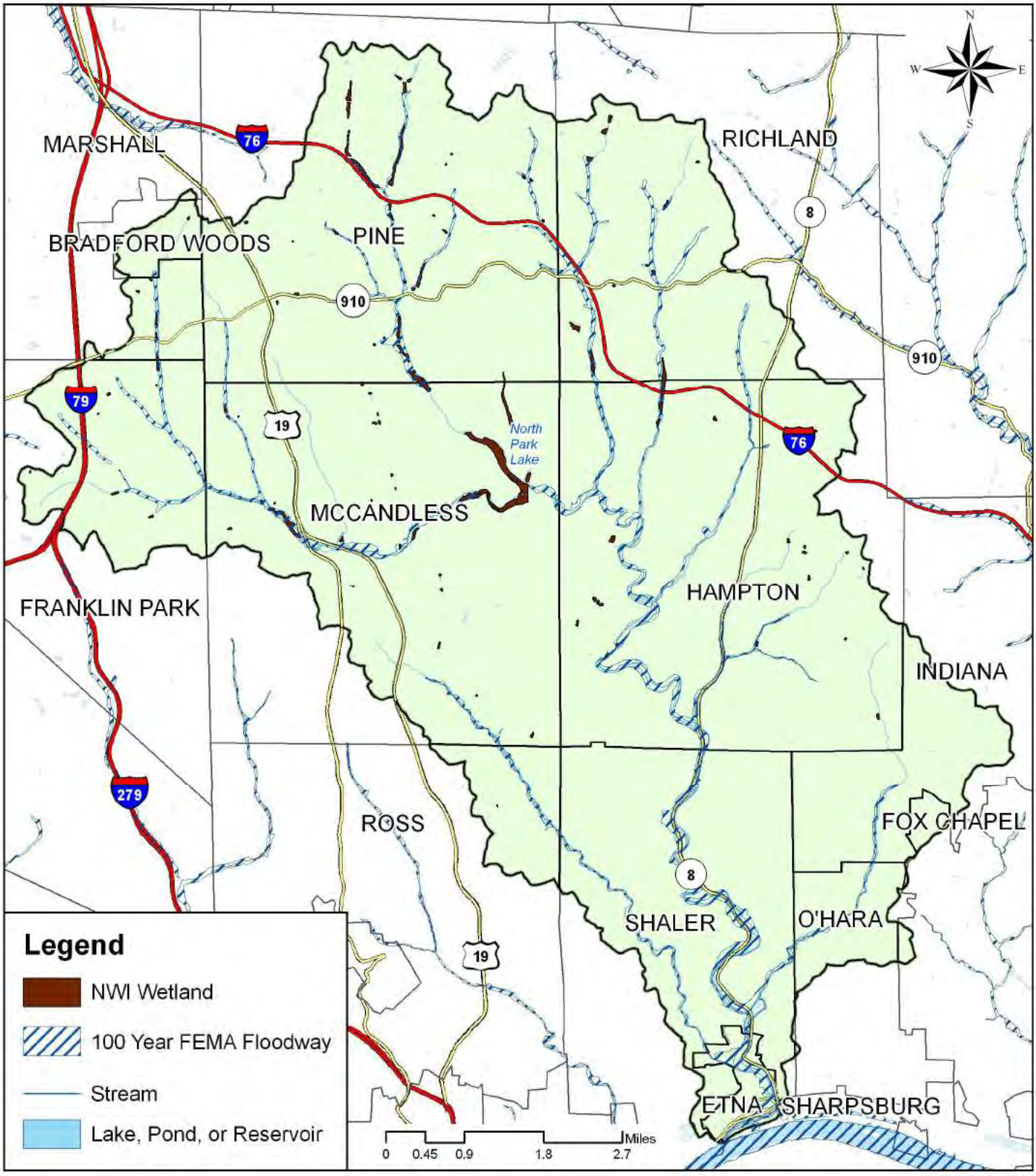
The Pine Creek Watershed has many man-made lakes and ponds within its boundaries, the majority of which are privately owned, small, and unnamed (**Figure III-4 Surface Water Resources**). The most significant/largest reservoir in the Pine Creek watershed is North Park Lake, located in Allegheny County's North Park at the confluence of Pine Creek and the North Fork of Pine Creek. The Department of Environmental Protection (PADEP) Chapter 93 Water Quality Standards designates the lake as a CWF. The PFBC has designated North Park Lake as an Approved Trout Water; stocking occurs during spring and fall.

North Park Lake Spillway

North Park Lake

When first constructed in 1935, the surface area of North Park Lake, or reservoir as accurately defined, was approximately 75 acres and its

Figure III-4 Surface Water Resources



depth was approximately 24 feet near the dam face. The surrounding watershed generally consisted of rural agricultural fields, pastures, and isolated woodlots. As the process of uninhibited urbanization progressed outward from the City of Pittsburgh, the landscape began to change. As development around the park continues to progress, forest cover and vegetated riparian buffers along streams are being removed and soils are being disturbed and covered by residential and commercial buildings, roads, and parking lots.

North Park Lake September 2009

Uncontrolled surface runoff carrying sediment to the lake from residential and commercial development in the Pine Creek basin in the mid to late 20th century has resulted in a loss of 12 acres of open water and a loss of about half of the lake's original depth (USACE, 2009). Due to enrichment from the excessive runoff, the lake has become eutrophic (low oxygen levels) and has seen an undesired increase in aquatic macrophyte (algae) growth. These factors have not only contributed to the reduced size of the original lake, but also severely degraded the remaining aquatic habitat.

North Park Lake during restoration, July 2010

In 2001, Allegheny County and the Army Corps of Engineers-Pittsburgh District (USACE) partnered to initiate the North Park Lake Aquatic Ecosystem Restoration Project. The project falls under the Water Resources Development Act 1996 Section 206 Aquatic Restoration Program, which allows the USACE to partner with local communities to improve degraded aquatic ecosystems. The project will involve draining the lake and subsequent removal of the sediment, which will restore the lake to its original depth and bottom configuration. Prior to re-filling the lake, habitat structures will be placed on the lake bottom to provide cover for fish and increased benthic production. The project partners estimate to have the restoration project complete and the lake refilled early to mid-2011 (USACE, 2009).

Wetlands

Wetlands are transitional areas between terrestrial and aquatic environments (Cowardin, Carter, Golet, & LaRoe, 1979) where the water table often exists at or near the surface, or where the land is inundated by water. Wetlands frequently exhibit a combination of physical and biological characteristics indicative of both terrestrial and aquatic systems. There are three specific hydrological and natural features that identify a wetland system: 1. the presence of hydric soils, 2. inundated or saturated hydrologic conditions during part of the growing season, and 3. a predominance of hydrophytic (water-loving) vegetation (Environmental Laboratory, 1987).

The presence of wetlands in a watershed is of particular importance. They perform multiple functions that are critical to preserving and protecting the health of the streams including (NRCS, 2009):

- Streambank stabilization—wetland vegetation serves to impede the erosive force of floodwaters and holds the soil in place with their roots;
- Surface water storage—helps to prevent flooding by temporarily storing water, allowing it to soak into the ground or evaporate;
- Sub-surface water storage – serves as a reservoir for rainwater and runoff by serving as a recharge area for water tables and aquifers;
- Nutrient cycling—enhance the decomposition of organic matter and incorporates the nutrients back into the food chain;
- Particle retention—filters out sediments and particles suspended in runoff water, preventing lakes, reservoirs, and other downstream water resources from being affected by sediment loading;
- Aquatic habitat—provides breeding, nesting, and feeding habitat for many species of birds, fish, and other wildlife.
- Values to society—provides opportunities for hunting, fishing, photography, outdoor classrooms or environmental education, and the enjoyment of open spaces.

Wetland located within the Pine Creek Watershed

The National Wetlands Inventory (NWI) is a U.S. Fish and Wildlife Service-maintained database developed from aerial photography/ infrared photography that denotes those wetlands that are either visible from aerial photography or can be classified from infrared photography. The information is used by Federal, state, and local agencies, academic institutions, and private industry for management, research, policy development, education, and planning activities. **Figure III-4 Surface Water Resources** depicts the location of all NWI wetlands within the Pine Creek Watershed.

Wetlands in the Pine Creek Watershed vary in size, complexity, and type depending on their location in the watershed. According to NWI wetland data, forested wetlands are the dominant wetland type within Pine Creek Watershed of which 7.9 acres are forested (PFO), 1.5 acres are emergent (PEM), and 0.6 acres are scrub-shrub (PSS). However, limitations of the NWI, such as seasonal and weather variations, may result in many wetlands not appearing in the inventory. As a result, smaller pocket wetlands that are not indicated by NWI

mapping can be found throughout the watershed.

A detailed wetland inventory is needed to assess and identify the location and function of each of these unknown areas. During the residential, commercial, and industrial development processes, comprehensive wetland evaluations are completed as part of the permitting process associated with a proposed site specific development. These wetland evaluations, typically conducted by the private sector, are useful in identifying wetlands not listed in the NWI.

In addition, constructed wetlands are developed to fulfill mitigation requirements associated with public and private development. The reestablishment of disturbed wetlands is very important because when wetland systems are eliminated from a watershed, typically due to development, but sometimes a result of natural causes, adverse results may occur such as increased downstream flooding, increased stream pollution, bank erosion and in-steam sedimentation, and the elimination of fishing and other recreational activities.

One such mitigation site is located within the Pine Creek Watershed. To compensate for wetland impacts associated with Pennsylvania Turnpike, a 1.81 acre wetland mitigation site was constructed in North Park in the summer of 2010. The mitigation site is located along Pine Creek, north of the ice skating rink along Pearce Mill Road. The site includes three different types of wetlands: palustrine emergent wetlands, which includes soft stem vegetation; palustrine scrub-shrub wetlands, which includes smaller bushes; and palustrine forested wetlands, which support larger trees. The project resulted in 101 new trees, 468 bushes, 200 silky dogwood shrubs and 3,500 willow cuttings being planted at the site. Because the wetland mitigation site is located to the north of Marshall Lake, the wetland will allow water moving through the site to slow down and sediment to fall out, thus reducing the amount of sediment that enters Marshall Lake. In addition, seven in-stream structures were installed to help centralize the stream flow to reduce bank erosion (Hofstetter, 2010).

Three of the fourteen municipalities in the Pine Creek Watershed have put into place land use regulations that require a minimum buffer around wetlands (Hampton, Marshall, Pine) to protect them from the adverse effects associated with new development activities. Hampton Township does not permit disturbance within 100 feet of any wetland, pond, or lake. In addition, Hampton also requires that such protection be set aside permanently via deed restriction, easement, or protective covenant. Marshall Township does not permit disturbance within 25 feet of any wetland, pond, or lake, while Pine Township's standard is 50 feet from these resources.

Floodplains

Floodplains function as temporary floodwater storage areas within a watershed and, therefore, are designated as "flood-prone" areas. As heavy or continuous rainfall exceeds the absorptive capacity of the land, the flow capacity of rivers and streams will be maximized, causing the water to overflow the stream banks and into the adjacent floodplains (DSD, 2009).

Floodplains are land areas adjacent to rivers and streams that are subject to reoccurring inundation.

The soils of undisturbed/natural floodplains are deposited by receding floodwaters and function to absorb large amounts of water, thus mitigating flooding effects. When a stream overflows its banks, natural floodplains capture the water and allow the flow to spread and lose velocity, therefore, reducing the erosive forces of the water on the stream channel.

Floodplain alterations, such as the removal of vegetation and encroachment by residential and commercial development, interrupt the natural relationship between the stream and its adjacent floodplain. The encroachments inhibit the normal water retention function of the floodplain, increasing the risk of significant upstream and downstream flood damage. In addition to holding back dangerous floodwaters, undisturbed floodplains exhibit a variety of ecological functions that directly benefit the health of the watershed including retention and release of groundwater, vegetative stabilization of stream banks, sediment and toxicant filtering from surrounding uplands, production of food sources, and cover and protection for wildlife.

Residential encroachment along the floodplain within the watershed

The National Flood Insurance Act of 1968, which made flood insurance available for the first time with the creation of the Federal Insurance Administration, and the Flood Disaster Protection Act of 1973, which made the purchase of flood insurance mandatory for the protection of property located in Special Flood Hazard Areas, were implemented to handle issues of floodplain alterations and subsequent watershed flooding. The Federal Emergency Management Act (FEMA) was given the authority to administer the laws outlined in both Acts. FEMA also conducts routine flood insurance studies throughout the country that develop risk data that can be used during land use planning and floodplain management. In 1994, the Acts were expanded through the National Flood Insurance Reform Act and serve as a foundation for the National Floodplain Insurance Program (NFIP), which assists in community floodplain and flood insurance planning through the implementation of local floodplain management ordinances (DSD, 2009).

All of the municipalities within the Pine Creek Watershed participate in

the National Flood Insurance Program (NFIP) and have adopted and enforce minimum NFIP floodplain management standards; however, significant floodplain encroachment occurred prior to the development of these ordinances and, as a result, the business districts and residential areas in several communities in the Pine Creek Watershed experience routine flooding. Other land uses have also altered the functionality of the floodplains such as buildings, residential yards, parking lots, and agricultural fields that abut streams, leaving the floodplains with less vegetation and space to retain flood flows and sediment, and provide habitat for riparian species.

To reclaim the flood control value of key floodplains, Hampton and Shaler Townships are in the process coordinating with local landowners in floodprone areas to purchase vacant properties and homes, demolish buildings, and restore these areas to their natural condition as a floodplain for flood control.

Figure III-4 Surface Water Resources depicts the FEMA defined floodplains in the Pine Creek Watershed.

A Riparian buffer includes the land and vegetation adjacent to streams, rivers, lakes, ponds, and wetlands. They provide a wide range of environmental "services" and, as a result are of considerable economic value. The most effective buffers are characterized by high plant and animal species density, diversity, and bio-productivity .

Riparian Buffers

A ***riparian buffer*** includes the land and vegetation adjacent to streams, rivers, lakes, ponds, and wetlands, and functions as a transitional zone between land and water to preserve stream health (StormwaterPA, 2009). Mowing or removing the vegetation from the riparian buffer increases flooding potential and reduces the capacity of the riparian buffer to perform crucial functions such as: slow the velocity of surface runoff, reduce erosion, filter pollutants, absorb excess water, and provide habitat for transitional species.

As recommended by the U.S. Department of Agriculture—Forest Service (USDA), current emphasis in riparian buffers is based on a three-zone system:

Zone 1: Approximately 15-feet wide from the top of the streambank. The purpose of this portion of the buffer is to help stabilize the streambank, provide shade to moderate and stabilize water temperatures, and serves as a source of coarse woody debris to the stream's ecosystem. Large, mature trees complimented with a dense shrub layer should be found within the reaches of Zone 1.

Zone 2: Approximately 60-feet wide from the edge of Zone 1. This zone is where most of the sediment filtration and deposition, nutrient uptake, and anaerobic denitrification take place. It is critical

Vegetated (left bank) vs. non-vegetated (right bank) riparian zones along Willow Run

that flow through this portion of the buffer be in the form of sheet flow (versus concentrated flow). Predominant vegetation should consist of native riparian trees and shrubs. For optimal performance, the vegetation needs to be managed to promote a healthy and rapidly growing system. Soil compaction and vegetation disturbance should be minimized wherever possible.

Zone 3: Approximately 20-feet wide from the edge of Zone 2. The most important function of this zone is to convert concentrated stormwater flows to dispersed, sheet flows. Additionally, some sediment filtration and nutrient uptake occurs in this area. Vegetation consists of dense grasses and forbs, which must be maintained by mowing, haying, grazing or other means of removal. Water bars and/or spreaders may be required to convert concentrated flows.

Steps taken toward the protection, restoration, creation, or reforestation of stream, wetland, and urban lake buffers offer significant improvement opportunities for water quality and/or quantity issues. Five (5) of the fourteen (14) municipalities in the Pine Creek Watershed have put into place land use regulations (in either their Zoning Ordinance, Subdivision and Land Development Ordinance, or both) that require a minimum buffer around streams (Hampton, Marshall, Indiana, Pine, O'Hara).

Hampton Township:

No grading, cutting, filling, removal of vegetation, or other disturbance shall be permitted within 50 feet of the top of the bank of any watercourse or within 100 feet of any pond, lake or wetland. In larger subdivisions and land developments, the required setback area must be integrated into a system of open space. In smaller subdivisions and land developments, the preservation of these open space areas shall be ensured through recorded easements, deed restrictions, or other means acceptable to the Township.

However, there are some weaknesses in these ordinances in protecting these natural resources. The township has a provision wherein if the required setback or easement would render a site unusable under existing zoning regulation because of the limited size or dimensions of a parcel of land prior to its subdivision, the Township may reduce the setback to no less than 25 feet along pond, lake, or wetland edges. Moreover, Hampton Township does not have any setbacks from headwaters and the setbacks mentioned above are only required for watercourses that have a drainage area of more than 100 acres. Thus, any watercourse with

Chapter 102 Erosion and Sedimentation Control and Stormwater Management Update—

PADEP is proposing new buffer standards, including a 150 foot buffer requirement for EV and HQ streams. As of August 2010, PADEP is making revisions to the regulations. Then, the Environmental Quality Board (EQB), the State Senate and House Environmental Resources and Energy Committees and finally the Independent Regulatory Review Commission (IRRC) must approve them (PACCW, 2010).

a drainage area of less than 100 acres is not protected by the setback requirements.

Marshall Township:

Lake and stream frontage must be preserved as open space whenever possible. In smaller minor subdivisions and land developments lake and stream frontage may be preserved through conservation easements. Access points to the water and maintenance easement areas shall be provided at intervals of no more than one-half mile. These access points shall be no less than 25 feet in width. No disturbance is permissible within 25 feet of the edge of any flowing stream, lake or wetlands.

Pine Township:

No disturbance shall be permitted within 50 feet of any watercourse or perennial stream. No disturbance shall be permitted that would require encroachment, regrading or the placement of fill in wetlands either in violation of any state or federal regulations or within 50 feet of such wetlands.

O' Hara Township:

There are no specific buffer requirements, but the Zoning Ordinance requires that the areas around ponds, wetlands, and watercourses "shall remain as permanent open space," and that no realignment, development, filling, piping, and concentrating, or diverting shall be permitted except for most essential road and utility facilities which cannot be placed elsewhere on the site or as otherwise directed by the Township and the PADEP.

Channel and Riparian Assessment and Restoration Plan

In May of 2006, the North Area Environmental Council (NAEC) in conjunction with the Pine Creek Watershed Coalition (PCWC) obtained grant funding via Growing Greener and the Pennsylvania Department of Environmental Protection (DEP) to undertake a complete assessment and inventory of stream channels and riparian zones in the watershed. The purpose of the study was to examine stream quality with special attention paid to significant causes of flooding and increased runoff, including erosion and sedimentation.

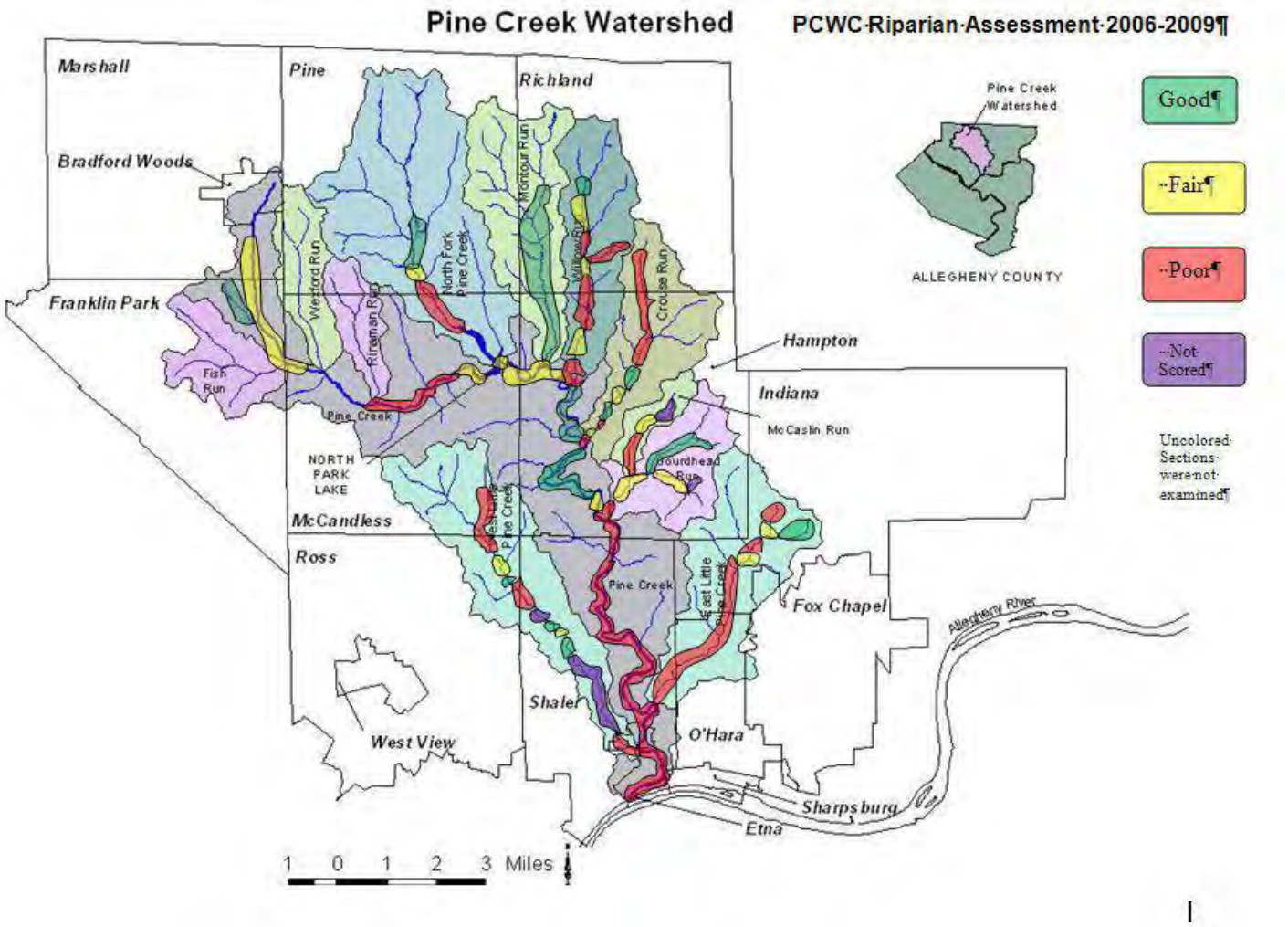
Six groups completed fieldwork for the study. The groups' work included using the USDA visual assessment protocol to score the condition of over 56 linear miles of stream channels that contained 122 segments. Photographs of their findings were also taken. The USDA protocol describes the condition of the stream channel and riparian

zone, taking into account such conditions as canopy cover, stream bottom character, invertebrate habitat, fish cover, excessive nutrient enrichment, and erosion and sedimentation. The group also collected data regarding pipe outlets, log debris piles, and exotic invasive species of plants.

After the completion of the field studies, the data was compiled, analyzed, and evaluated. The result was a GIS database developed to assist in determining patterns for conditions within the watershed. This GIS data, with color-coded visual assessment rankings, was also formatted into KMZ files that can be accessed via Google Earth. The report breaks down each of the 12 sections of the watershed into separate chapters and includes for each:

- A map of the stream, highlighting its location in the watershed
- A satellite image showing the stream and waypoints colored by visual assessment quality rankings

Figure III-5 Summary Map from the PCW Riparian Assessment



- Narrative describing the location of the headwaters, mouth, and notable features
- Narrative generally describing conditions found along the stream
- A table summarizing the visual assessment data by segment
- Photo images and narrative describing issues of concern
- A table summarizing recommendations for restoration, listed by waypoint, and providing priority ranking and relative costs

Issues consistently found throughout the watershed include erosion, debris jams, riparian zone encroachment, illegal dumping and debris, sedimentation, and exotic invasive plants, especially Japanese knotweed. For example, Harts Run is a significant contributor to Gourdhead and thus to Pine Creek. The visual assessment found that the lower reaches of Gourdhead Run are hard-channeled where it runs along residential or commercial development sections parallel to Route 8, and that upper reaches of the stream have accumulated debris such as tree limbs and trunks. In addition, there is indication of AMD below McCully Road. Reduced opportunities for infiltration and concentrated outflows from roads and developments have contributed to accelerated erosion along much of the stream.

Figure III-5 Summary Map from the PCW Riparian Assessment depicts the visual assessment quality ranking for some sections of the stream.

Headwaters

The source or headwaters of a stream is the place from which the water in a stream originates.

Scientific evidence clearly shows that healthy ***headwaters*** – tributary streams, intermittent streams, and spring seeps – are essential to the health of stream and river ecosystems. Scientific evidence also demonstrates that protecting these headwater streams with forested riparian buffer zones and protecting and restoring the watersheds in which they arise will provide benefits vital to the health and well-being of Pennsylvania's water resources, and thus its citizens.

Healthy, undisturbed headwaters supply organic matter that contributes to the growth and productivity of higher organisms, including insects and fish. Headwaters also help to keep sediment and pollutants out of the stream system's lower reaches. In addition, they enhance biodiversity by supporting flora and fauna that are uniquely acclimated to this habitat.

Forested buffer zones protect these headwaters in a variety of ways.

They promote broad, shallow streams with a great total area of aquatic habitat and a broader diversity of habitats. They help protect headwaters from both point source and non-point source pollution. They slow erosion from flooding and help to keep water cool, a critical factor in streams that support trout and other cold-water species. These types of protection will grow more important as climate change may raise average temperatures, and if the frequency and severity of storms increases (Stroud, 2008).

Headwaters (dry stream bed) of Pine Creek in Bradford Woods Reserve

The small size of these headwaters and their integration into the landscape makes them exceedingly vulnerable to degradation when those landscapes are altered by construction or agriculture. Their small size also means that the degradation of just one headwater may escape detection downstream, but cumulatively the destruction of many small headwaters would have negative impacts on water resources. Headwaters are not as resilient as larger streams when disturbed because they lack sufficient flows to transport sediments associated with erosion and sedimentation, and animal life in them is usually cold-water adapted and thus sensitive to temperature increases associated with forest removal and other factors (Stroud, 2008).

Headwaters provide important benefits for entire stream systems. Even though we know how they are damaged, and how they can be protected; current regulations do not provide adequate protection for these important resources. The regulations need to be updated to reflect the research-based knowledge we now possess.

The communities near the mid to lower section of Pine Creek as well as those near the West Branch of Little Pine Creek are the most developed in the watershed. While the headwater sections of the basin are the least developed, there is a significant transformation underway from rural communities and farmlands to suburban communities and commercial districts (Act 167 Plan, Phase I). Data included in the Act 167 Plan, Phase I illustrates that the most significant percent population increases within the Pine Creek watershed between 1990 and 2000 occurred in the municipalities that contain the headwaters (**Figure III-6 % Population Change—1990-2000**).

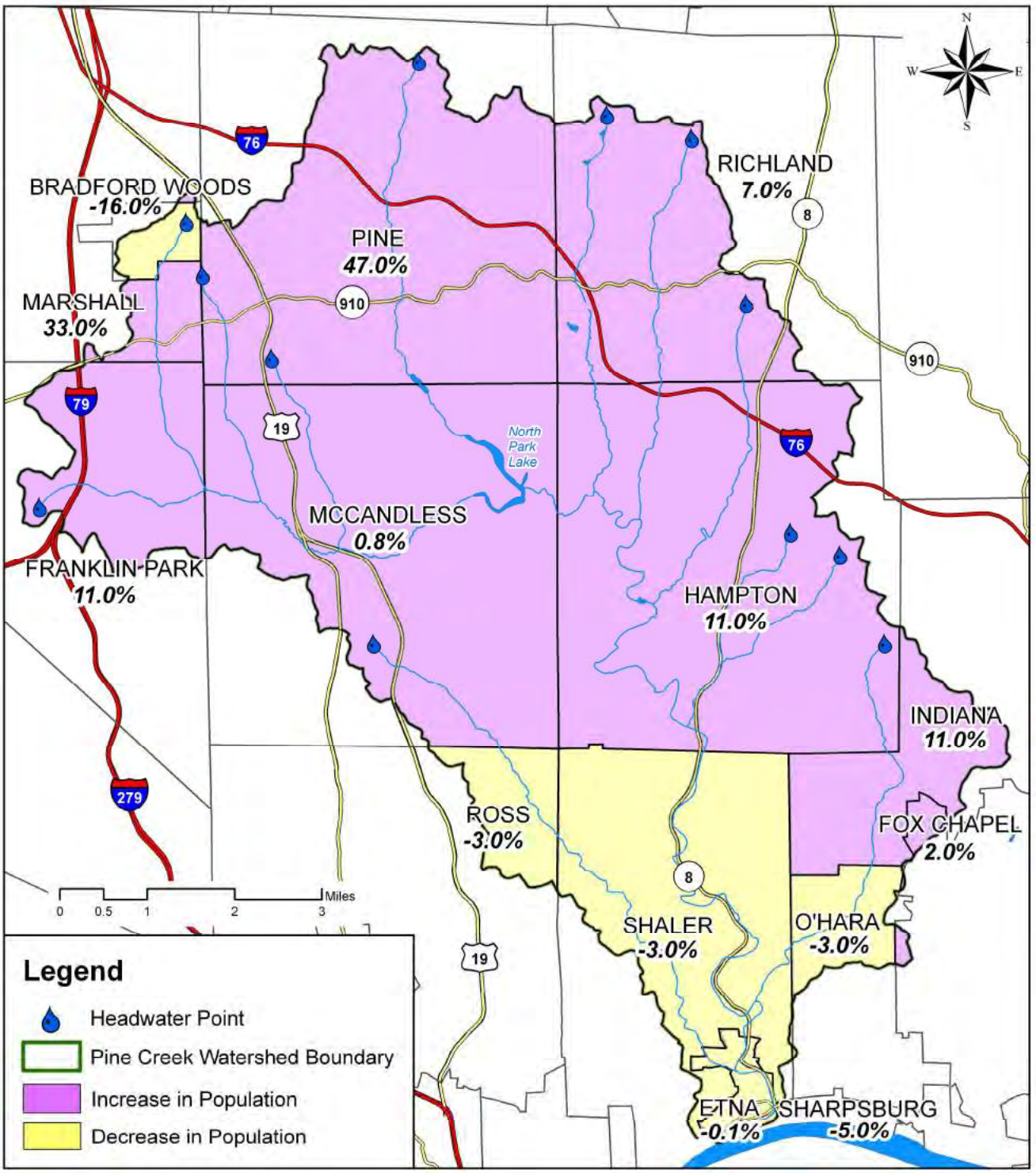


Figure III-6 % Population Change-1990-2000

IV. Groundwater

Groundwater is stored beneath the land surface in pores and openings of soil and rock formations in the saturated zone. Although groundwater is commonly considered separate from the surface water found in streams and lakes, the two are constantly interchanging as groundwater emerges to the surface in valleys as springs and seeps, and surface water percolates downward into underground storage areas of rock and soil, called ***aquifers***. As a result of this dynamic, the quality of streams and lakes can directly impact the quality of groundwater.

An **aquifer** is an underground rock formation composed of such materials as sand, soil, or gravel that can store groundwater and supply it to wells and springs.

According to Frey (1996) significant sources of groundwater contamination in Pennsylvania include pesticide application, above ground and under ground storage tanks, surface impoundments, landfills, hazardous waste sites, industrial facilities, mining and mine drainage, pipelines, sewer lines, and spills. All of these sources contain hazardous chemical compounds that can leach into the soil and subsequently contaminate groundwater supplies via infiltration and fluctuations in water table depths.

Groundwater contamination results from a variety of sources and can often impact public water supply. Of the seven public water suppliers (see water supply section for more details, page III-36) that serve the municipalities of the Pine Creek Watershed, one is supplied by surface water, two are derived from groundwater sources, and four purchase their water from a surrounding system. In addition, private wells provide water in areas that are not served by public water systems. These facts alone convey the importance of preventing and remediating groundwater pollution.

V. Water Quality

The quality of water in a watershed is important because it directly impacts the chemical, physical, and biological processes that take place in waterways. Water quality standards set the general and specific goals for the quality of our water. The standards are based on the water uses that should be protected, the surface water conditions that need to be maintained or attained to support those uses, and an anti-degradation policy which protects and maintains existing uses.

The federal **Clean Water Act** establishes the basic structure for regulating discharges of pollution into waterbodies of the United States.

In Pennsylvania, the federal ***Clean Water Act (CWA)*** is enforced by the PADEP under the Clean Streams Law and provides regulations

under the PA Code that strive to "restore and maintain the chemical, physical, and biological integrity of the nation's waters" (The Pennsylvania Code, 2010).

Point and Non-Point Sources of Water Pollution

Water pollutants are typically assigned to one of two categories: point source and non-point source pollution. According to PA Code Chapter 93 Water Quality Standards, water may not contain substances attributable to point or non-point source discharges in concentrations or amounts sufficient to be unfavorable or harmful to the designated water uses or to human, animal, plant, or aquatic life.

Point source pollution comes from a defined point, such as a pipe, along a waterway. Permitted point source discharges from industrial, commercial, and municipal facilities are described below. Conversely, non-point source pollution comes from non-specific areas that cannot be easily quantified such as runoff from agricultural lands or parking lots and, therefore, is more difficult to control and regulate (PEC, 2005). The following sections describe both types of pollution in more depth:

Point Sources

In order to control and regulate the amount and types of pollution entering our waterways, and to help achieve designated uses and prevent water quality degradation, point sources of pollution must have proper permits to discharge wastes into the nation's waters. The National Pollutant Discharge Elimination System (NPDES), established by Section 402 of the 1972 Clean Water Act, is a permitting system that targets point source discharges, such as industrial facilities and wastewater treatment plants. Permitted facilities must meet stringent effluent limits and are responsible for monitoring (water quality testing) and reporting to the DEP. These permits are referred to as "individual" permits. For other point source discharges, such as stormwater pollution or construction site runoff, a "general" permit is issued. General permits usually apply to smaller operations and are less stringent in the monitoring and reporting requirements *(Ross Township, 2009)*.

The DEP eFACTS (Environment, Facility, Application, Compliance Tracking System) database provides information on all NPDES-permitted facilities in the state and allows the public to search for facilities by name, county, or municipality.

An example of the types of facilities and activities with NPDES permits

under DEP Bureau of Water Pollution Control include the discharge of stormwater associated with industrial activities, discharge from gasoline-contaminated groundwater remediation systems, discharge from industry, single residence sewage treatment, stormwater runoff from construction (greater than one acre disturbance), publicly owned sewage treatment works, active mining operations, and discharge of stormwater from Municipal Separate Storm Sewer Systems (MS4s) (see section on stormwater below).

Examples of facilities that do not have permits, but that affect water quality are: sanitary sewer overflows and illegal sanitary sewer tie-ins to storm drains.

Three Rivers Wet Weather

To help municipalities to address the wet weather sewer overflow issue within Allegheny County, the 3 Rivers Wet Weather (3RWW) program created the calibrated radar rainfall system in 2001. The program provides communities in the ALCOSAN service area with accurate rainfall data. The data is analyzed and used to design cost-effective sewer rehabilitation projects and long-term sewer maintenance plans. High-quality rainfall data is available online about two weeks after the end of each month. The system covers all 130 Allegheny County municipalities and provides real-time rainfall data, which is critical for optimizing the operation of wet weather treatment and storage facilities (3RWW, 2010).

Thirty-three rain gauges are located throughout Allegheny County to collect actual rainfall during wet weather events. Three rain gauges of this program are located within the Pine Creek Watershed: Shaler, Hampton, and Franklin Park. The primary radar source used is the National Weather Service (KPBZ) NEXRAD radar, located in Moon Township. The radar data gathered during a wet weather event is calibrated with the rain gauge data collected during the same time period. The data is then processed into even time increments and presented in 2,276 1x1 km radar grid cells across the county (3RWW, 2010).

Non-Point Sources

Although non-point source pollution is much more difficult to control than point source pollution, there are still efforts throughout Pennsylvania and the nation to prevent and control the pollution. The PADEP Water Quality Bureau has set up a “Non-point Source (NPS) Management Program,” which consists of action plans that address this type of pollution across the state.

Sources of NPS Pollution:

- Urban runoff
- Construction/earthwork
- AMD
- Agriculture
- Land disposal

Erosion refers to the wearing away of soils and other surface materials by fast moving water.

Impervious Surface—Parking Lot

The **Storm Water Management Act** or **Act 167** requires each county, in consultation with the municipalities involved, to prepare and adopt a storm water management plan for each watershed in its boundary. Plans must be reviewed every five years and include an inventory of both existing and potential characteristics and problems of the area, such as run-off characteristics, soil impacts, and significant obstructions.

Examples of common sources of NPS pollution in Pennsylvania are urban runoff (pesticides, lawn fertilizers, oil, and other chemicals and debris deposited or littered in urban areas), construction/earth movement (runoff of soil into waterways which increases chance of flooding), abandoned mine drainage (AMD) (drainage from, or caused by deep mining, surface mining, or coal refuse piles; may be acidic or alkaline with elevated levels of dissolved metals), agriculture (runoff of soil that contains fertilizers and excess nutrients), and land disposal (landfills and illegal dumpsites).

Sources and Types of Water Pollution

Stormwater Runoff / Impervious Cover

Forested/vegetated land, as opposed to impervious areas, contributes to improved water quality because of its innate ability to filter sediments and pollutants, reduce erosive flows, and provide shade cover to buffer temperature fluctuations. This is of particular importance to the land use adjacent to streams and waterways.

As an area is urbanized, the natural watershed is changed; previously vegetated areas are replaced by impervious cover (e.g., roads, parking lots, rooftops). Impervious cover does not allow water to pass through to the soil below, preventing recharge and retention of water and reducing nature's ability to filter contaminants such as excess nutrients and sediment, lawn fertilizers, pesticides, bacteria, metals, road salts, pet droppings, oil, gasoline, and other chemicals and debris deposited or littered in urban areas and directly into surface waters. This urban runoff is often referred to as stormwater.

Research has shown that a strong relationship exists between the percentage of impervious cover in a watershed and the impairment of the watershed (PEC, 2009). Increases in impervious surfaces lead to increased flooding, increased channel ***erosion***, increased sedimentation, and damage to the ecosystem in the receiving stream. Streams are generally impacted when impervious cover exceeds ten percent (10%). Although the overall impervious cover for the Pine Creek watershed is below the limit at 8.3%, five of the subbasins exceed the 10% value (**Figure III-7 Percent Impervious Cover**) (PEC, 2009).

In response to the impacts of accelerated stormwater runoff resulting from land development, in 1978, the state enacted ***Pennsylvania's Stormwater Management Act (Act 167)***. The Act requires counties to prepare and adopt watershed based stormwater management plans—and requires municipalities to adopt and implement ordinances to

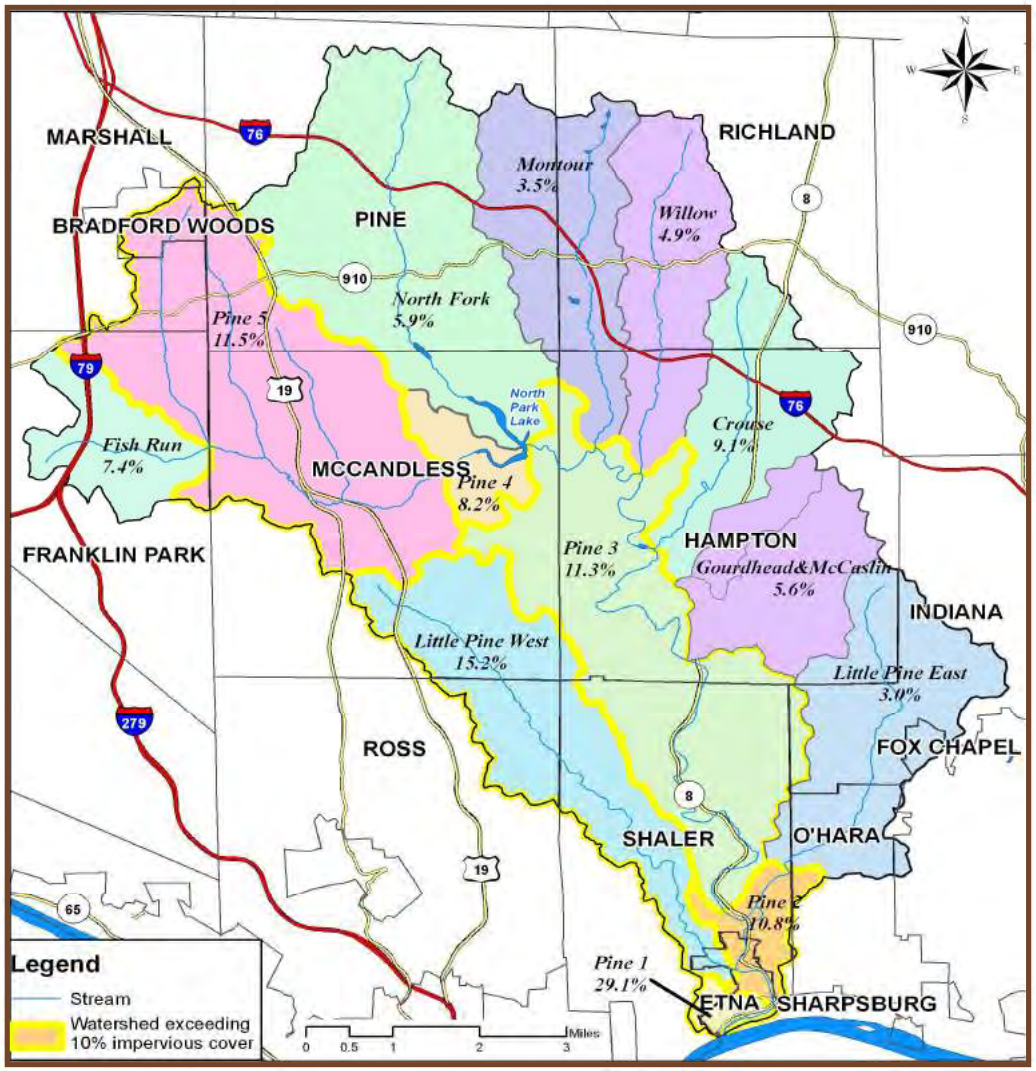


Figure III-7 % Impervious Surfaces

regulate development consistent with these plans. The DEP provides technical, administrative, and financial assistance to counties for the preparation of Stormwater Management Plans and pays for 75% of the associated costs that the counties incur. DEP also approves reimbursements to municipalities for 75% of the allowable costs for enacting, administering, and implementing stormwater ordinances (StormwaterPA, 2009). Reimbursement occurs only when there is adequate funding; all stormwater planning line items were zeroed by the legislature in the 2009-2010 budget.

The North Hills Council of Governments (North Hills COG) is in the process of updating a multi-municipality Act 167 Plan for the Pine Creek, Deer Creek, Girtys Run, and Squaw Run watersheds. The original plan was dated December 1981. The updated Act 167 Phase I Report was approved by Allegheny County Council in December 2007 and by PADEP in March 2008; Phase II has been temporarily

cancelled due to lack of funding. The project goal is to develop a plan that will better manage stormwater run-off and lead to a reduction in the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from flooding. All of the municipalities in the watershed area have adopted the SWM ordinances developed as part of the Phase I updates.

Generally, the subwatersheds in the northern and northeastern parts of the Pine Creek Watershed and headwater region of the main stem Pine Creek are predominantly forested with pockets of agricultural/ pasture land and low density residential. As Pine Creek flows southeast towards Etna, the watershed becomes predominantly medium to high density residential and commercial/industrial.

Storm Drain Cover

The Integrated Water Quality Monitoring Report for Pine Creek watershed indicates that urban runoff/storm sewers are the predominant pollution source in the watershed. Overall, the increased stormwater brings higher flows, thermal impacts, and pollutants, all damaging to stream health.

Local organizations such as the Three Rivers Rain Garden Alliance, Audubon Society of Western Pennsylvania (ASWP), and the Pennsylvania Resource Council (PRC) have has been instrumental in encouraging and educating local residents about rain gardens and rain barrels as on-site methods of stormwater prevention. In 2010, The ASWP received a $90,000 grant from the Department of Environmental Protection (DEP) to install rain gardens in the Crouse Run Watershed as a way of addressing stormwater runoff issues. The grant will fund the installation of 50-60 free gardens, which are expected to hold back 500,000 gallons of rainwater annually. "The rain gardens are a wonderful opportunity (for) individual homeowners (to) get involved with stormwater management right at the source," said Jim Bonner, director of the ASWP (Hofstetter, 2010).

To educate the public about their benefits, a rain garden was constructed in the summer of 2010 in North Park. The rain garden is located along the edge of a parking lot along Lake Shore Drive. It will provide a number of benefits including reduced runoff, filtering out pollutants, and cooling the water temperature before it enters creek or lake habitats. An interpretive sign was also posted at the site to educate the public about the benefits and importance of rain gardens (Hofstetter, 2010).

Sewage

The main types of pollutants that are entering streams from sewage

treatment plants and septic systems are inorganic and organic nutrients, sediment, and bacteria. Nutrients can lead to excessive plant growth, which depletes the oxygen levels of streams. Sediment will coat the stream bottoms, resulting in the clogging of the gills of aquatic organisms and disrupting the in-stream hydrology and habitat. Bacteria can be harmful, and sometimes fatal, to both stream life and humans.

Sewage pollution can come from municipal and non-municipal sewage treatment plants and from private septic systems. This pollution can come from plants that have inadequate capacity due to population growth or poor design, and private systems that are not properly built or maintained.

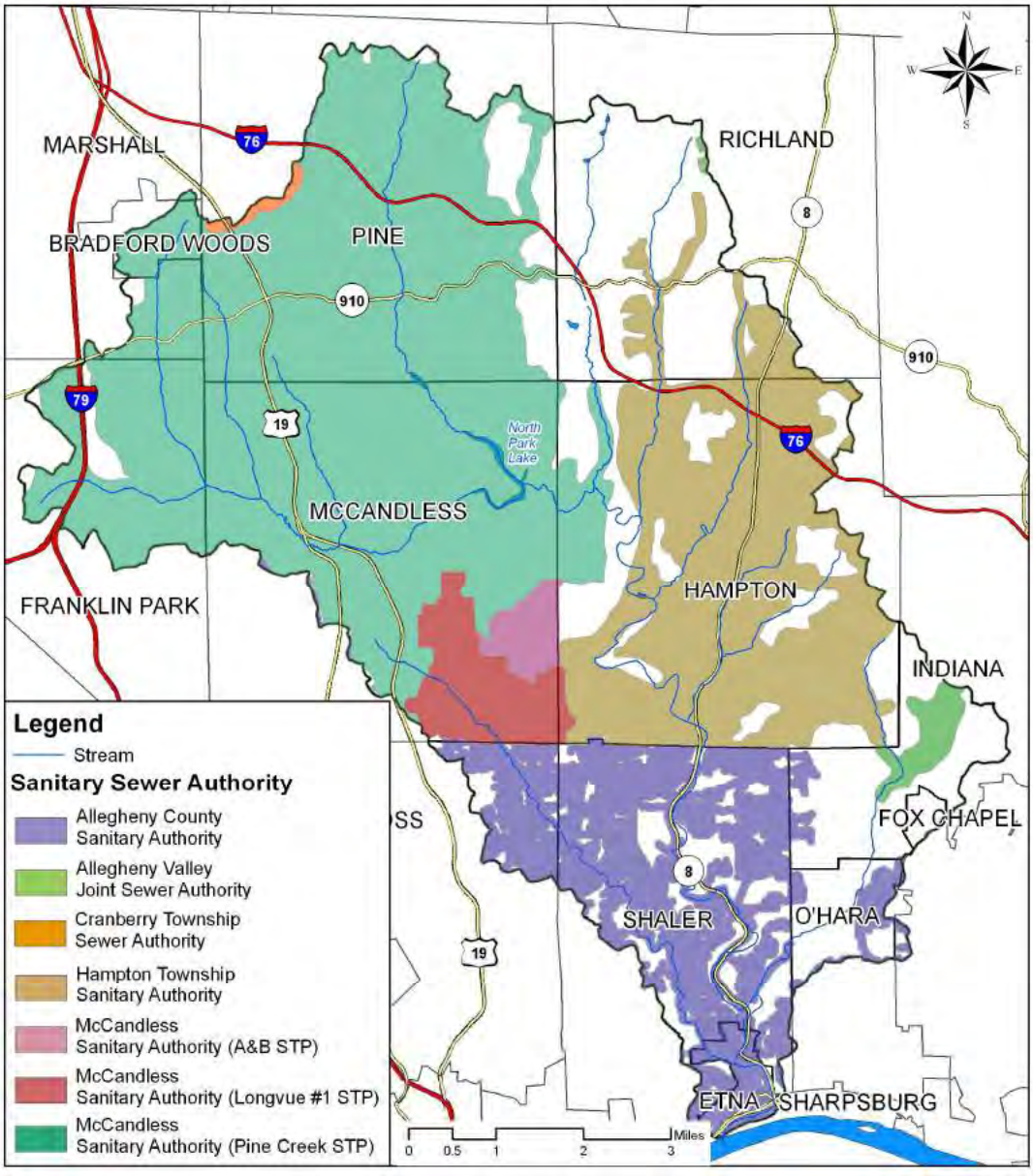


Figure III-8
Wastewater Treatment Facilities

Like many older regions of the country, particularly in the northeastern United States, Allegheny County relies on an aging and deteriorated sewer system, portions of which are more than a century old (3RWW, 2009). The fourteen communities in the Pine Creek Watershed fall within six different wastewater treatment facilities (**Figure III-8 Wastewater Treatment Facilities**).

Sanitary Sewer located within Main Stem Pine Creek channel

Two types of sewer systems transport wastewater to the multiple treatment facilities: separate sanitary sewer systems and combined sewer systems. Combined sewer systems, which were designed to carry both sewage waste and stormwater, enter a municipal system through the same infrastructure. These systems are common in communities with collection systems built prior to 1940. During wet weather, the treatment plants do not have the capacity to handle the influx of sewage combined with stormwater, so the pipes overflow into the waterways. This overflow is called a combined sewer overflow (CSO). These structures are legal, though they require a permit.

On January 24, 1966, the Pennsylvania Sewage Facilities Act (Act 537, as amended) was enacted to correct existing sewage disposal problems and prevent future problems. To meet this objective, the Act requires proper planning in all types of sewage disposal situations. Local municipalities are largely responsible for administering the Act 537 sewage facilities program. To assist local municipalities in fulfilling this responsibility, the Department of Environmental Protection (DEP) provides technical assistance, financial assistance, and oversight (DEP, 2009).

By January 2004, nearly 100% of the municipalities of the ALCOSAN service area negotiated consent agreements with EPA to reduce the sewer overflows in their communities, thus coming into compliance with Act 537 and avoiding costly fines. Under the municipal consent orders, EPA assigned enforcement responsibility to PADEP and the Allegheny County Health Department (ACHD). Municipalities operating combined sewer systems received a “Consent Order and Agreement” which is enforced by PA DEP, while the municipalities with separate sanitary sewer systems received an “Administrative Consent Order”, which is enforced by the ACHD (3RWW, 2009).

Separate sanitary sewer systems were designed to carry only wastewater; stormwater is managed through a different collection system. However, stormwater and groundwater can leak into cracked or broken pipes and, in some instances, stormwater from gutters, street storm drains, and parking lots is illegally piped into the system. In addition, ALCOSAN has identified eleven streams that were diverted directly into the sewer system during the construction of roads

or homes. As with CSOs, wet weather can cause the flow to exceed the capacity of the sewers causing sewage to overflow into creeks, streams, or rivers, creating sanitary sewer overflows (SSOs). Separate sanitary sewer systems were required for any new system built after the 1940's.

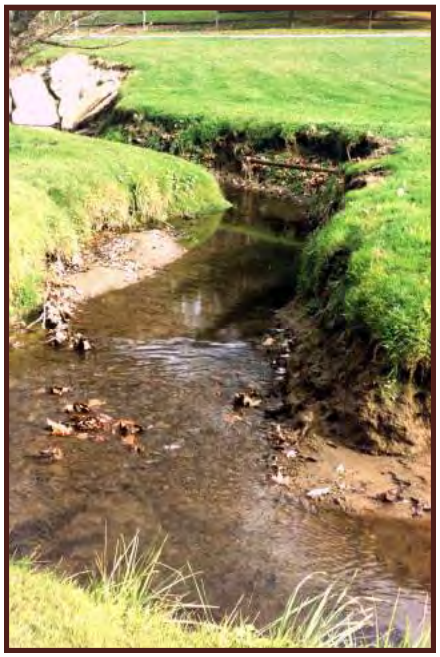
In the years 2000-2005, ***Three Rivers 2nd Nature (3R2N)*** began a study of the water quality in the rivers and streams of Allegheny County. Specifically, the study focused on variations in water quality in the Pittsburgh region's rivers and streams during "wet" and "dry" weather, and at different proximities to the riverbanks, such as near the shoreline or in the center of a river (Knauer, 2009). Data collected during the 3R2N study indicated that Pine Creek is one of six tributaries of the Allegheny River that is most impacted by fecal coliform during dry weather (3R2N).

Three Rivers 2nd Nature (3R2N) was a project of The Studio for Creative Inquiry at Carnegie Mellon University that intended to reveal the dynamic nature of water quality in the Pittsburgh region, in the context of increased public access to the rivers and tributary streams of Allegheny County.

Erosion and Sedimentation

Erosion is the natural process of water and wind removing particles of soil from the land as it weathers. Sedimentation refers to the deposit of these particles on the earth's surface. A specific example of the erosion and sedimentation process is the deposition of eroded material from streambends and land onto the bottom of a stream. Although erosion and sedimentation are both natural earth surface processes, they are significantly escalated by land use practices (such as poor farming practices and improper management of stormwater runoff) that strip vegetation and elevate the amount of sediment that enters a stream system.

Pennsylvania's Clean Stream Act and regulations under the Pennsylvania Code create a role for local governments in protecting streams by developing erosion and sediment control plans, which include sediment control Best Management Practices (BMPs). BMPs are practices that help protect the quality of the land and the environment by preventing erosion and pollution. They include agriculture activities such as contour farming and filter strips and installing silt fences on a construction site.



Mowed riparian buffer with eroded banks—unnamed tributary to Rinaman Run

Abandoned Mine Drainage

Abandoned mine drainage (AMD) is the discharge of contaminated water as a result of past or current mining activities. The formation of AMD involves a complex set of chemical reactions, but begins with the exposure of geologic formations, on the surface or underground, to air and water. The AMD can be either acidic or alkaline and often contains elevated levels of iron, aluminum, and manganese. Through

natural processes, the AMD flows into streams, disrupting the ecology and water quality, often times rendering the stream lifeless.

AMD Treatment System Willow Run

Like many watersheds in the region, the Pine Creek Watershed has been affected by AMD, however, the site along Willow Run is the only sizable AMD discharge. A few other minor AMD seeps were found during the PCW Channel and Riparian Assessment and Restoration Plan (2010). According to an article in the Pittsburgh Post Gazette North Section dated January 11, 1995, ACV power trucked the waste coal from the Wildwood Mine site to their Scrubgrass Power Plant in Emlenton, Venango County, Pa, to be burned and produce electricity. As a result, the site is considered reclaimed. Also existing on-site is a passive AMD treatment system.

AMD Treatment System Outflow, Willow Run

Acid Precipitation

Rainwater is already slightly acidic, generally having a pH of around 5.6. However, acidity from non-natural sources has caused rainwater in some areas to have a pH of 4.9 or lower. Acidity in precipitation (rain, snow, fog, dew) that forms from the reaction of air pollutants with water in the air is called acid rain. Aside from falling with rain, these pollutants can fall as dry deposition, or acidic gases and particles that are blown onto buildings, cars, etc. When it rains, the particles are washed from objects and decrease the pH of the stormwater runoff. The sources of this pollution include vehicles and industrial and power generating plants. The effects of acid rain are usually felt many miles away from the source.

Acid rain is most detrimental in headwater areas where rainfall is the greatest source of water. Larger streams and rivers have the capacity to neutralize acid run through dilution. Most fish and other aquatic organisms cannot survive when the pH is below 5.0.

Agriculture

Agriculture has developed as the current leading industry within Pennsylvania, providing pleasing countryside aesthetics and the livelihood of many residents throughout the state. Most farms in the Pine Creek Watershed are located in the north and northwest regions of the watershed, in the headwater regions of Pine Creek. Unfortunately, wastes from farms may degrade surface and groundwater quality. Fertilizers, pesticides, and manure from concentrated lots, fields, and livestock access to stream channels can easily be washed into streams during high rainfalls, increasing nutrient levels and contaminants in the streams. An overabundance of nutrients stimulates the growth of nuisance vegetation, such as algal

blooms, which subsequently use much of the dissolved oxygen needed by aquatic organisms.

According to SPC land use data (2006), only approximately 1,800 acres or 4% of the Pine Creek Watershed is agricultural land—rangeland, pasture, groves, crop, and orchards. Practices such as keeping livestock out of streams (stream side fencing), using rotational grazing, and properly storing manure will help protect streams from sediment and nutrient impacts. Refer to **Figure I-3 Land Use Cover** in the Project Area Characteristics section.

Gas Wells

Oil and gas extraction in Pennsylvania is primarily concentrated in the western and north central parts of the state. Several statutes and regulations regulate oil and gas activities. The PADEP Bureau of Oil and Gas Management began regulating the oil and gas industry's impact on the environment in April 1985, after the passage of the Oil and Gas Act of 1984. Regulations were adopted in 1989. The Bureau is responsible for processing well permits, registrations and orphan well determinations, issuing permits for wastewater discharges; road spreading of brine dust control, erosion and sedimentation; and administering the abandoned and orphan well program.

The extraction of oil and gas resources can pose several environmental threats to water quality in a watershed including improper disposal of unwanted brine water and waste pit sludge, increased erosion and sedimentation from well drilling sites, improper disposal of wastewater, unpermitted draws of fresh water used to frac new wells, and improperly installed/malfunctioning wastewater storage pits.

According to SPC GIS data, there are 22 existing oil and gas wells within the Pine Creek Watershed. As of July 2010, no Marcellus shale wells were located within the Pine Creek Watershed (DEP, 2010).

Impaired Waterbody or 303 (d) List

The 1972 amendments to the Clean Water Act include Section 303(d). The regulations implementing Section 303(d) require states to develop lists of water bodies that do not meet water quality standards and to submit an updated list to the U.S. Environmental Protection Agency (EPA) every two years. The PADEP has an ongoing program to assess the quality of waters in Pennsylvania, resulting in the development of a bi-annual Integrated Waterbody List (formerly the 303(d) list).

A TMDL identifies allowable pollutant loads to a waterbody from both point and non-point sources that will prevent a violation of water quality standards and includes a margin of safety to ensure protection of the water (DEP, 2009).

The PADEP's *2008 Integrated Water Quality Monitoring and Assessment Report* summarizes the water quality status of Pennsylvania's waters using a five-part categorization of waters according to their use attainment status. The five categories represent varying levels of use attainment, ranging from Category 1, where all designated waters uses are met, to Category 5, where impairment by pollutants requires a ***Total Maximum Daily Load (TMDL)*** to correct.

According to PADEP, TMDLs set an upper limit on the pollutant loads that can enter a water body so that the water will meet water quality standards. The elements of a TMDL include a problem statement, description of the desired future condition (numeric target), point and non-point source pollutant analysis, load allocations, description of how allocations relate to meeting targets, and a margin of safety. All completed TMDLs must be submitted by DEP to the Environmental Protection Agency (EPA).

Table III-2 Integrated Waterway List summarizes the information in the 2008 Integrated Water List for Pine Creek and its major tributaries. All of the streams in the Pine Creek Watershed except for Willow Run are slated to have TMDLs developed (**Figure III-9 TMDL Required Streams**).

Completed Pollution Studies

In October 2009, the Pennsylvania Environmental Council (PEC) in cooperation with the Pine Creek Watershed Coalition (PCWC), a group of stakeholders committed to improving the health of the Pine Creek Watershed, published the *Pine Creek Watershed Implementation Plan*. The Plan defined projects that can reduce nonpoint source pollution and improve water quality by restoring floodplains, restoring and revegetating eroded stream banks, and possibly altering flows through natural stream channel design. The ultimate goal of the plan is to reduce non-point source pollution by identifying appropriate Best Management Practices (BMPs) for the watershed and create a mechanism and schedule for implementation. Suggested BMPs are included in the recommendations section of this Plan. While Watershed Implementation Plans are typically used for the development of Total Maximum Daily Loads (TMDLs), the Pine Creek Plan addresses pollutant reduction on impaired streams before the development of TMDLs.

Included in the Pine Creek Watershed Implementation Plan is a geographic information system (GIS) based evaluation of nonpoint source pollution in the watershed that modeled the existing conditions and determined the effects of proposed improvements (the tools

Table III-2 Integrated Waterway List for the Pine Creek Watershed

Category	Waterway*	Year listed as Impairment	Pollution Source	TMDL Target Date
Aquatic Life	Crouse Run	2002	Nutrients from urban runoff/storm sewers	2015
	Fish Run	2002	Siltation from land development	2015
			Nutrients from urban runoff/storm sewers	2015
	Gourdhead Run	2002	Nutrients from urban runoff/storm sewers	2015
	Little Pine Creek	2002	Nutrients from urban runoff/storm sewers	2015
	McCaslin Run	2002	Nutrients from urban runoff/storm sewers	2015
	Pine Creek	2002	Siltation from land development	2015
		2002	Nutrients from small residential runoff	2015
		2002	Organic Enrichment/Low D.O.	2015
		2002	Nutrients from urban runoff/storm sewers	2015
Recreational	Crouse Run	2008	Pathogens from unknown source	2021
	Fish Run	2008	Pathogens from unknown source	2021
	Gourdhead Run	2008	Pathogens from unknown source	2021
	Little Pine Creek	2008	Pathogens from unknown source	2021
	McCaslin Run	2008	Pathogens from unknown source	2021
	Montour Run	2008	Pathogens from unknown source	2021
	North Fork Pine Creek	2008	Pathogens from unknown source	2021
	Pine Creek	2008	Pathogens from unknown source	2021

*Includes all unnamed tributaries in each stream basin.

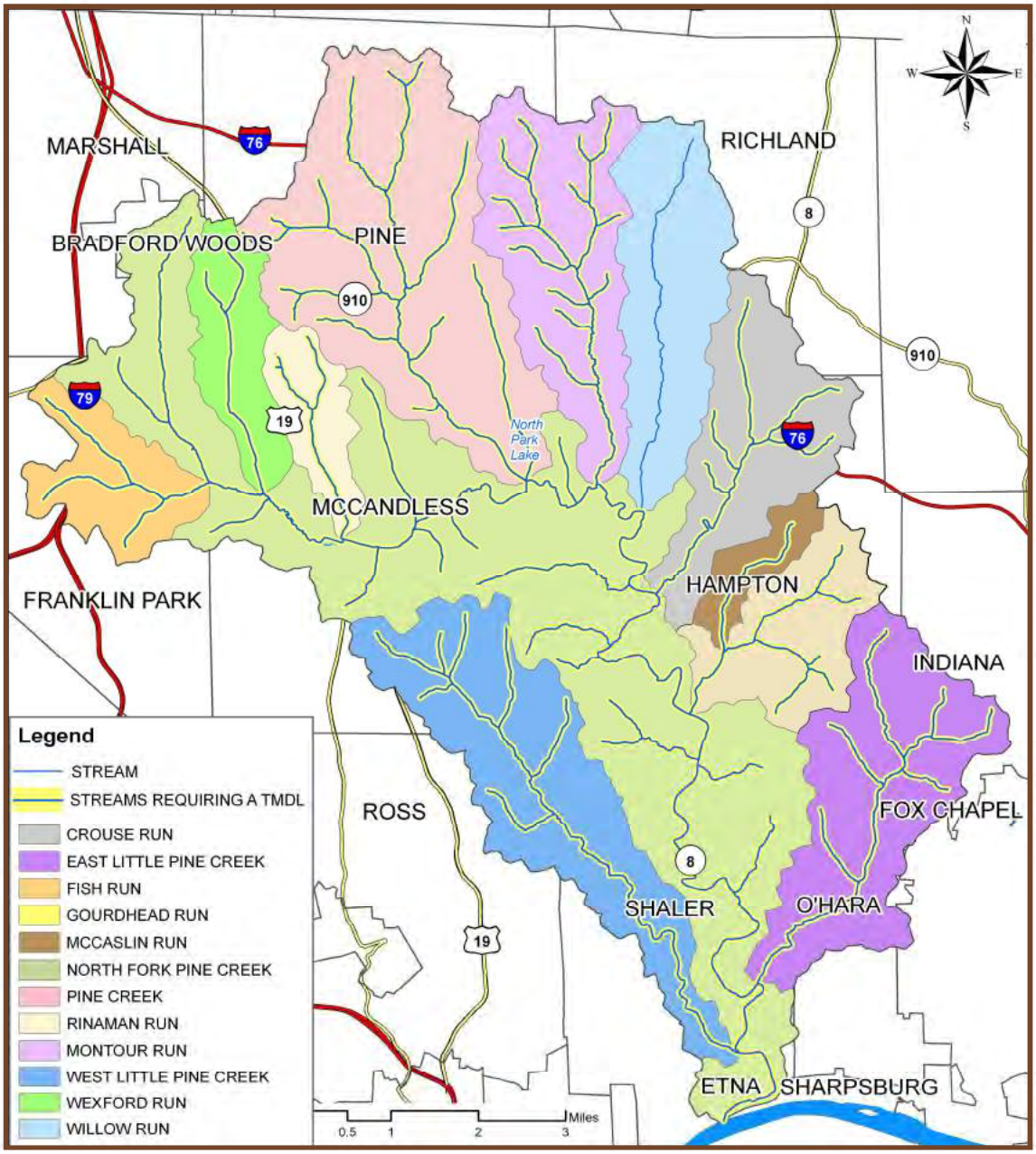


Figure III-9 TMDL Required Streams

utilized for this analysis included a geographic information system (GIS) based watershed assessment tool, ArcView Generalized Watershed Loading Function (AVGWLF), and methods contained in the Center for Watershed Protections (CWP) Manual: Urban Stormwater Retrofit Practices). The model showed a pollutant loading of total suspended solids, nitrogen, and phosphorus. A separate study evaluating the riparian zone and stream channel indicated areas of severe erosion and damage from excessive stormwater.

VI. Water Supply

Public and Private Supplies

Community water supplies are the primary sources of potable water within municipalities of Pennsylvania. According to the Pennsylvania Safe Drinking Water Act (SDWA), community water systems are mechanisms that provide water for human consumption to at least 15 service connections or 25 persons year round. Municipalities are required to obtain a PADEP water allocation permit if the community water supply is generated from either surface water, ground water that is under direct influence of surface water, or consecutive system purchases (a system with no source or treatment facilities). However, if the water is withdrawn from wells and springs that are not directly influenced by surface waters, water allocation permits are not required.

All community water systems within the Pine Creek Watershed are identified as either primary or consecutive systems. Primary water systems operate as the municipalities' principal water source and the municipalities drive the treatment systems producing potable water. This water is sold either to retail customers or to consecutive systems. Consecutive systems purchase treated water from primary water systems as a result of having no source or treatment facility. A total of seven Public Water Suppliers are located within the watershed. **Figure III-10 Public Water Suppliers** and **Table III-3 Public Water Suppliers** depict the name, type of ownership, and water source of each facility. Private wells provide water in areas that are not served by public water systems.

Table III-3 Public Water Suppliers

Supplier	Type of Ownership	Water Source
Etna Borough	Municipal	Consecutive
Fox Chapel Authority	Authority	Consecutive
Hampton Township Municipal Authority	Authority	Consecutive
Richland Township Municipal Authority	Authority	Consecutive
Shaler Township Water Department	Municipal	Primary - Ground
Borough of Sharpsburg	Municipal	Primary - Ground
West View Borough Municipal Authority	Authority	Primary - Surface

Wellhead Protection Areas

According to the PADEP Wellhead Protection Program Overview (PA DEP, 2009), almost half of Pennsylvania's residents rely on groundwater as a source of drinking water. Groundwater used as a public water supply is less expensive to use than surface water due to land acquisition costs and various treatment requirements for surface-water supplies.

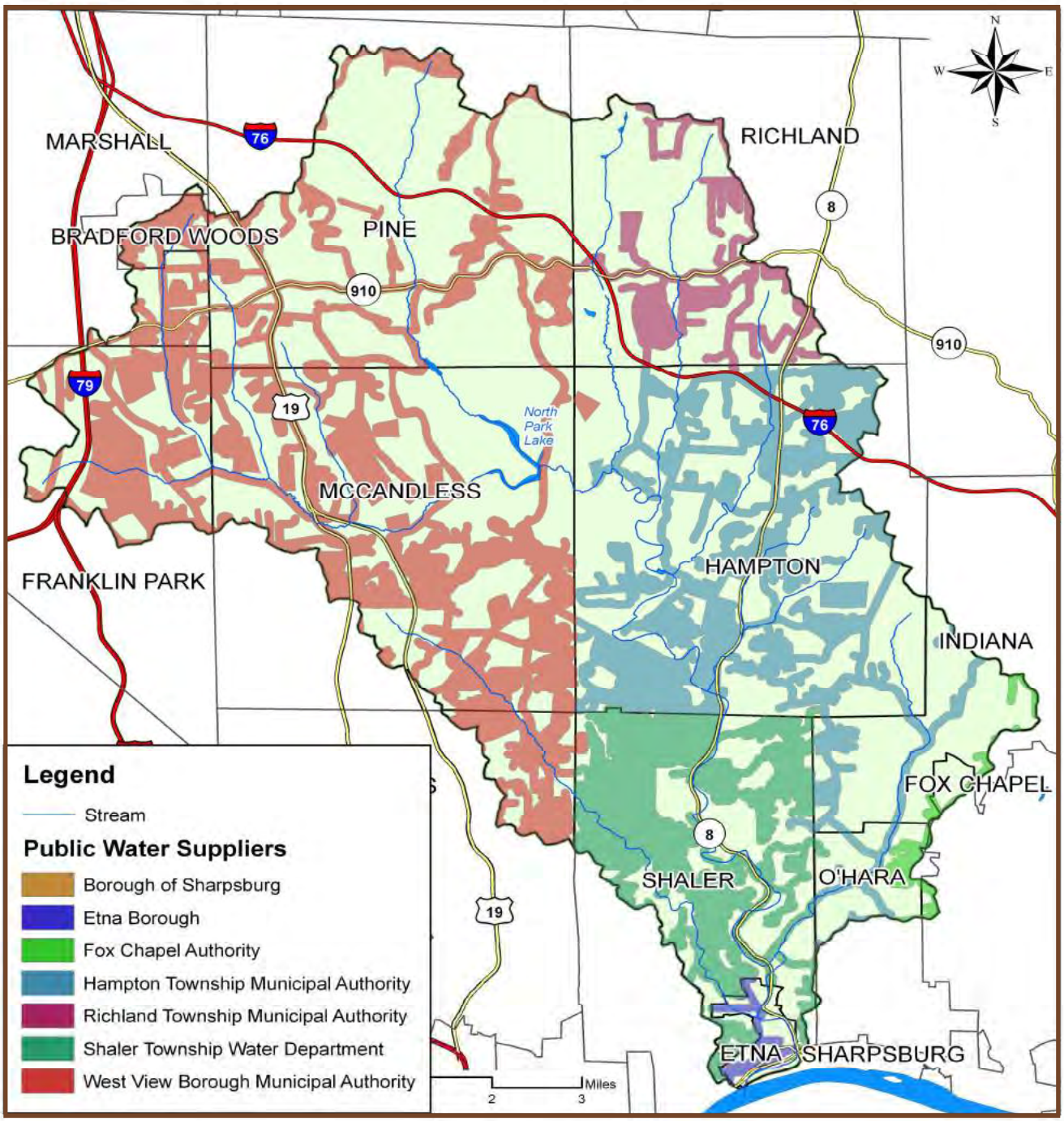


Figure III-10 Public Water Suppliers

However, if groundwater contamination occurs, it is very costly to employ remedial activities and to provide the necessary treatment to comply with drinking water standards. Also, once groundwater is polluted, it remains contaminated for a long period of time. Even if groundwater remediation is undertaken, it is a long and difficult

process to attempt to restore water quality.

Section 1428 of the Federal Safe Drinking Water Act (SDWA) requires States to submit plans to EPA that describe how they will protect groundwater sources used by public water systems from contamination. The Wellhead Protection Program (WHPP) is a proactive effort designed to apply proper management techniques and various preventative measures to protect groundwater supplies thereby ensuring public health and preventing the need for expensive treatment of wells to comply with drinking water standards. The underlying principle of the program is that it is much less expensive to protect groundwater than it is to try to restore it once it becomes contaminated.

Pennsylvania's WHPP was approved by EPA in March 1999 and it is the cornerstone of the Source Water Assessment Program which is also required under the SDWA. PADEP is the primacy agency for the Safe Drinking Water Act and the Source Protection Section in the Bureau of Watershed Management is responsible for administering the WHPP and other drinking water source protection efforts in Pennsylvania.

According to the Allegheny County Health Department's Wellhead Protection Program website (ACHD, 2009), Allegheny County has a history of groundwater contamination by industrial solvents, which has forced some groundwater systems to abandon wells or entire well fields and resort to the purchase of bulk water from another system or provide costly treatment to remove solvents/chemicals.

In 1993, the Allegheny County Health Department obtained a $100,000 grant from the state to develop their WHPP, which would serve to identify the location of affected water wells and provide some protection against future occurrences. Their accomplishments to date include delineation of the well field capture zones, mapping of potential sources of contamination, installation and sampling of monitoring wells, and installation of "Water Supply Area" signs to alert the public of the locations of WHPP zones.

Future activities include formation of local steering committees to begin implementation of local wellhead protection plans for each of the 10 community groundwater systems. Local steering committees have been formed for three community water systems and Wellhead Protection Ordinances have been adopted in two municipalities to protect their groundwater systems. More recently, Wellhead Protection efforts have evolved into the Source Water Assessment and Protection (SWAP) Program, which requires a Wellhead Protection

Program as part of the development of new surface or groundwater sources for community water supplies.

Shaler and Sharpsburg are the only WHPP communities located within the Pine Creek watershed.

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CHAPTER IV—
BIOLOGICAL RESOURCES

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The Pine Creek Watershed is located within the Pittsburgh Plateau Ecological Subregion or Ecoregion of the Western Glaciated Allegheny Plateau. Ecoregions are mapped and delineated based on various features such as physiography, climate, and cultural ecology, as well as, biological resources such as surface water, soils, and flora and fauna (Appendix B—Ecoregions Map). These ecoregions were developed to provide a consistent approach to ecosystem classification and mapping at multiple geographic scales. The classification system is an essential tool for implementing ecosystem management strategies (USFS, 1994).

1. EcoRegion Characteristics

Physiographic Characteristics

The Pittsburgh Plateau (See Existing Resources – Land, Pg. II-7) is characterized by the smooth, undulating upland areas, cut by narrow and relatively shallow valleys. During the Pennsylvanian period (299 – 318 million years ago), the bulk of the bituminous coal was formed along the upland areas of this physiographic section. Today, the landscape reflects the history of the mining industry—operating surface mines, old strip mined areas, and reclaimed strip mined areas. Elevation throughout the section varies from 660 to 1,700 feet. Due to the steepness of the valley sides, some areas in the southwestern part of the section are susceptible to landslides (DCNR, 2009).

Climate

The climate (Project Area Characteristics, Pg. I-5) for the region averages an annual temperature of approximately 50 degrees Fahrenheit (10 degrees Celsius). This allows for a growing season that averages 160 days from spring until fall. Precipitation averages 35 to 40 inches (900-1,020 mm), which is fairly distributed throughout the year; however, precipitation may be slightly higher in the spring and early summer and lowest in winter.

Cultural Ecology

Paleo-Indians, nomadic hunters, were the first humans to reach the ecoregion approximately 12,000 years ago. Due to glacial recession and warming climate, the landscape changed to a more deciduous and diverse environment. Over time floral and fauna species were exploited and rudimentary agriculture emerged, resulting in a more

sedentary lifestyle. The Fort Ancient Period (about 1,000 to 1,600 A.D.) was typified by large settlements dependent on maize agriculture. Europeans reached the area around 1,650 A.D. and maintained the farming community lifestyle, but then shifted to extractive industries such as coal, iron ore, clay, oil and gas, and sandstone.

According to DCNR habitat quality studies (2001), the Pittsburgh Plateau Ecoregion ranked "poor" in terms of wildlife habitat (**Figure IV-1 Pennsylvania Wildlife Habitat Quality Map**). Overall for the ecoregion, stream and wetland quality were noted as degraded and forests are relatively fragmented. Grassland habitat was well represented. Even though only a moderate increase in development was noted, road densities for this ecoregion were some of the highest in the state. High deer abundance is an issue that is impairing forest quality and regeneration. Recommendations for this ecoregion include habitat conservation priorities, such as maintaining or improving grassland habitats, reclaiming surface mines as wildlife enhancement areas, limiting forest fragmentation, and providing connectivity along reforested riparian zones. Stream and water quality improvement were also recommended as a major focus to protect the highly diverse fish and amphibian fauna (DCNR, 2001).

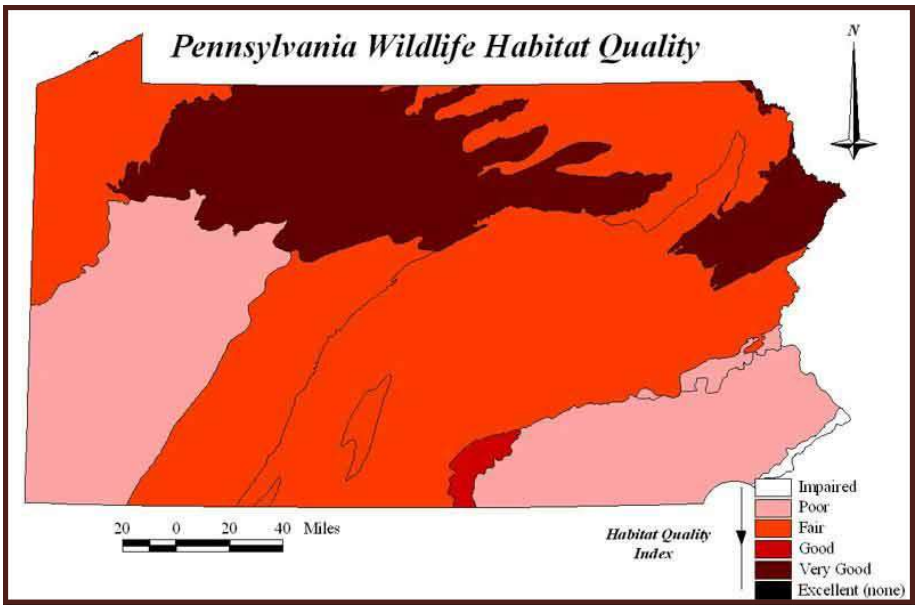


Figure IV-1 Pennsylvania Wildlife Habitat Quality Map

II. Habitats

The value of open space, wildlife, and associated habitat is difficult to quantify; their value and importance are more easily measured by the public's feelings and beliefs. According to a recent survey, Pennsylvanians enjoy and highly value wildlife as well as the

Forested area within the Pine Creek Watershed

experiences associated with these natural resources. The survey revealed that 91% of people rank green space as being important in deciding on a place to live (DCNR, 2001). This point was confirmed among respondents to the Pine Creek Watershed Conservation Plan public survey. Approximately 78% of the respondents (100 respondents total) said that conservation of green spaces and natural areas and wildlife habitat and protection are extremely important resources to protect within the watershed.

Forested area within the Pine Creek Watershed

Forest

Located within the Pittsburgh Plateau Ecoregion, the Pine Creek Watershed has historically been described as mostly Appalachian Oak Forest and also Mixed Mesophytic Forest (USFS, 1994). These forests are characterized by mixed oak forest, oak-hickory-chestnut forest, oak-pine forest, hemlock forest, floodplain forest, and swamp forest. Due to a history of timbering within the state, the current forests are second and third growth forests.

Sign advertising new development within the watershed

Today, forested areas account for approximately one-third of Allegheny County's landscape and provide many benefits, including slope stability, aesthetic value, habitat, recreation, stormwater runoff prevention, and water quality protection. Tree cover can significantly reduce both the quantity and velocity of surface runoff into local waterways, reducing sediment loads and flooding as well as improving water quality by trapping excessive nutrients and sediments. Tree cover within riparian areas shades waterways and wetlands, thereby maintaining a lower water temperature, which is important to aquatic ecosystems and habitats.

New development within the watershed

Forested habitat for wildlife is becoming more fragmented and degraded due to human induced impacts such as development, encroachment, and pollution. Interstates 79 and 279 provide easy access to Pittsburgh and have helped to encourage development in rural areas. In addition, Route 8 runs parallel to mainstem Pine Creek through the project area from Allison Park to Etna; making this area accessible for development. Since the early 1990's, the greatest population increases in Allegheny County have been in forested areas, according to the University of Pittsburgh's Center for Social and Urban Research (ACED, 2008). This trend is evident in the Pine Creek Watershed where the general character of this part of the county, also known as the North Hills, is that of a highly developed suburban landscape with pockets of green space and forested areas. The majority of the forested areas are located on steep slopes and ridges of stream and river valleys. Some of these areas are owned by the

county as part of their county park system, but the overwhelming majority of forested area is privately owned (ACED, 2008). Publicly-owned land, which includes public recreational parks, schools, universities, municipal parks, preserved land, and random tracts of municipal properties, comprises 4,322 acres or 10% of land within the watershed.

In addition to reducing forest cover and fragmenting habitat, these interstates, local roads, and residential and commercial developments have altered the hydrological characteristics of watersheds. The flooding that has resulted has caused severe problems for a number of downstream communities. With rural municipalities continuing to grow and develop, water management has become increasingly expensive, placing strain on limited economic resources. In response, municipalities have developed and updated stormwater management requirements to help compensate and prevent future flooding. However, the economic value of forested areas as natural flood control and prevention is often underestimated. Thus, maintaining adequate vegetative cover in critical locations within watersheds will also be important to reduce flooding (ACED, 2008).

Wetland within the watershed

A wetland is a transitional area between terrestrial and aquatic environments (Cowardian, Carter, Golet, & LaRoe, 1979) where the water table often exists at or near the surface, or where the land is inundated by water.

A waterway or stream is a water conveyance or flowing body of water in a channel or bed composed of substrate.

A pond is an inland body of standing fresh water, either natural or man-made, that is smaller than a lake.

A vernal pool is a temporary pool of surface water that serves as breeding habitat for certain amphibians and invertebrates.

Aquatic – Wetland / Open Water

Aquatic wildlife can live in a variety of habitats including ***wetlands, waterways, ponds, and vernal pools***. Some species, such as fish, need water on a continual basis, whereas, waterfowl, reptiles, and amphibians rely on aquatic ecosystems for only a portion of their life cycle. For example, most salamanders require small wetlands and vernal ponds for breeding, and ultimately overall species survival.

Like terrestrial wildlife populations, aquatic species are also threatened by direct habitat loss from development as well as habitat degradation from stormwater runoff, invasive species, pollution, and erosion and sedimentation. Regarding amphibian habitat, research suggests that habitat connectivity is as important as habitat availability for maintaining populations. Undeveloped corridors, also called conservation greenways, along waterways or through wooded areas are important for population dispersal and maintaining their communities. These greenways primarily serve to link and protect natural resources, and may incorporate both public and private land. Some species of salamanders, such as *Ambystoma* salamanders, have been found to utilize an area of forest up to 550 feet from their aquatic environment. Other species may utilize a greater distance of forest, but further research is needed to fully understand the habitat needs of amphibians (DCNR, 2001).

Jefferson Salamander (*Ambystoma jeffersonianum*), is a species of conservation concern (See also page IV-14)

Pine Creek in Etna

In order to protect these species and habitats, identification and protection of key conservation greenways within the watershed will be necessary. Conservation greenways along with recreational greenways are discussed in more detail in the Existing Resources-Recreation section (Pg. V-8).

Aquatic - Stream

As habitat, the approximately 128 stream miles of waterways or streams (See also Existing Resources—Water) of the Pine Creek Watershed provide habitat for both terrestrial and aquatic species as well as a water source for terrestrial species.

The diversity, number, and type of aquatic life present, including macroinvertebrates, fish, and freshwater mussels within a stream are often indicative of the stream's water quality.

Stormwater Drain Cover

Macroinvertebrates are organisms that are generally associated with soil or stream substrates, lack backbones, and can be seen without magnification. In streams, macroinvertebrates are larvae of insects, such as dragonflies or mayflies, which remain in the stream for part of the year or over winter before emerging as flying adults. Due to their presence in the stream for an extended period, limited mobility, and ease to collect, these organisms are a good way to evaluate the water quality of a stream. Moreover, macroinvertebrates differ in their tolerance to the amount and types of pollutions. For example, damselfly and dragonfly larvae are a sign of good water quality, whereas worms and midges are indicators of poor water quality (EPA, 2009).

Similarly, fish species also differ in their tolerance to the amount and types of pollutions. This fact qualifies them as a reliable indicator of water quality based on the type and number of each species identified.

Macroinvertebrate—Caddis Fly Larvae

According to the Western Pennsylvania Conservancy, freshwater mussels are some of the most sensitive species to water quality, thus making them the canaries in the coal mine in terms of a stream's water quality. Based on the size of the watershed, mussel experts suspect that historically mussels were found in some of the larger, deeper streams within the watershed. Mussels require good water quality and stable stream beds, which make them a good indicator of water quality. Flash flooding washes away mussel populations and/or buries them, which threatens their population. As a suburban watershed, it is suspected that there currently are not any mussel populations, but if there were they would be close to the mouth of the stream, where it flows into the Allegheny River. No mussel studies have been

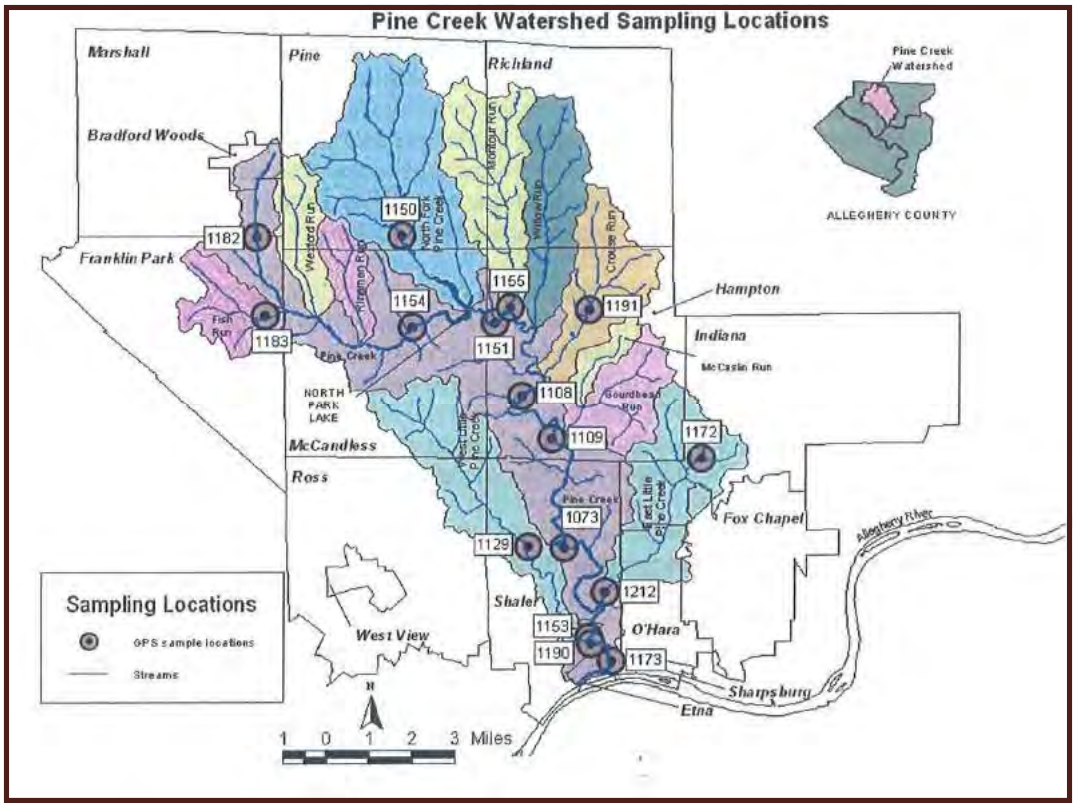
specifically conducted within the Pine Creek Watershed nor at mouth of Pine Creek into the Allegheny River; however, mussel studies have been conducted further upstream on the Allegheny river, where mussels were identified. The studies revealed that half of the mussel species have disappeared and the surviving species have a decreased abundance (WPC, 2009). A benthic aquatic survey is recommended for the Pine Creek Watershed. During data collection, researchers can also look for mussel shells that may have washed ashore or gotten buried to obtain a sense of past or current presence of mussels.

A riparian buffer is the land and vegetation adjacent to streams, rivers, and lakes that functions as a transition zone between land and water to slow the velocity of surface runoff, reduce erosion, filter pollutants, and absorb excess water.

During studies for the Pine Creek Watershed Assessment, Protection, and Restoration Plan (PEC, 2005), macroinvertebrate samples were taken at 10 of the 16 sampling locations. As a result, one site received a "good" score for water quality, one site received a "poor" score, and the other eight sites received a "fair" score.

Water quality can affect the number and diversity of aquatic species within an area. Nutrient enrichment from agricultural runoff, pesticides, sewage, and abandoned mine drainage (AMD) pose threats to water quality and aquatic habitat quality (See also Impaired Waterbody, **Pg. III-31)**. Erosion and sedimentation are significant threats in some areas of the watershed, especially where riparian cover has been reduced and/or removed. To measure these impacts on local waterways, volunteers from the watershed investigated the following parameters of Pine Creek and its tributaries: water temperature, pH, dissolved oxygen, conductivity, phosphate, sulfate, alkalinity, nitrate, and stream flow. As a result of the watershed assessment study, 16 sites (**Figure IV-2 Pine Creek Watershed Sampling Locations)** were tested, and many sites had undesirable levels for pH, sulfates, phosphates, and

Figure IV-2 Pine Creek Watershed Sampling



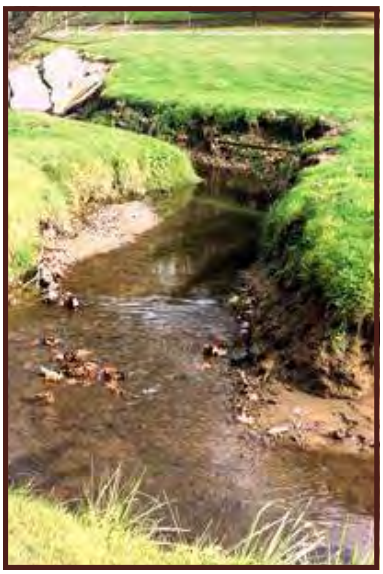
conductivity, indicating that the water quality and aquatic habitat has been negatively affected (PEC, 2005).

Natural riparian buffer—Pine Creek

Riparian Buffers

Riparian buffers (Existing Resources – Water, Pg. III-15) are the land and vegetation adjacent to waterways and waterbodies, such as streams, rivers, and lakes that function as a transition zone between land and water. Vegetation in the riparian area can slow the velocity of surface runoff, reduce erosion, filter pollutants, and absorb excess water.

Riparian buffers and the adjacent waterways they border provide habitat, food, and water for a variety of flora and fauna throughout the watershed. In addition, riparian areas serve many beneficial functions in terms of wildlife and ecosystem health: habitat for terrestrial and aquatic species; a filter for pollution, excess nutrients, and sediment preventing it from entering waterways; stream bank stability; and shade for the water to maintain the water temperature and dissolved oxygen levels. As habitat, riparian areas serve as breeding, cover, nesting, rearing, and resting areas for both terrestrial and semi-aquatic species. The types and diversity of plant and animal species in riparian areas and in the streams are also an indicator of the overall health and water quality of the waterway.



Mowed riparian zone with eroded banks—unnamed tributary to Rinaman Run

A functioning riparian buffer also can reduce flood flows during high water events by retaining water in its vegetation and soil. Dense, deep rooted vegetation is needed in riparian zones to have maximum value and function to reduce flood flow. In contrast, mowed grass does not stabilize soil more than three inches deep and can be as impermeable as concrete when compacted. The groundwater retained in riparian areas during flood events also supports vegetation and wildlife during dry periods. Riparian vegetation, such as woody debris and leaves, enters the aquatic system and decomposes into the nutrients and organic matter, which is utilized by aquatic organisms. These nutrients and organic matter provide much of the initial energy for sustaining a healthy stream ecosystem.

The biggest threat to habitat in riparian areas in the Pine Creek Watershed is removal of vegetation as a result of development and maintenance of residential lawns and/or landscaping close to waterways. To combat this threat, all municipalities within the watershed now require buffers for waterbodies—required buffers of 50 feet or 80 feet for waterways and in most cases, a buffer up to 100 feet for ponds and wetlands (PEC, 2005).

III. Wildlife

Located in a suburban area, the Pine Creek Watershed is home to a variety of birds, mammals, amphibians, and reptiles that are typical of Southwestern Pennsylvania (**Table IV-1 Common Resident and Transient Wildlife in Southwestern Pennsylvania**). Comprehensive wildlife studies identifying all species present have not been conducted on the Pine Creek Watershed.

Common Name	Scientific Name
White-tailed deer	*Odocoileus virginianus*
Ruffed grouse	*Bonasa umbellus*
Beaver	*Castor canadensis*
Woodpecker	*Picidae*
Porcupine	*Erethizon dorsatum*
Squirrels	*Sciurus spp.*
Wild turkey	*Meleagris gallopavo*
Eastern cottontail rabbit	*Sylvilagus floridanus*
Various raptors	*Falconiformes*
Various owls	*Strigiformes*
Ring-neck pheasant	*Phasianus colchicus*
Red fox	*Vulpes fulva*
Coyotes	*Canis latrans*
Raccoon	*Procyon lotor*
Opossum	*Didelphis virginiana*
Black bear	*Euarctos americanus*

Table IV-1 Common Resident and Transient Wildlife in Southwestern Pennsylvania

Birds

According to the Audubon Society of Western Pennsylvania, the Pine Creek Watershed is home to a variety of resident as well as migratory birds. According to studies, over 100 species of resident or breeding birds can be found in the watershed and nearly 200 species of birds can be found during the migration seasons. Birds are attracted to the watershed because of the diversity of available habitat, as well as abundance of food resources found during portions of the year. The abundance of bird species is also enhanced by the proximity of the watershed to the Laurel Mountains and Ohio River basin, which serve as major migratory pathways in the state.

Several of the breeding bird species that exist in the watershed also serve as indicators of land use or habitat availability. For example, pileated woodpecker (*Dryocopus pileatus*) and wood thrush (*Hylocichla mustelina*) require relatively large, contiguous woodlands in which to breed. Louisiana waterthrush (*Seiurus motacilla*), a small wood warbler, breeds along forested and clean freshwater streams, such as a few of the tributaries to Pine Creek. The Eastern bluebird (*Sialia sialis*), a species which has recovered from severe population declines across the country, is also represented in fields throughout the area. Another notable breeding species is the yellow-throated warbler (*Dendroica dominica*) which breeds within a few isolated patches of American Sycamore along the floodplains of Pine Creek. Wood duck, red-tailed hawk, yellow-billed cuckoo, belted kingfisher, eastern wood-pewee, red-eyed vireo, rose-breasted grosbeak, scarlet tanager and indigo bunting are other examples of breeding birds.

Northern Cardinal

Unlike breeding birds, migratory bird species use portions of the watershed only during their migration in spring and fall. Notable areas within the watershed include the forested landscapes of Marshall Township, north of Allegheny County's North Park, as well as the

Common Name	Scientific Name
Northern pintail	*Anas acutas*
American black duck	*Anas rubripes*
Solitary sandpiper	*Tringa solitaria*
Olive-sided flycatcher	*Contopus cooperi*
Warbling vireo	*Vireo gilvus*
Yellow-throated vireo	*Vireo flavifrons*
Swainson's thrush	*Catharus ustulatus*
Chestnut-sided warbler	*Dendroica pensylvanica*
Black-throated blue warbler	*Dendroica caerulescens*
Magnolia warbler	*Dendroica magnolia*
Pine warbler	*Dendroica pinus*
Nashville warbler	*Vermivora ruficapilla*
Northern waterthrush	*Seiurus noveboracensis*

Table IV-2 Common Migratory Bird Species

contiguous forested hillsides of Indiana Township and Fox Chapel Borough in the southern reaches of the watershed. Migratory species are: northern pintail, American black duck, solitary sandpiper, olive-sided flycatcher, warbling vireo, yellow-throated vireo, Swainson's thrush, chestnut-sided warbler, black-throated blue warbler, magnolia warbler, pine warbler, Nashville warbler and northern waterthrush (**Table IV-2 Common Migratory Bird Species**) (ASWP, 2010).

Due to habitat loss and land use changes, changes in local breeding bird occurrences have been noted. According to the recent Pennsylvania Breeding Bird Atlas data, which has not been published at the time of this report, nearly 30 species of birds are no longer widespread in the Pine Creek Watershed or no longer exist at all. Louisiana waterthrush, mentioned previously as an indicator species, can now only be found in very select sites within the watershed. This species is particularly vulnerable to siltation of streams, which drastically decreases certain aquatic invertebrate populations, its primary food source. Green heron (*Butorides virescens*) and spotted sandpiper (*Actitis macularius*) were historically found along the floodplains; however, habitat loss or degradation has likely limited these species to only a few locations. Similarly, the golden-winged warbler (*Vermivora chrysoptera*) and prairie warbler (*Dendroica discolor*) were typically found in area fields, but these species appear to be extirpated from the watershed. Lastly, Kentucky warblers (*Oporornis formosus*) were widespread in the understory of the local woodlands just 25 years ago, but habitat loss, presumably due to the over-population of deer, has removed this species from the local bird list (ASWP, 2010).

Resident Canada geese

	Common Name
1	American crow
2	European starling
3	Canada goose
4	American robin
5	Mourning dove
6	Rock pigeon
7	Northern cardinal
8	House sparrow
9	American goldfinch
10	Ring-billed gull

Table IV-3 Top 10 CBC Bird Species

Every year, the ASWP also holds a Christmas Bird Count (CBC). The CBC is conducted annually during a Saturday around Christmas day. The count is organized in geographic circles; thus, the Pittsburgh CBC encompasses Pittsburgh and much of the North Hills of Allegheny County. This larger area is then subdivided into smaller areas that are assigned to teams consisting of bird experts and volunteers (ASWP, 2008). The top 10 most commonly seen birds during the 2008 Pittsburgh CBC are listed in **Table IV-3 Top 10 CBC Bird Species**. Many of the identified birds are resident species and inhabit the watershed year-round. The complete 2008 CBC list can be found in Appendix C.

Canada goose overpopulation is an issue within the watershed, particularly in North Park. Three distinct Canada goose subspecies occur in Pennsylvania--two are migrants that breed in Canada and the third one, giant Canada geese (*B. c. maxima*), breeds and lives in the state. Prior to 1935, no Canada geese nested anywhere in Pennsylvania, but today they are found in every county and their population continues to increase (PGC, 2004). According to the U.S. Fish and Wildlife Service estimates, the national resident goose population in 2006 was 4.5 million, and increasing at an average annual growth rate of 10%. In 2007, the Pennsylvania Canada goose population was approximately 125,000, with about 700 of them residing in North Park alone (KDKA, 2007).

Resident deer and Canada Geese in North Park

Resident Canada goose populations cause crop damage and nuisance problems in residential neighborhoods and local parks. Park visitors complain about goose excrement in public parks and facilities. Excrement can also negatively affect water quality as a suspected cause of high fecal coliform counts (DCNR, 2007).

To combat the overpopulation issue, Allegheny County naturalists have spent numerous years studying the Canada goose life cycle, habits, and behaviors. These studies have helped them to develop a multi-faceted approach to humanely control the Canada goose population within the park. The ***population management strategies*** currently being utilized are egg addling, modified mowing, and harassment.

Egg "addling" directly effects the overall goose population by reducing the number of chicks born each year. Naturalists learned that chicks born within the park return to the same location to be reproduce. Utilizing Global Positioning System (GPS) technology, naturalists identify and locate nest locations throughout the park from year to year. Once a new nest is identified, the just-laid eggs (at the embryo stage) are covered with a thin coating of oil to prevent the embryo from developing. In 2009, 45 nests containing a total of 237 eggs were treated within the park.

Canada geese utilize the Park's lakes and other water bodies as their safe haven from predators. They prefer to have a clear line of sight between their land locations and the safety of the water. To make the area surrounding the lake less hospitable to geese, a modified mowing plan has been established. Grassy areas around the water's edge are mowed less frequently to allow the grass to be higher. Since predators can hide in high grass areas, the geese perceive these areas as unsafe, and therefore, seek out other "safer" areas.

Canada Goose Population Management Strategies:

- Egg addling—coat the eggs in oil to prevent embryo development
- Modified mowing plan—allow grass around the water's edge to be higher
- Harassment strategies—scare the geese away by using trained dog, lasers, and pyrotechnics

The County is also implementing USDA harassment strategies, which systematically scare the geese from land to water and vice versa until they eventually fly away. Methods to scare the geese include trained dogs, lasers, and pyrotechnics. These strategies are utilized 40-50 times per year when the birds have ample energy stores to fly away to a new location.

Naturalists have realized that Canada geese located within a 2-mile radius of the park will walk to the lake with their chicks. As a partner in resolving this overpopulation issue, the County offers egg addling management services to residents that live within the identified radius (ACPD, Personal Communication, 2009).

Mammals

Land development, habitat loss, and habitat fragmentation are the primary threats to wildlife throughout the state. Overall habitat quality estimates suggest that less than 10% of the state is represented by good quality habitat for wildlife (DCNR, 2001). As habitats become degraded, opportunistic wildlife flourish while other species' populations decline, need to relocate, or may be ***extirpated***. Fragmented habitats become more susceptible to degradation and wildlife populations become isolated. To maintain the resilience and longevity of an ecosystem, ***biodiversity*** is key.

As an area becomes urbanized, shifts occur in the types of wildlife that are present. For example, habitats altered by development tend to favor generalist species over species that have very specialized requirements. Generalist species are those that can thrive in a wide variety of environmental conditions and make use of different resources (i.e. food, shelter, etc.), whereas specialist species can only thrive in a narrow range of environmental conditions or have a special diet. Consequently in habitats altered by development, the diversity of wildlife is low, while the abundance of wildlife may be very high. Likewise, opportunistic species that thrive in disturbed areas such as invasive plant (i.e. Japanese knotweed) and animal species (i.e. pigeons, house sparrows) can take hold, and out compete native species. ***Typical wildlife species in suburban areas*** include the black-capped chickadee, American robin, northern cardinal, mourning dove, opossum, raccoon, and white-tailed deer. The Pine Creek Watershed is no exception to these habitat changes, especially as more development encroaches on natural areas.

Overpopulation of certain species such as white-tailed deer and Canada geese has become a problem within the watershed. This fact was confirmed by the respondents to the Pine Creek Watershed

Extirpated means to totally destroy or exterminate.

Biodiversity is the number, variety, and genetic diversity of plant and animal species within a specified geographic region.

Typical wildlife species in suburban areas include the black-capped chickadee, American robin, northern cardinal, mourning dove, opossum, raccoon, and white-tailed deer.

Conservation Plan public survey. Only 17% said that overpopulation of deer and geese was not an issue.

An increase in deer populations has negatively impacted forest understory and tree growth. As browsers, deer consume sapling trees, thereby reducing the regeneration of forests and providing opportunity for non-native species to establish. Unmanaged deer populations not only damage their own habitat but also the habitat of various other types of wildlife. As deer reduce the availability of shrub or understory, this habitat for nesting birds also declines (DCNR, 2001).

Common Name	Scientific Name	Common Name	Scientific Name
Blacknose Dace	*Rhinichthys atratulus*	Mottled Sculpin	*Cottus bairdii*
Bluegill	*Lepomis macrochirus*	Northern Hog Sucker	*Hypentelium nigricans*
Bluntnose Minnow	*Pimephales notatus*	Pumpkinseed	*Lepomis gibbosus*
Brown Trout - Hatchery	*Salmo trutta*	Rainbow Trout - Hatchery	*Oncorhynchus mykiss*
Central Stoneroller	*Campostoma anomalum*	Rock Bass	*Ambloplites rupestris*
Common Carp	*Cyprinus carpio*	Sand Shiner	*Notropis stramineus*
Creek Chub	*Semotilus atromaculatus*	Sauger	*Sander canadensis*
Emerald Shiner	*Notropis atherinoides*	Silver Redhorse	*Moxostoma anisurum*
Fantail Darter	*Etheostoma flabellare*	Smallmouth Bass	*Micropterus dolomieu*
Gizzard Shad	*Dorosoma cepedianum*	Smallmouth Buffalo	*Ictiobus bubalus*
Golden Redhorse	*Moxostoma erythrurum*	Walleye	*Sander vitreus*
Green Sunfish	*Lepomis cyanellus*	White Bass	*Morone chrysops*
Johnny Darter	*Etheostoma nigrum*	White Crappie	*Pomoxis annularis*
Largemouth Bass	*Micropterus salmoides*	White Sucker	*Catostomus commersonii*
Longnose Dace	*Rhinichthys cataractae*	Yellow Bullhead	*Ameiurus natalis*
Source: PFBC Fish Studies, 1992-2000			

Table IV-4 Fish Species Found within Mainstem Pine Creek

Fish & Other Aquatic Species

According to the PA Code, Pine Creek is designated as a cold water fishery (CWF) from its sources to North Park Lake Dam and a Trout Stocked Fishery from the North Park Lake Dam to its mouth in the Borough of Etna.

The Pennsylvania Fish and Boat Commission (PFBC) conducts water quality studies as well as fish studies on Pine Creek and its tributaries.

Brown trout

During fish studies conducted between July 1992 and June 2000, the PFBC identified 30 different fish species within the main stem of Pine Creek (PFBC, Personal Communication, 2009). The complete list of fish species can be found in **Table IV-4 Fish Species Found within Mainstem Pine Creek**. In addition to native aquatic species, Pine Creek is stocked with game fish such as brown trout, rainbow trout, and golden rrainbow trout by the PFBC at least three times a year—spring, summer, and fall. These recreational fish species are able to sustain themselves for months at a time until the water eventually becomes too warm for them to survive.

Reptile & Amphibians

Eastern Box Turtle, Species of Conservation Concern

Started in 1997, the Pennsylvania Herpetological Atlas Project was a 6-year study examining the distribution of reptile and amphibian species within the state. Funded through the Pennsylvania Wild Resource Conservation Fund and private donations, volunteers from environmental organizations, colleges and universities, and state agencies documented species type, critical habitats, locations, and photographs for the project. In 2004, the Atlas project was revitalized as an on-line form for the public to participate and called the Pennsylvania Online Herpetological Atlas. For this project, the Amphibian and Reptile Technical Committee identified 36 species of conservation concern to focus on for data collection. These species were targeted for investigation due to evidence of declining populations, restricted and/or patchy distribution, and susceptibility to threats such as habitat destruction or over collection by humans. Appendix D lists the amphibian and reptile species of conservation concern found within Allegheny County (POHA, 2009).

IV. Conservation Areas

Natural Heritage Inventory Areas

The Allegheny County Natural Heritage Inventory (NHI), conducted and published by the Western Pennsylvania Conservancy (WPC) in 1994, identifies and maps the County's most significant natural heritage areas, which includes natural areas (NA), biological diversity areas (BDA), dedicated areas (DA), landscape conservation areas (LCA), other heritage areas (OHA) and managed lands. More specifically, the study identified plant and animal species and communities that are unique or uncommon in Allegheny County. The NHI also covered areas that are important for general wildlife habitat,

education, and scientific study (WPC, 1994).

According to the NHI, the Pine Creek Watershed contains 5 BDA, 1 OHA, and 2 managed lands. A ***BDA*** is an area of land that contains and supports state or federally protected plant or animal species of special concern, exemplary natural communities, or exceptional native biodiversity. Other Heritage Areas (OHA) are important because of their significant value as an education and scientific resource. Managed lands are owned or leased public or private properties that are importance to overall maintenance and protection of ecological resources. The natural heritage areas identified within the Pine Creek Watershed are:

A Biological Diversity Area (BDA) is an area of land that contains and supports state or federally protected plant or animal species of special concern, exemplary natural communities, or exceptional native biodiversity.

Allegheny River BDA

Significance: High

Location: Etna Borough and Shaler Township, Pine Creek empties into the Allegheny River.

Description: A recovering river system that is vital habitat for state listed animal species.

Rare occurrences: Provides vital habitat for a number of state listed animal species.

Threats and stresses: Human influences include effluent discharges, point source discharges, navigational locks, and dams and dredging of the river bed.

Recommendations: The NHI states that it is imperative for water quality improvement efforts to be targeted at streams that flow into the Allegheny River because of their negative impacts on the river's ecosystem and aquatic life.

Allegheny River

Crouse Run BDA

Significance: Exceptional

Location: Hampton Township

Description: Area is home to Mesic Central Forest Community, which is an imperiled forest community within the state because of rarity or other factor(s) that make it vulnerable to extirpation. Typically 6 to 20 occurrences or few remaining individuals or acres. This community is dominated by sugar maple (*Acer saccharum*), basswood (*Tilia sp.*), and eastern hemlock (*Tsuga Canadensis*). Red oak (*Quercus rubra*) becomes more prominent at higher elevations and in the upland areas.

Rare occurrences: Site for a state listed plant species as well as a high diversity area. Though not a natural heritage characteristic, a portion of this BDA is recognized as a significant geologic feature, known as Cold Valley, for Allegheny County (See Existing Land Resources – Geology for more details).

Threats and stresses: ATV use of the area, trampling of plants, compaction, and soil erosion. Proposed development upslope and improvements or maintenance of existing sewer line, dumping of garbage, construction of utility right-of-ways, and uncontrolled use of valley.

Recommendations: Restrict ATV use on site and/or educate ATV users about threats they pose to natural qualities of the habitat.

Hemlock Grove BDA

Significance: High

Location: McCandless Township, North Park

Description: This area is home to Mesic Central Forest Community, which is an imperiled forest community within the state because of rarity or other factor(s) that make it vulnerable to extirpation. Typically 6 to 20 occurrences or few remaining individuals or acres. This community is dominated by sugar maple (*Acer saccharum*), basswood (*Tilia sp.*), and eastern hemlock (*Tsuga Canadensis*). Red oak (*Quercus rubra*) becomes more prominent at higher elevations and in the upland areas.

Rare occurrences: The site for a state listed plant species.

Threats and stresses: Actively used recreational trail divides habitat of state listed plant species. Dilapidated pavilion is located in proximity to the plant's habitat.

Recommendations: Close the trail and relocate it upslope to an area beyond the plant's habitat. Do not rebuild the dilapidated pavilion that is currently in proximity to the plant's habitat.

North Park Lake

North Park Lake BDA

Significance: Notable

Location: McCandless Township, North Park

Description: Lake provides disturbed habitat for a state listed plant species. (Due to the North Park Lake Ecological Restoration Project that is currently taking place at the lake, this statement may no longer be accurate.)

Rare occurrences: State listed plant species.

Threats and stresses: Habitat is highly degraded and threatened by nearby road use and maintenance, such as de-icing chemicals, heavy metals from gasoline, or asbestos from car brake linings.

Recommendations: Monitor the plant colony. Alleviate disturbance caused by road maintenance and construction and encourage fisherman not to access water at this location.

Willow Run Slopes BDA

Significance: High

Location: Hampton Township, between North Park and Crouse Run.

Description: This area provides critical habitat for a state listed plant species.

Rare occurrences: State listed plant species.

Threats and stresses: Pasture and private residence, and cleared floodplain and railroad tracks prevent population from expanding. Any additional development, clearing of forest, or related disturbance would be detrimental to the species.

Recommendations: Allow the forest to recover and encourage cleared areas to revert back to forest.

Other Heritage Areas are important because of their significant value as an education and scientific resource.

Beechwood Farms Nature Reserve OHA

Significance: Notable

Location: Fox Chapel Borough, along the eastern boundary of the watershed.

Description: Even though only partially located within the watershed, Beechwood Farms was noted as an ***"other heritage area" (OHA)*** because it serves as both an education and scientific area for local educational institutions, environmental organizations, and the general public.

Rare occurrences: None

Beechwood Farms

Threats and stresses: None

Recommendations: Develop a management plan for the nature reserve to protect areas of potential or significant natural quality.

North Park

Managed lands are owned or leased public or private properties that are importance to overall maintenance and protection of ecological resources.

Significance: ***Managed Lands***

Location: Pine, McCandless, and Hampton Townships

Description: At 3,075 acres, North Park is largest park in Allegheny County and lies completely within the watershed. The land is managed by Allegheny County.

Rare occurrences: None

Threats and stresses: Still recovering from past use (agricultural and timbering). Recreational use stresses. Very few areas in the park remain in natural condition.

Recommendations: Manage some of the park's natural resources as natural areas and manage accordingly as such. Give consideration to protecting the largest forested or undeveloped areas from high impact types of activities that are common in county parks such as mowing, construction and development, etc.

Hartwood Acres County Park

Hartwood Acres

Significance: Managed Lands

Location: Hampton and Indiana Townships

Description: Hartwood Acres is comprised of 629 acres in total, with the majority of the park lying within the watershed. The land is managed by Allegheny County.

Rare occurrences: None

Threats and stresses: None

Recommendations: Set aside forested areas of the park, which are the most natural areas, as conservation area and manage them accordingly.

Due to the age of the NHI report (1994), some of the information outlined may no longer be accurate, such as the North Park Lake BDA description. As previously mentioned,

the North Park Lake Ecological Restoration is being conducted, which involves draining and dredging the lake in order to restore it as a recreational resource. That said, it is recommended that the Natural Heritage Inventory for Allegheny County be updated.

Other Important Natural and Recreation Areas

In addition to the NHI, the North Area Environmental Council has identified five other areas that are important natural and recreation areas within the watershed. Outlined in the Pine Creek Watershed Assessment, these five self-guided walking tours were developed to promote the importance of the local watershed and to encourage residents to enjoy the watershed's natural beauty and diversity (PCWC, 2009). Additional information on the self-guided hikes can be found in Appendix E.

Important Bird Areas

Habitat loss and fragmentation are the most serious threats facing birds in Pennsylvania. To help curb these threats and reverse declining bird populations, the Important Bird Area (IBA) program was established by Birdlife International in Europe. The program is carried out in the United States by the National Audubon Society. The IBA program identifies large or small, public or private tracts of land that are part of a global network of places recognized for their outstanding value to bird conservation. Even though it is a voluntary program, each IBA has to meet a set of objective criteria. The IBA program helps to promote proactive habitat conservation, benefiting birds and biodiversity, by focusing attention on the most essential and vulnerable areas.

In 1996, Pennsylvania developed the first statewide IBA program in the country. Since then, the Ornithological Technical Committee (a group of scientific advisors within the PA Biological Survey) has identified more than 80 IBA sites encompassing over two million acres of Pennsylvania's public and private land. These IBAs include migratory staging areas, winter roost sites, and prime breeding areas for songbirds, wading birds, shorebirds, and other species (PA Audubon, 2009).

There are not any identified IBAs currently in the Pine Creek Watershed.

V. Threatened and Endangered Species

Threatened and endangered plant and animal species within Pennsylvania are tracked through the Pennsylvania Natural Diversity Inventory (PNDI) database as part of the Pennsylvania Natural Heritage Program (PNHP). PNDI is a partnership between natural resource agencies, including the Department of Natural Resources (DCNR), PGC, PFBC, and U.S. Fish and Wildlife Service (USFWS). These agencies conduct inventories and collect data to identify rare, threatened, and endangered species in the state. The data is housed in the PNDI, which provides the most accurate and up-to-date data on ecological resources to allow for planning, conservation, and natural resource management of these areas.

Agency coordination and a review of the PNDI revealed three Pennsylvania Rare, Threatened, or Endangered Species within the Pine Creek Watershed (**Table IV-5 Threatened and Endangered Species within the Watershed**). The location and identification of individual species is not provided in order to protect these vulnerable species.

Snow Trillium

Common Name	Scientific Name	PA Status
Snow trillium	*Trillium nivale*	Species of Concern
Bluebreast darter	*Etheostoma camurum*	Threatened
Tippecanoe darter	*Etheostoma tippecanoe*	Threatened

Table IV-5 Threatened and Endangered Species within the Watershed

Common Name	Scientific Name	Type
Norway rat	*Rattus norvegicus*	Mammal
House mouse	*Mus musculus*	Mammal
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	Mammal
Rock dove or pigeon	*Columbia livia*	Bird
Ring-neck pheasant	*Phasianus colchicus*	Bird
European starling	*Sturnus vulgaris*	Bird
House sparrow	*Passer domesticus*	Bird
Mute swan	*Cygnus olor*	Bird
Red-eared slider	*Trachemys scripta elegans*	Reptile (Turtle)
Dutch gypsy moth	*Lymantria dispar*	Insect
Hemlock woolly adelgid	*Adelges tsugae*	Insect
Beech bark scale	*Cryptococcus fagisuga*	Insect
Emerald ash borer	*Agrilus planipennies fairmaire*	Insect
Asian longhorned beetle	*Anoplophora glabripennis*	Insect
Woodboring wasp	*Sirex noctilio*	Insect

Table IV-7 Invasive Terrestrial Species

VI. Exotic and Invasive Species

Like many watersheds, Pine Creek is susceptible to invasive plant and animal species. Invasive species are any non-native plant, animal, or other organism that is introduced into an ecological system that causes economic or environmental harm. Invasive species are one of the largest threats to wildlife habitat in the state. Current estimates suggest that over one-third of all Pennsylvania plants are non-native (DCNR, 2001).

Not all invasive species are harmful to native species or ecosystems, but some can have severe ecological and economic impacts. The presence of invasive species can lead to a ripple effect throughout the ecosystem causing shifts in the food chain and reducing food availability for native species. Human influences such as development, ecosystem degradation, habitat fragmentation and pollution can all weaken natural systems and provide opportunity for invasive species to flourish.

Common Name	Scientific Name	Description
Garlic mustard	*Alliaria petiolata*	a woodland flower that crowds out spring ephemerals
Japanese knotweed	*Polygonum (Falopia) cuspidatum*	a large shrub that grows so dense nothing else will survive; frequently found along river banks, but grows nearly everywhere there is sunlight.
Tree of heaven	*Alianthus altissima*	a fast-growing tree that chemically inhibits other trees from germinating near it
Asiatic bittersweet	*Celastrus orbiculatus*	a vine that overwhelms trees and displaces native, American bittersweet
Japanese honeysuckle	*Lonicera japonica*	a shrub that grows in forest understory
Japanese barberry	*Berberis thunbergii*	commonly planted for hedges, this thorny invasive crowds the forest understory
Burning bush	*Euonymus alatus*	a popular yard shrub that escapes into the woods to crowd the understory
Autumn olive	*Elaeagnus umbellata*	another shrub invading forests and old fields
Purple loosestrife	*Lythrum salicaria. L. virgatum*	a wetland invasive threatening delicate wetland ecosystems
Common Reed / Phragmites	*Phragmites australis*	a wetland plant that displaces native cattails, but has little wildlife value compared to cattails
Common Privet	*Ligustrum vulgare*	a shrub that escaped from cultivation and seeds are spread by birds.
Border Privet	*Ligustrum obtusifolium*	a shrub that was planted commonly in the past, but now is invasive
Multiflora Rose	*Rosa multiflora*	a shrub that was planted commonly as fencing in the past, but now is invasive

Table IV-6 Invasive Plant Species

Invasive Plant Species

Japanese Knotweed

Several invasive plant species common to Pennsylvania have been identified within the watershed including Japanese knotweed, purple loosestrife, and porcelain berry. In North Park, plant and animal invasive species are problems. The park staff has been attempting to eradicate invasive plants such as purple loosestrife and Japanese knotweed, but it is an ongoing battle due to need for repeat herbicide treatments and cutting down plants before they go to seed. Invasive plant species are easily spread as seeds are unintentionally dispersed by wildlife populations, wind, and humans. **Table IV-6 Invasive Plant Species** shows a list of common invasive plant species within Southwestern Pennsylvania.

Common Name	Scientific Name
Bighead carp	*Hypophthalmichthys nobilis*
Black carp	*Mylopharyngodon piceus*
European rudd	*Scardinius erythrophthalmus*
Quagga mussel	*Dreissena rostriformis bugensis*
Round goby (fish)	*Apollonia (Neogobius) melanostomus*
Ruffe (fish)	*Gymnocephalus cermuus*
Rusty crayfish	*Orconectes rusticus*
Silver carp	*Hypophthalmichthys molitrix*
Snakehead (fish)	*Channa spp.*
Tubenose goby (fish)	*Proterorhinus semilunaris*
Zebra mussel	*Dreissena polymorpha*

Table IV-8 Invasive Aquatic Species

Zebra Mussel

Invasive Animal Species

Invasive animals, insects, and pathogens can also be a threat to wildlife habitat and ecosystems. There are several common invasive invertebrate and vertebrate species, both terrestrial and aquatic, in Pennsylvania (**Table IV-7 Invasive Terrestrial Species; Table IV-8 Invasive Aquatic Species**); however, no specific studies on these species have been conducted in the Pine Creek Watershed.

One species that has been identified in recent years and is currently being monitored as a threat to Pennsylvania's ash trees is the emerald ash borer (*Agrilus planipennies fairmaire*) (USFS, 2008). Native to Asia, these beetles feed on the inner bark and phloem of ash trees and can kill a tree within 3-4 years of infestation. The emerald ash borer (EAB) was originally detected in the Commonwealth in Cranberry Township, Butler County in June 2007.

Emerald Ash Borer

The DCNR's Department of Forestry and the PA Department of Agriculture (PDA) have been working together to identify infested areas and to protect unaffected areas from infestation. Two separate studies were conducted last year—Seasonal Study and Statewide Survey.

Emerald Ash Borer Trap

Seasonal Study

In 2009, the DCNR's Division of Forestry Pest Management (FPM) studied the seasonal abundance and dispersal potential of the EAB. A total of 53 sites were selected, including 38 sites within a 20 mile radius of the original Cranberry infestation and 15 sites within a 10-

mile radius of the Wheatland infestation in Mercer County **(Figure IV-3 Seasonal Study Area and Results)**. The additional 9 sites were outside the study area as outlier sites. The standard purple traps were used and were monitored every other week from May 31 through September 26, 2009.

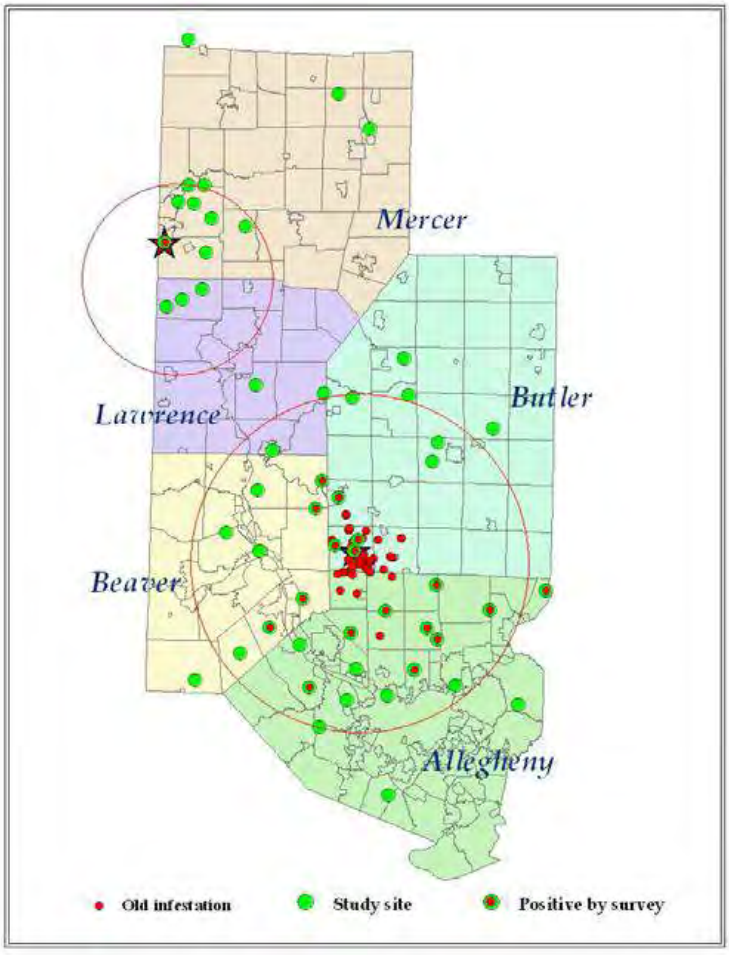
For the Cranberry area, 17 of the 38 sites were positive for the emerald ash borer, including one outlier site, which was 21 miles away from the epicenter.

Statewide Survey

The PA DCNR conducted a statewide survey as part of a larger national survey to identify the presence of the EAB within the nation. To identify the leading edge of infestation within the state, emerald ash borer traps were placed throughout the state in 2009. These traps help to identify infested and uninfested areas while a public education program is helping to prevent future infestations. Natural resource agencies have requested that firewood not be transported from where it was harvested in order to prevent spreading the emerald ash borer to unaffected areas (PDA, 2009).

As a result, Allegheny County is one of seven counties where the emerald ash borer has been found and is currently quarantined to prevent the spread of the emerald ash borer (DCNR, 2009). The other counties are Mercer, Lawrence, Beaver, Butler, Westmoreland, and Mifflin.

Figure IV-3 Seasonal Study Area and Results



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CHAPTER V—

RECREATIONAL RESOURCES

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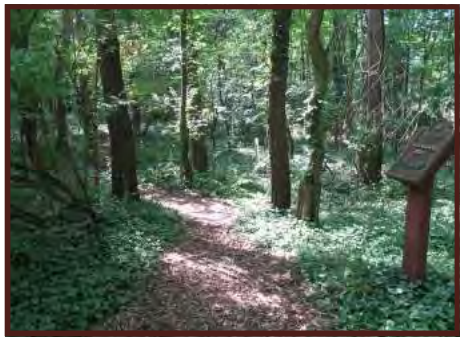
Given its suburban nature, the Pine Creek Watershed hosts a multitude of outdoor recreational opportunities for its local residents as well as visitors to the region. Passive and active recreational opportunities are available within county, municipal, and local parks and open spaces in the watershed. Even though there are no state parks, state forests, or state gamelands within the Pine Creek Watershed, additional recreational opportunities have been created through cooperative programs with private landowners such as conservation easements, land trusts, and land donations. The combination of all these facilities provides residents of all ages a variety of opportunities to recreate outdoors.

1. Types of Facilities

Trails



Trail in Bradford Woods

Trails are a valuable resource to local residents in terms of recreation, access, and connection between communities and local points of interest. In terms of recreation, trails provide opportunities for cycling, hiking, and running, among other activities. As the network of trails grows, trails are also being used as a means of alternative transportation, while interpretative trails provide educational and cultural learning experiences for users.

The Pine Creek Watershed has trails that vary in length, width, and surface material; involve many uses; and occur on public and private land. Public trails are typically maintained by the property owner or by local volunteer groups, while private trails are up to the private owner to maintain. The Rachel Carson Trail is the only major (longer than a few miles) public trail within the watershed (**Figure V-1 Recreational Resources**).

According to the Allegheny County Comprehensive Plan (2008), several trails and connections are proposed within the watershed. These trails are the North Hills/Harmony Trail and Spur and Millvale Trail (**Figure V-1 Recreational Resources**). The North Hills/Harmony Trail and Spur is discussed in more detail on the next page. The Millvale Trail extends approximately 1 mile across the mouth of Girty's Run and ends at a point about 1,000 feet into the Shaler boundary along the Allegheny River. A Feasibility Study is currently being conducted by McTish, Kunkel, and Associates for approximately 24 miles of the trail from Millvale to Schenley (Personal Communication, Friends of the Riverfront, 2010).

The trail maps for the two county parks—North Park and Hartwood Acres—are located in Appendix F.

Rachel Carson Trail

Extending 35.7 miles from North Park to Harrison Hills Park, (Natrona Heights, Allegheny County), the Rachel Carson Trail is a hiking trail with diverse terrain that traverses several county parks, follows power and gas lines, skirts suburban homes and farms, crosses creeks, meanders through woods and fields, and passes along the edge of steep bluffs. As a result, the terrain along the trail ranges from paved roads to primitive and rugged areas with steep slopes. Only a few bridges have been built to cross streams, so in most areas, hikers have to cross on their own. Spurs off of the main trail connect to the mansion area at Hartwood Acres in Indiana Township and the Rachel Carson Homestead in Springdale. The trail is intended for day hiking; thus, there are no camp sites or shelters along the way (Rachel Carson Trails Conservancy, 2009).

Rachel Carson Trail, Hampton Township

Rails-to-Trails

Encouraging the conversion of abandoned or unused rail corridors into multi-use recreational trails, the ***Rails-to-Trails Program*** of 1965 is one of the primary ways to extend the network of trails in the region. The program is a locally driven movement that has also been successful in addressing several conservation and environmental issues including: recycling, land conservation, illegal dumping, and wildlife habitat preservation, in addition to promoting recreation and a healthy lifestyle.

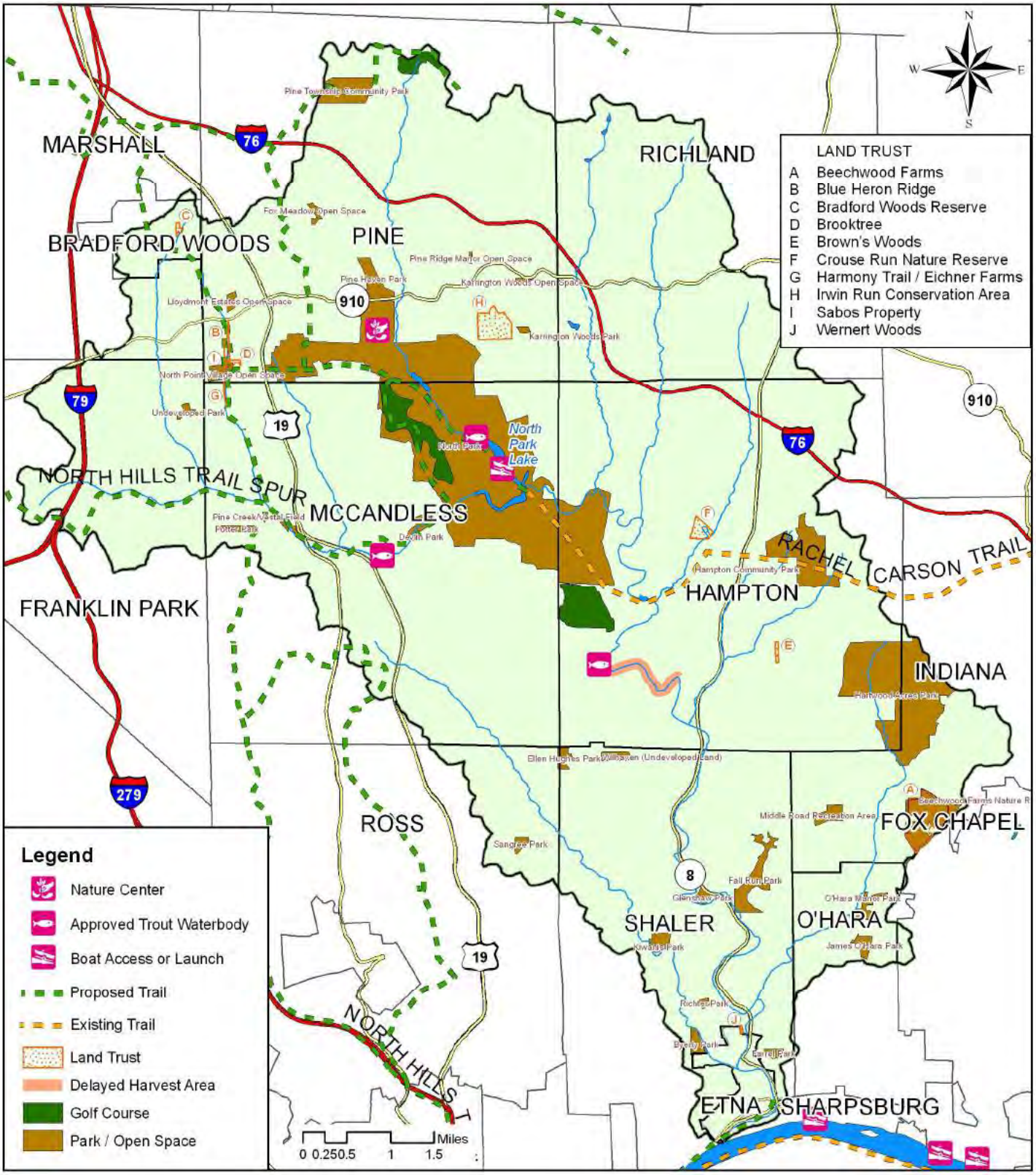
Rails-to-Trails is a program that encourages the conversion of abandoned or unused rail corridors into multi-use recreational trails.

Currently, there are no rails-to-trails type trails within the project area; however, the proposed North Hills/Harmony Trail would follow a portion of the old Harmony interurban trolley line and rail bed, constituting it as rails-to-trails (Rachel Carson Trails Conservancy, 2009). The Rachel Carson Conservancy is focusing its resources on a 4.3-mile section of the former rail bed between Ingomar and Warrendale to preserve this scenic tract of right-of-way as a future trail for hiking, biking, and walking. The full length of the proposed trail is shown on **Figure V-1 Recreational Resources**.

Pittsburgh Trail Advocacy Group

The Pittsburgh Trail Advocacy Group (PTAG) is a local 501(c)3 non-profit organization founded in 2001 to protect and encourage trail use and share use trail access to wooded trails in western Pennsylvania. While PTAG is concerned with single track trails used by mountain bikers, equestrians and hikers, the group also works with city, county,

Figure V-1 Recreational Resources within the Pine Creek Watershed



state, and private landowners to ensure that all trails are approved by the land owner or manager, and constructed and maintained to International Mountain Bike Association (IMBA) standards, with minimal impact on the environment. PTAG recognizes that the larger mission of creating sustainable trails is preservation of Western Pennsylvania's forests, lakes, rivers, and streams. For example, by using IMBA standards, PTAG improves existing trails to stop erosion. The erosion that is eliminated helps to prevent excess soil from flowing into streams and rivers. Moreover, the group educates all users on responsible trail use with the goal of fostering improved relations among landowners and trail users (PTAG, 2010).

International Mountain Bike Association (IMBA) produces standards, or best practices, for trail design, installation, and maintenance so as to provide sustainable trails that resist erosion and reduce adverse impacts on the land.

PTAG is an active group in most of the Allegheny County parks including North Park and Hartwood Acres. In 2009, PTAG developed a North Park Trails Plan, which provides a plan for the improvement of the trail system within North Park to better serve the varied park users, including trail users on foot, mountain bikers, and equestrians, as well as provide a direction for PTAG efforts in aiding the county.

Parks

Although no state parks are located within the watershed, there are numerous local, municipal, and county parks and open spaces, totaling 4,322 acres, that provide residents with recreational opportunities (**Figure V-1 Recreational Resources**). These parks and open spaces vary in size and recreational opportunities provided, with the county parks—North Park and Hartwood Acres—as the largest parks within the watershed. The Public Parks & Open Space table in Appendix G lists all parks and open spaces with their respective locations and acreages.

North Park directional sign

North Park

The establishment of North Park was initiated by Allegheny County Commissioner E.V. Babcock, who purchased a parcel of land and later sold it to the county at cost. Established in 1927, North Park is the largest of the county parks.

Almost centrally located within the Pine Creek Watershed, North Park is a recreation mecca for local residents. Managed by Allegheny County, North Park is comprised of approximately 3,075 acres of forested area, recreational facilities, and water resources. The park's amenities include:

- 18-hole golf course
- shelters and rental buildings


Tot lot in North Park

North Park Lake and Boathouse

- various fields (soccer, football, ballfields)
- basketball courts
- a boathouse, a lake and pier
- playgrounds
- ice skating rink
- Nature Center
- multi-use trails
- off-leash dog area
- horse show arena
- tennis courts
- remote control airplane field
- swimming pool

North Park Lake Ecosystem Restoration Project Sign

Due to the presence of all these amenities, very little of the park remains in its natural state (Allegheny County, 2009).

North Park Lake

At approximately 60 acres, North Park Lake is probably one of the most prominent and notable features of the park. Originally constructed in 1936, the lake has provided park visitors with fishing, boating, and other recreational opportunities for decades. The lake is a stocked fishery (See also Fishing on Page V-14). However, due to excessive siltation from upstream erosion and sedimentation issues, these recreational opportunities were being compromised and the aquatic habitat degraded. To maintain these functions, the originally 75-acre lake is under going restoration. A cooperative project between Allegheny County and U.S. Army Corps of Engineers (USACE), the North Park Lake Ecosystem Restoration Project involves draining the lake, removing excess sediment, and restoring the lake habitat. Excess sediment will be transported to a 65-acre brownfield site off Wildwood Road, which will help to remediate that site and create additional recreation and green space within the county. The North Park Lake Ecosystem Restoration project started in September 2009 and is anticipated for completion in May 2011 (Evanto, 2009).

North Park Lake during restoration, July 2010

Latodami Nature Center

Located in North Park, the Latodami Nature Center is an environmental education center and sanctuary, consisting of a barn, pond, and more than 300 acres of forest and fields. Thirteen trails meander through the property to allow visitors to explore the various habitats—grasslands, riparian areas, wetlands, forestland, and aquatic habitats. North Park naturalists operate the center and hold a variety of environmental education courses for the general public, private and public schools, local boy and girl scout troops, and other interested groups.

Latodami Nature Center, North Park

In 2004, the Mammal Technical Committee of the PA Biological Survey identified the Latodami Nature Center as an ***Important Mammal Area (IMA)***. As an IMA, the Nature Center serves as an inspiration and model for mammal habitat conservation and education (Friends of Latodami Environmental Education Center, 2009).

Important Mammal Area (IMA) is an area that is a model for mammal habitat conservation and education.

Hartwood Acres

Consisting of 629 acres, Hartwood Acres is also managed by Allegheny County. More than half of the park is located within the Pine Creek Watershed.

A highlight of the park, the Tudor mansion (erected in 1929), stable complex, and gate lodge (erected in 1927) comprise one of the largest and most spectacular country estates in the region. The mansion's 16th century architecture and excellent collection of original English and American antiques allows visitors a glimpse of Pittsburgh's past.

Hartwood Acres

In the winter time, the Hartwood Acres Celebration of Lights is a local attraction for vehicles to drive through the park's 3-mile display of more than three million holiday lights.

In addition to its cultural attributes, Hartwood Acres offers a multitude of passive and active recreational opportunities including wildlife viewing; theatre and concert performances; and trails for horseback riding, cross country skiing, off-leash dog area, and walking/hiking depending on the season (Allegheny County, 2009).

Campgrounds

There are no campgrounds located within the Pine Creek Watershed.

Greenways

Greenways are corridors of open space that are identified and preserved with the purpose of linking natural resources or man-made features. These corridors may incorporate public and private property and be either land or water-based. Oftentimes, greenways follow abandoned railways, canals, ridge tops, river and stream valleys. There are several different types of greenways based on their function (ACED, 2008):

Forested area within the watershed

- **Conservation Greenways** are unimproved corridors designated to protect natural resources.
- **Recreational Greenways** are corridors that accommodate recreational facilities and trails including hiking trails, bikeways, water trails, and multi-use trails.
- **Major Greenways** are long-distance greenway corridors that encompass at least 50 miles and pass through two or more counties. These greenways are identified in official planning documents and represent the major corridors for developing a statewide greenways system.
- **Mega Greenways** are greenways of 100 miles or more that have a completed plan.

Currently, there are no designated greenways within the Pine Creek Watershed; however, the Allegheny County Comprehensive Plan, Allegheny Places, included a study and Greenways Plan for the county outlining recommended areas of protection including proposed greenways, sensitive steep slopes, natural areas, and land trust property (**Figure V-2 Proposed Greenways**). Included in these recommended areas of protection are the proposed greenways of the Allegheny Land Trust's (ALT) GREENPRINT.

In 2007, the ALT developed a GREENPRINT of the county, which used Geographic Information Systems (GIS) to identify priority conservation areas. The intent of the GREENPRINT was to "...promote strategic land conservation by identifying highly functional landscapes that harbor biological diversity, manage water resources, and maintain the region's scenic landscape character" (ACED, 2008).

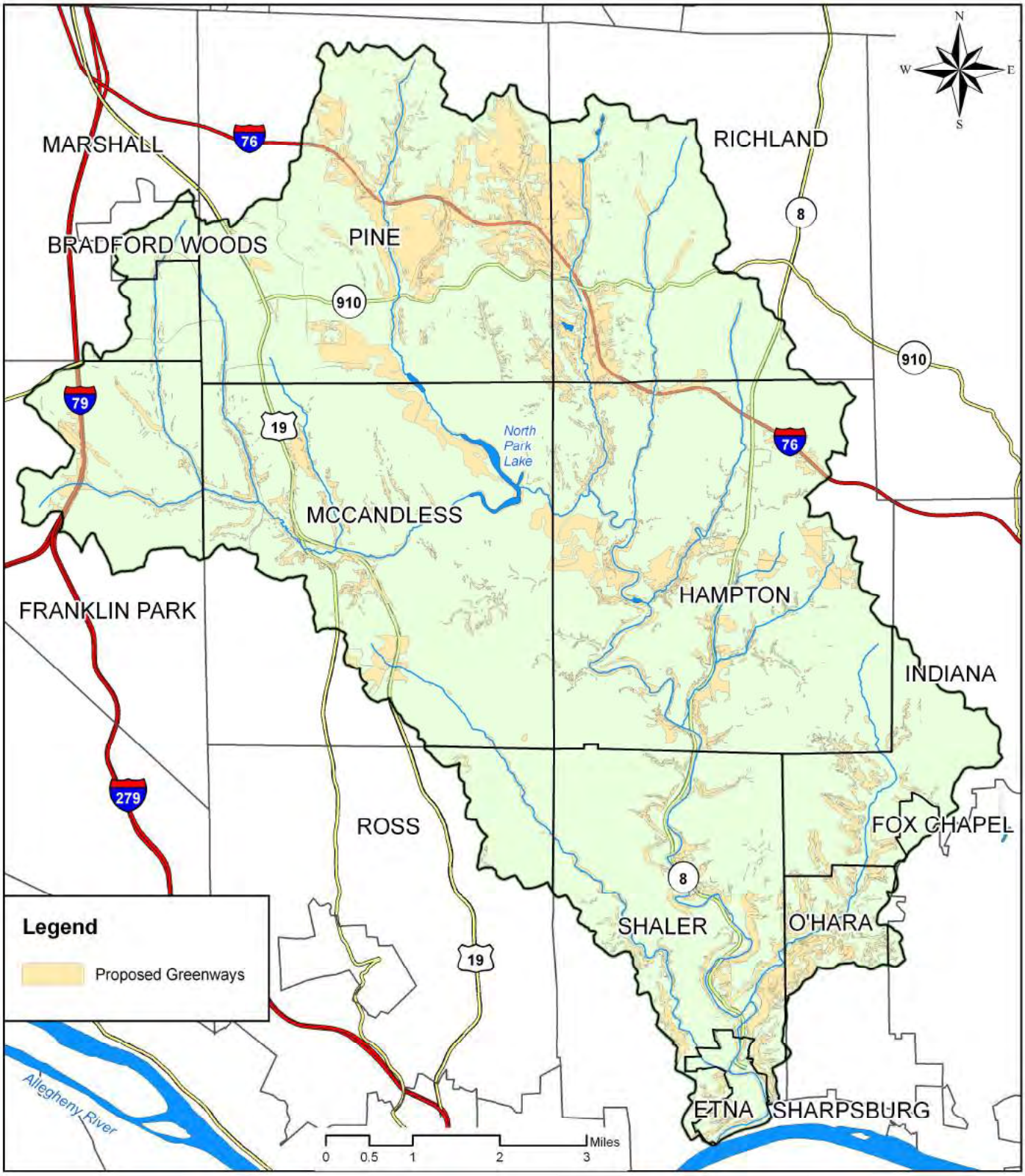


Figure V-2 Proposed Greenways within the Pine Creek Watershed

Land trusts

Land trusts are non-profit organizations dedicated to preserving land or natural areas through acquisition or conservation easements. A conservation easement is a legal agreement between the property owner and a qualified land trust or other qualified organization. The property owner continues to own and use the land, but the land's uses are limited to protect the property's conservation value. The owner is still able to sell the land or pass it on to heirs, but the terms of the conservation easement are included in the deed, thus future owners inherit those easement terms. Landowner benefits of conservation easements include income tax deduction and reduced property and estate taxes.

Land Trusts are non-profit organizations dedicated to preserving land or natural areas through acquisition or conservation easements.

Preserved properties are typically acquired by land trusts through donation from the landowners, through the land being willed to them, or by purchasing the land or easement. Once acquired, land trusts hold the lands or easements in trust for future generations to enjoy. As a result, land trusts play an important role in protecting natural areas and open space (ACED, 2008).

Allegheny Land Trust

Like most land trusts, Allegheny Land Trust (ALT) is an independent non-profit organization dedicated to protecting and conserving land of natural value. Its mission is to serve as the lead land trust conserving and stewarding lands that support the scenic, recreational, and environmental well-being of communities within Allegheny County and its environs. ALT has permanently conserved more than 1,400 acres of land within and adjacent to Allegheny County. Within the Pine Creek Watershed specifically, the organization has protected approximately 73 acres, near North Park, called the Irwin Run Conservation Area. The property was dedicated on October 31, 2009 as a conservation area (ALT, 2009).

Irwin Run Conservation Area

Irwin Run Conservation Area

Located within the Pine Creek Watershed, the Irwin Run Conservation Area is ALT's most recent land acquisition project. Located in Pine Township adjacent to North Park, the approximately 73 acres of land surrounds Irwin Run, which flows south through the property and eventually empties into North Park Lake. Preservation of this land will help to buffer North Park from development and protect beneficial wetlands, densely wooded

slopes, and stream valleys. This property lies within a proposed conservation greenway corridor, which was identified in the 1995 Allegheny County Greenway Plan (ALT, 2009).

Bradford Woods Reserve Sign

Bradford Woods Conservancy

Operating under the umbrella of the ALT, the Bradford Woods Conservancy is also dedicated to promoting and maintaining the natural beauty of the local community through land preservation. As a non-profit, its mission is to promote education, appreciation, and conservation of the community, and to encourage environmental stewardship of natural resources. Bradford Woods Conservancy focuses on land preservation within the Borough of Bradford Woods and surrounding communities (Bradford Woods Conservancy, 2009).

Bradford Woods Reserve

The Bradford Woods Reserve is an approximately 4.5-acre reserve owned by the Borough of Bradford Woods. Previously a nursery, the property was donated to the borough about 17 years ago. Currently, there is no standing formal agreement to keep the property as open space, thus, the Bradford Woods Conservancy is working with the Borough to preserve the land through an official conservation easement. The reserve is located in the headwaters of Pine Creek and consists of a pond (utilized by locals for fishing), meadows, numerous natural spring-seeps, headwater wetlands, and trails. The property is open for public use (Personal Communication, Bradford Woods Conservancy, 2009).


Bradford Woods Reserve

Fox Chapel Area Land Trust

Established in 1978, the Fox Chapel Area Land Trust (FCALT) is committed to insuring that the natural and unaltered lands in the Squaw Run Watershed shall be the inheritance of all people. Even though only a small portion of the Pine Creek Watershed is located within Fox Chapel Borough, the goals and future projects of this organization may fall within the Pine Creek Watershed. According to their website, the FCALT has several goals for 2010, which include to build partnerships with adjacent municipalities and to partner with O'Hara Township to develop local area trail mapping (FCALT, 2009).

Rachel Carson Trail Sign

Rachel Carson Trails Conservancy

Originally started in 1992 as the Harmony Trails Council, the Rachel

Rachel Carson Trail, Hampton Township

Carson Trails Conservancy (RCTC) is a non-profit, volunteered-based organization dedicated to the development, protection, and promotion of hiking, biking, and walking trails throughout western Pennsylvania. The organization is committed to raising awareness of the benefits of community trails, promoting interest in physical activities, encouraging residents to experience the beauty of our region and the natural world, and helping people to see our region as active and vibrant. The group oversees the maintenance and upkeep of the Rachel Carson Trail and Baker Trail. Approximately 5 miles of the Rachel Carson Trail (**Figure V-1 Recreational Resources**) is located within the watershed (RCTC, 2009).

The RCTC currently is working to secure properties along the corridor for the proposed North Hills Harmony Trail and Spur. RCTC has secured approximately one mile of the proposed trail corridor through purchase, donation, or easement by working with adjacent property owners. These properties are Brooktree, HarmonyTrail/Eichner Farms, and Sabo property (**Figure V-1 Recreational Resources**). The spur of the trail leads up through the Brooktree area, crosses S.R. 19, and heads directly into North Park via Allegheny County's 2004 bike trail to adjoin other trails in the park (**Figure V-1 Recreational Resources**) (RCTC, 2009).

WPC Garden in Etna

Western Pennsylvania Conservancy

Established in 1932, the Western Pennsylvania Conservancy (WPC) is dedicated to protecting and restoring exceptional places in the region, which provide clean waters, healthy forests, and wildlife and natural areas for the benefit of present and future generations. WPC has protected nearly 225,000 acres of natural lands in Pennsylvania.

Within the Pine Creek Watershed, the WPC owns the Beechwood Farms Nature Reserve and leases the property to the Audubon Society of Western Pennsylvania. In addition, WPC maintains two community gardens within the watershed—one in Etna at Route 8 and Kittanning Street and one in Shaler at the Shaler Intermediate School (WPC, 2009).

Beechwood Farms Nature Reserve

Beechwood Farms Nature Reserve

Partially located within the Pine Creek Watershed, Beechwood Farms Nature Preserve is one of the largest nature reserves and environmental education centers in Western Pennsylvania. Since 1967, Beechwood has also been the headquarters of the Audubon Society of Western Pennsylvania (ASWP). The property is owned by

the WPC and leased to the ASWP to carry out its mission, which is to inspire and educate the people of southwestern Pennsylvania to be respectful and responsible stewards of the natural world.

This public recreation area contains more than five miles of walking trails, which are open from dawn until dusk every day year-round. Some of the walking trails are accessible for visitors with special needs. With approximately 134 acres comprised of woodlands, fields, streams, and a pond, the property offers a variety of outdoor experiences. Indoor facilities include a 125-seat auditorium, a natural history library, the Audubon Nature Store, educational classrooms, a modern barn for programs and rentals, and the Audubon Center for Native Plants. Professional and volunteer naturalists are on staff to serve visitors to the reserve (ASWP, 2009).

Pine Creek Land Conservation Trust

The Pine Creek Land Conservation Trust (PCLCT) is small non-profit organization that was started in 1991 to protect natural areas and lands within the Pine Creek Watershed. To date, 38 acres of land have been protected by the organization (PCLCT, 2009). Of the total preserved acreage, 25 acres falls within the Pine Creek Watershed.

Crouse Run Nature Preserve Sign

Crouse Run Nature Reserve

Acquired in 1996, the Crouse Run Nature Reserve is a beautiful 17-acre property located along Wildwood Road. The parcel includes a steep hemlock ravine and a significant population of northern wildflowers that were studied by Rachel Carson and Dr. O. E. Jennings. Today, however, these wildflower populations are being heavily impacted by deer populations that browse in the area. Residents can enjoy the property by walking a public trail located onsite. Other passive uses are exploring, hiking, and nature study.

Property highlights also include a historic site, an old German Club building, that burned in 1969. Educational tours are given of the site to teach local students about the history of the area.

Brown's Woods

Acquired in 2003, Brown's Woods is a 5-acre parcel located along Harts Run Road in Hampton Township. The property is primarily utilized by families and children that live on the adjacent properties.

Wernert Woods

Acquired in 1995, Wernert Woods is a 3-acre homestead property located in Shaler Township, overlooking Route 8. The property is utilized predominantly by local residents to walk their dogs (PCLCT-Personal Communication, 2009). There is also a 1-acre conservation easement located adjacent to this property that adds to the overall conservation area of Wernert Woods.

Fishing

Stocking North Park Lake

The Pine Creek Watershed is a popular place for local fisherman and outdoor enthusiasts alike. With the mainstem of Pine Creek and North Park Lake regularly trout stocked, the waters of the Pine Creek Watershed are a valued treasure for local fisherman. According to public input and interviews, fisherman utilize the fishing opportunities year-round.

The mainstem of Pine Creek is typically stocked three times per fishing season, which is from March until October. The Allison Park Sportsman's Club (APSC), a local organization, and the PA Fish and Boat Commission (PFBC) work together to stock the creek. Various types of trout are stocked including golden rainbow and rainbow trout *(Oncorhynchus mykiss)*, which simply have a color variation, and the brown trout *(Salmo trutta)*. The pre-season stock releases between 5,000 and 6,000 trout into Pine Creek in preparation for opening day, which is the second or third Saturday in April. To extend the fishing season, a late harvest stock is performed in the fall.

Rainbow Trout caught in Pine Creek in 2009

A 1.4-mile section of Pine Creek from the abandoned railroad near the Mount Royal Boulevard and Duncan Avenue intersection to 150 yards downstream of the SR 4019 bridge is a delayed harvest area. This part of the stream is open year-round for fishing; however, fisherman are required to follow certain guidelines in this area—artificial lures composed of certain materials (i.e. metal, plastic, rubber or wood) must be used, a current trout permit is required, and a catch and release policy is instituted (**Figure V-1 Recreational Resources**). From June through Labor Day, however, fisherman are permitted to keep three fish, but they must be at least nine inches in length.

Happy Prize winners at the 2006 Dan Wagner Memorial Kid's Fishing Contest

As previously mentioned, North Park Lake is also stocked in the spring with rainbow *(Oncorhynchus mykiss)* and brown trout *(Salmo trutta).* Stocking the lake provides ample fish for all fisherman as well as supports the APSC annual fishing tournament—Dan Wagner Memorial Fishing Contest. The tournament is held for kids from 2 to 12 years of age. With various prizes and contests, the tournament is a fun, family

event that promotes kids' interest in fishing and outdoor recreation. Due to the Lake's Ecological Restoration Project, the tournament was not held in 2009 and will be postponed until the project is completed.

The commitment to protecting fishing resources within the Pine Creek Watershed is evidenced by the involvement of many local organizations, including the APSC, Trout Unlimited, Tri-County Trout Club, and local boy and girl scout troops. These organizations among other volunteers and groups partner with the natural resource agencies to assist in a variety of projects that protect streams and recreational fishing resources such as habitat improvement projects (i.e. diverters, deflectors), stream bank stabilization, and water quality monitoring. Water diverters in the local streams slow down flood water and provide fish habitat by offering protective cover, hiding places, and feeding opportunities in calm water. Collectively, the efforts of local organizations and natural resource agencies have led to public education and awareness of watershed-wide issues as well as implementation of projects on the ground which have improved and protected the waterways of the Pine Creek Watershed.

The APSC, for example, holds a stream clean-up event every year to preserve the quality and integrity of the waterways. In the spring, members from APSC and other volunteers pick up trash along Pine Creek from the spillway in North Park to the Burger King located on Route 8 in Shaler Township. Many organizations and municipalities participate in the effort. The municipalities donate supplies including dump trucks to haul away the trash. On average, volunteers remove 13 dump trucks full of trash from the stream each year. In 2008, APSC received the Great American Cleanup Award for the greatest amount of waste removed from an area (APSC-Personal Communication, 2009).

Fisherman at North Park Lake

Water testing on Little Pine Creek

Deflector placed in Pine Creek by the Alison Park Sportsman's Club

Golf Courses

Golfing is a popular recreational activity in the region with numerous public and private golf courses located within and just outside the Pine Creek Watershed boundary. Within the watershed, there is one public and two private golf courses (**Figure V-1 Recreational Resources**). The one public golf course is the North Park Golf Course, located along Kummer Road in McCandless Township. The two private golf courses are Wildwood Golf Club and Treesdale Country Club. The Wildwood Golf Club is located along Sample Road in Hampton Township while the Treesdale Country Club is only partially located within watershed along Old Orchard Drive in Pine and Adam

North Park Golf Course

Townships. The Treesdale golf course is a 27-hole Championship Course designed by legendary golf professional Arnold Palmer. The other two courses are 18-hole.

Hunting

As previously mentioned, there are no state forests or gamelands in the Pine Creek Watershed; thus no designated public hunting areas exist within the watershed. A decision by the Pennsylvania Supreme Court in 1988 ruled that local municipalities have no authority to prohibit hunting. As a result, hunting is not prohibited within the Pine Creek Watershed; however, it is restricted due to private land owner access and right to allow hunting or not on their property.

Hunting on private property may occur with permission from the landowner or as part of a municipality's deer management program or Pennsylvania Game Commission's (PGC) Cooperative Farmland or Forest Programs. Hunters are required by law to follow the orange safety requirements for the various seasons. Likewise, they must comply with the safety zone distances, which are 50 yards for archery and 150 yards for firearms from a home or building, and 150 yards from a school or playground regardless of the hunting equipment (Personal Communication-PGC, 2010).

For safety reasons, several municipalities have developed comprehensive wildlife management programs, which focus primarily on controlling deer populations. These programs are a cooperative effort of the municipalities and the PGC and attempt to match qualified archers with property owners who want hunting to take place (Borough of Fox Chapel, 2001). Fox Chapel Borough currently participates in this program.

Cooperative Farm Game Program is a partnership between the PA Game Commission and landowners whereby they work in concert to improve public hunting opportunities and wildlife habitat on farm property that is enrolled.

Cooperative Forest Game Program is a partnership between the PA Game Commission and landowners whereby they work in concert to improve public hunting opportunities, wildlife habitat, and forest management on forested property that is enrolled.

Farm Game and Forest Game Programs

The ***Pennsylvania Game Commission's (PGC) Cooperative Farm Game Program*** is a partnership between the PGC and landowners whereby they work in concert to improve public hunting opportunities and wildlife habitat on farm property enrolled in the program. Hunters and trappers help to manage wildlife populations through lawful hunting and trapping, while the PGC provides a variety of benefits to the cooperating landowner. Benefits to the landowner include: law enforcement patrols to deter unlawful all-terrain vehicle use; unauthorized hunting and illegal dumping or littering; while providing free food and cover seedlings and advice on soil conservation and habitat improvements.

To enroll in the program, the landowner or group of landowners must place at least 1,000 acres under lease for five or more years. More than 21,000 landowners and tenants currently enrolled in this program, which covers more than 2.5 million acres of farm land in Pennsylvania (PGC, 2006). Currently, there is one farm game area enrolled in the program within the Pine Creek Watershed in Richland Township.

The ***Cooperative Forest Game Program*** was developed by the PGC to help landowners implement good forest management practices and wildlife conservation strategies on their properties. The program is available to interested landowners, who own more than 1,000 acres of mostly forested land and are willing to allow public hunting on their property. Participating landowners benefit by receiving assistance from PGC on managing their property and local sportsmen benefit from having additional lands on which they can hunt. Currently, Pennsylvania has more than 600,000 acres enrolled in this program; however, no Forest Programs are located within the Pine Creek Watershed (PGC, 2006).

II. Private Recreational Opportunities

In addition to the private recreational opportunities mentioned throughout the text, Wildwood Highlands, North Park's Family Fun Center, provides indoor and outdoor family fun, such as snow tubing in the winter and mini-golf and various other entertainment and rides the rest of the year. Wildwood Highlands offers a wide variety of entertainment options for everyone:

- Kiddie City (play area)
- Laser Extreme (Laser tag)
- Bumper Boats
- Water wars
- Woodys Den (Small amusement park)
- Snow Tubing
- Arcade
- Mini golf
- Go carts

West of North Park on Ingomar Road, there are additional private recreational opportunities as well. North Park Sports Shop offers bicycle rentals and repairs and fishing supplies. Slightly further west on Ingomar Road, there are batting cages available. These cages offer softball and different speeds of baseball pitches. In addition, just west of North Park, there is a mini-golf course and a par-3 golf course, as additional private recreational opportunities.

CHAPTER VI—

CULTURAL RESOURCES

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The Cultural Resources Element of the Watershed Plan focuses on the history of the Pine Creek Watershed. Specifically, it examines these resources with the intent of analyzing how this history has affected development and stewardship within the watershed. Cultural heritage is comprised of many different elements – not just historic buildings but also places, people, cultural groups, entertainment, and natural features. This element proposes to identify a number of cultural attributes that deserve enhancement and protection, and that contribute to the development of the watershed's cultural resources.

1. Historic Settlement

Local knowledge has identified the Seneca Indians, one of the original "Six Nations" of the Iroquois, as the original Native American settlers within the Pine Creek watershed. Indeed, much of the land in the Ohio River Valley was in dispute during the eighteenth century, with the French and the British battling over control of the land at the Point and its surroundings (Gray, 2004). The Pine Creek Watershed was an important player in these disputes, as archeologists and local history have established that the Native Americans had several transient settlements within the watershed, including a substantial village in what is now Fox Chapel.

In the case of both the **Depreciation Lands** and the Donation Lands (located just north of the Depreciation tracts), many Revolutionary War soldiers wanted hard cash, not land in the wilderness, and thus sold their parcels to land speculators, who then turned around and sold the tracts to pioneer settlers.

The Native American presence in the three rivers area came to an end on October 23, 1784 when the Six Nations of the Iroquois sold the land north of the Ohio River and west of the Allegheny River to Pennsylvania and were relocated to New York state. Because of the "depreciated" value of Colonial currency due to the Revolutionary War (1775-1783), those lands were used like money to pay active soldiers for their service and were known as the ***"Depreciation Lands".***

Archaeology

Settlement within the watershed in the early to mid 1800's as well as the presence of Native Americans suggests that there is the potential for the presence of numerous archaeological sites within the Pine Creek Watershed (Depreciation Lands Museum, 2009). This was confirmed through a review of the Pennsylvania Historical and Museum Commission (PHMC) database, which contains information on the presence of any known archaeological sites and/or information. To protect the integrity of these sites, specific site information cannot

Depreciations Land Museum, Hampton Township

be made available for public documents. The concern is that if site information is presented publicly, these known archaeological sites could be disturbed by relic hunters.

Depreciation Lands

When the battles between the French and British over the control of the Forks of the Ohio ceased in the early 1780's, white settlement in the Pine Creek Watershed began to infringe upon the Native American settlements. Although many pioneer families can trace the first settlement to the 1760's, the land within and surrounding the Pine Creek Watershed was officially opened for settlement in 1783 when the Commonwealth of Pennsylvania set aside the 720,000 acres of land known as "the depreciation lands" (Depreciation Lands Museum, 2010). The intersection of McKnight Road and Babcock Boulevard lies almost directly upon one of the survey lines dividing District 3. Numbered west to east, this third district was divided among five men – Nathaniel Breading, Winchester Alexander, Samuel Nicholson, Ephraim Douglass, and Samuel Jones – who would administer the sale of lots of 250 to 300 acres.

Depreciations Land Museum, Hampton Township

II. Local Histories

Several municipalities within the watershed have their own place in history within the Pittsburgh area. The information is summarized below:

Bradford Woods Borough

The area that was to become Bradford Woods was originally part of the ***Depreciation Lands*** purchased by Thomas Bradford of Philadelphia in 1800 and thus was part of Marshall Township (Jenkins, 1985). It was primarily an attractive area for settlers seeking agricultural pursuits, but with the establishment of the Harmony Short Line in 1908, the area's appeal as an ideal rustic location for summer homes began to take hold. Local investors such as the North Pittsburgh Realty Company purchased lots and advertised both the setting and the modern model of access (the Harmony Line) as incentives to attract new residents (Jenkins, 1985). Many of those who came for a summer retreat decided to make the area their full time home. In 1915, with the hope of maintaining the tranquility of the area as it grew, the residents petitioned the court to separate from Marshall Township and become a borough. It has maintained its reputation as a peaceful, close-knit community since that time.

Etna Borough

Among Etna's first settlers was George Croghan, a "rough-hewn" Irishman who came to Pine Creek to trade with the Indians in 1746. Croghan set up a trading hut and "plantation" of 300 acres on the current site of downtown Etna (Fleming, 1922). Using his connections with local Native American tribes, Croghan established a trading operation (using Pine Creek as a primary means of water transit) that extended into Kentucky and Illinois and north throughout New York and south through what is now West Virginia. However, Croghan's plantation was burned to the ground in Pontiac's uprising in 1763. Croghan was eventually tried for treason for his faulty land deals. Another early pioneer family in Etna was that of the Henry S. Spang family, who moved to the area in 1818, and bought the Pine Creek Iron Works in 1828 (Ancestry.com, 2010). Spang changed the name of the company to the "Etna Iron Works," in that year. The name "Etna" was also applied to many other industries in the area owned by Spang in 1828 (Fleming, 1922). By September of 1868, the industries of the village had grown so much there was a constant glow from the industrial furnaces, causing the area to resemble the volcano in Sicily from which it took its name. Etna's industrial activity continued well into the next century, when de-industrialization throughout the Pittsburgh region took its toll on the community, as well. Today the Borough is a quiet and pleasant community that acts primarily as a suburb for Pittsburgh.

Planes taking off at Rogers Field (near Fox Chapel), 1932

Fox Chapel Borough

A small portion of the Pine Creek watershed is located within Fox Chapel Borough. The current site of Fox Chapel was an active Native American settlement well into the early nineteenth century. Early landowners included James O'Hara, who was a Revolutionary Army general and prominent Pittsburgh businessman. Facing financial ruin during the economic depression of 1818, General O'Hara was counseled by James Ross, a noted lawyer and former Senator. For his guidance, General O'Hara gave Ross 1,700 acres of land which is now a portion of Fox Chapel (Fox Chapel, 2010).

The Borough was originally part of O'Hara and Indiana Townships but in 1928, approximately 40 property owners assembled and voted to incorporate the Fox Chapel District Association. The matters of immediate concern to the Association were fire and police protection, and the directors took action to meet these needs. As time went on, the District Association addressed other concerns of its members including naming of roads, development and zoning. However, by 1933 the District Association had grown concerned that its interests

were at variance with those of both Townships, and a petition was filed to allow the formation of a new borough. Despite vigorous opposition by both Townships, on August 3, 1934, the Court ordered the incorporation of Fox Chapel Borough from 6.8 square miles of O'Hara Township and 0.4 square miles of Indiana Township (Fox Chapel, 2010). Over the years, other residents adjacent to the Borough have petitioned for annexation, increasing the area of the Borough to its present size of approximately 8.5 square miles.

Franklin Park Borough

The land that is Franklin Park Borough (formerly Franklin Township) was originally part of Pitt Township. It was then included in early Pine Township and was part of Ohio Township when Ohio seceded from Pine in 1803 (Franklin Park Borough, 2010). At the time, Ohio Township extended nine miles along the Ohio River and northward to the Butler County Line. Twenty years later, Franklin Township was the first of several communities to secede from Ohio Township. The original Franklin Township included land that now comprises Marshall Township and Bradford Woods Borough, until the former separated from Franklin Township in 1863 and the latter in 1915 (Franklin Park Borough, 2010). Franklin Township remained a second-class township until 1961 when it became the Borough of Franklin Park. The community was for a long time primarily agricultural in nature. There were no major business districts, with only small churches, schools, and country stores scattered among the farms. It was during the years following World War II that Franklin Park began to see an increase in development as infrastructure in the form of roads, water, and sewer lines was extended into the Pine Creek watershed region. Today, the Borough still maintains much of its open space and mature woodlands interspersed with residential neighborhoods.

Hampton Township

The first settlers of present-day Hampton Township arrived in the mid to late 1700s around the time of the Revolutionary War. In 1794, John McCaslin obtained a large section of land presently known as Oak Hill Farms near the junction of Route 8 and Mt. Royal Boulevard (Hampton Township, 2010). Many geographical landmarks in the area bear the names of early settlers such as Robert and James Sample, William and Henry McCully, and John McNeal. Other early pioneer families included Alex McDonald and Frank Black. The Honorable Moses Hampton, LLD, a well respected judge and member of Congress, signed incorporation documents in 1861 and Hampton Township became a municipal entity encompassing parts of Indiana, McCandless and West Deer Townships (Fleming, 1922). Land area

totaled approximately 10,323 acres or 16.33 square miles. Hampton Township saw steady immigration through the 19th century. The Township has and continues to be overwhelmingly residential in nature.

Indiana Township

Indiana Township was chartered in 1805. Since its creation, Indiana Township's land area has been reduced by the formation of the municipalities adjacent to it. East Deer was first in 1836, followed by Hampton Township in 1847, Shaler Township in 1860, Harmar and O'Hara Townships in 1875, and Fox Chapel Borough in 1934. Today, Indiana Township is a municipality of seventeen square miles. Currently, the Township is bounded by West Deer Township on the north; Frazer Township on the east; Fox Chapel Borough, Harmar Township, and O'Hara Township on the south; and Shaler and Hampton Townships on the west (Indiana Township Comprehensive Plan, 2001).

In 1919, the town of Indianola was built as the "Last word in coal producing and miners' home development." The houses featured running water and electric lights, although many houses did not have electricity until much later. Pre-cut houses were shipped from Michigan to Harmarville by railroad and loaded on one-ton horse drawn wagons and driven on a dirt road to Indianola.

The first recorded settlers in Indiana Township were Jacob Huddle and Henry Strohm, both of German descent. They settled here in 1798 and received the deeds to their lands on August 21, 1805. Other early settlers included Peter Weaver, Jacob Bave, Daniel Sweeney, Robert Black, John McKee, John Edward, and David Stewart. Early settlement patterns in the Township were the farming village of Dorseyville, the mining village of Rural Ridge, and the mining village of Indianola. Indiana Township was primarily an agricultural community from its creation until the late nineteenth century. In 1897 the Pittsburgh, Bessemer, and Lake Erie Railroad was built and the Township experienced its first surge of development (Indiana Township Comprehensive Plan, 2001). The railroad made coal mining the leading industry and primary employment source in the Township. Today the Township is primarily a quiet residential rural community.

Marshall Township

Marshall Township's existence as a township dates back to June 3, 1863. This territory was previously an election precinct of Franklin Township. Marshall Township is named for Thomas Mercer Marshall, one of the most famous attorneys in Western Pennsylvania and a very influential man. For 40 years, in Pittsburgh, there was scarcely an important murder trial in which he did not conduct the defense (Cushing, 1975).

There are two Indian trails dating from the colonial times that wind their way through the area. The Venango Trail goes through the northeast

corner of the Township as that historic road follows its course from Pittsburgh to Venango (present day Franklin, Venango County) Erie, and Presque Isle. The Kuskusky Path passes through the entire Township from south to north on its way to Kuskusky (present day New Castle, Lawrence County) and cuts its way through the property where Marshall Elementary and Middle Schools are located (Cushing, 1975).

McCandless Township

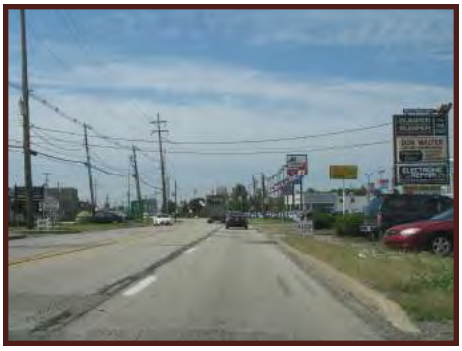
The first settler in McCandless was James Duff, who had purchased 400 acres in 1796. Farming was the primary activity of the area, as was the case throughout the watershed, and in 1849, Daniel Vogel presided over meetings for the purpose of forming a local government. The Township was originally founded in 1851 and called Taylor. In 1857, it was re-incorporated as second-class township and renamed McCandless in honor of District Judge Wilson McCandless (McCandless Township, 2010).

McKnight Road in McCandless Township

The primary feature of McCandless has been that approximately 15% of its area is comprised of North Park. Expanding population and traffic brought more diversified development into the area. The Harmony Short Line brought the first wave of suburbanization into the area in the late nineteenth and early twentieth centuries; the more rapid suburbanization of the post World War II period has been due to the construction of McKnight Road. Despite this development McCandless still retains significant undeveloped areas.

O'Hara Township

Present-day O'Hara Township was originally part of Pitt Township, as was much of the Pine Creek Watershed area. In 1794 one of the region's most prominent early settlers, James O' Hara, for whom the Township is named, purchased land at a sheriff's sale. The tract included land between what is now the Guyasuta Boy Scout Camp to the Allegheny River (O'Hara Township, 2010).



McKnight Road in Pine Township, 2010

In 1797 the area's first settler James Powers, whom local history dates to arriving around 1785, purchased a Depreciation land tract along with his brother Thomas in order to legalize his claim. In the first decades of the nineteenth century, U.S. Senator James Ross acquired lands extending from present-day Aspinwall to the former County Workhouse in O'Hara. In 1820, he established his estate the "Meadows" where Fox Chapel Village now stands (O'Hara Township, 2010).

During this same period of time, Pitt Township was divided, which

resulted in the creation of Indiana Township and eventually O' Hara Township (O' Hara's creation resulted from later splits which also created Aspinwall, Blawnox, Fox Chapel, Harmar, Indiana, Shaler, and portions of Sharpsburg, Hampton, and East and West Deer). The growth of O'Hara was also spurred by the 1829 establishment of the Pennsylvania Mail Line Canal which helped sustain gristmills, logging camps, and farms along the canal. The Canal was eventually replaced by rail as the Western Division of the Pennsylvania Railroad purchased the canal rights. In addition, in the era after the Civil War, the Allegheny City Poor House and County Workhouse were erected in present-day O'Hara (O'Hara Township, 2010). Oil storage and an oil refinery plant were also established along the Allegheny River during this time, as the watershed was seeing the peak of the Pennsylvania oil boom.

In 1902, the City of Pittsburgh constructed a water filtration plant on the former site of an H.J. Heinz cabbage farm and sauerkraut factory. It annexed the land for "water supply, distribution, and filtration plant purposes," (O'Hara Township, 2010). The Waterworks Mall, St. Margaret Hospital, and the water plant currently occupy this area. The beginning of the new century also saw the growth of John F. Casey construction company and Blaw-Knox manufacturing company. In 1925, Rogers Field (near Fox Chapel Area High School) was dedicated and was Pittsburgh's municipal airport until the Allegheny County Airport opened in 1931. In 1932, the charismatic radio priest, Father James R. Cox, opened "Coxtown" a planned community built to house victims of the Great Depression. It was located on Calmwood Road (O'Hara Township, 2010). The venture failed and the property was sold by 1939. In 1934 Fox Chapel Borough was first incorporated, and in the midst of the post World War II housing boom during the 1950s, surrounding areas petitioned to be annexed into Fox Chapel, resulting in O'Hara's curious present-day configuration: five noncontiguous sections. Today the Township enjoys a mix of commercial, light industrial (including RIDC Park), and residential uses.

Pine Township

Pine Township was established in 1796. At that time it included all of Allegheny County north of the Ohio and Allegheny rivers and west of the boundary between Jones' and Cunningham's Depreciation districts. Its original limits comprised the whole of eleven current townships and parts of three others. After the establishment of Ohio Township in 1803, Pine Township included much of Jones' and Douglass' Depreciation Land districts that were situated in Allegheny

County including all of Ross, Reserve, McCandless, Pine and Allegheny City, and parts of Richland, Hampton, and Shaler Townships. With the excision of McCandless Township, Pine Township was established at its current size of approximately 17 square miles (Pine Township website, 2010).

Thomas Rodgers has generally been regarded as the first settler within the present limits of Pine Township, having settled in the area in 1796 (Pine Township website, 2010). Samuel Beatty was also one of the early settlers in Pine. The old Franklin Road was opened through the township early in its development and gave the first impetus to settlement. Wexford, one of the oldest post-villages in the Pine Creek watershed, was established in 1828.

At the turn of the century, there were six churches in the township, with the oldest being Cross Roads Presbyterian, established in 1827 and still active today (Pine Township website, 2010). The first house of worship was a log cabin, with a brick church erected in 1843 and rebuilt in 1860. St. Alphonsus Roman Catholic parish was established in 1864. Other churches included the West Union United Presbyterian Church organized in 1842, the Far View Baptist Church established in 1879, the Salem Methodist Episcopal church and the Mt. Pleasant Presbyterian church. The first school opened in 1800 in the home of Francis Deery. Today Pine Township retains its traditional rural feeling although residential and commercial development has increased significantly due to the convenient access to Pittsburgh granted by I-79.

Richland Township

Richland Township can trace early settlement back to 1800, when John Crawford, who owned 403 acres, built his log cabin home in what was then Pine Township (Richland Township, 2010). Richland Township has a strong agricultural history as the name suggests, and for most of its history has been a primarily rural community interspersed with small villages and settlements. The two most prominent of these are Bakerstown and Gibsonia.

McKelvy Stop Farm, Richland Township

Modern Bakerstown sits on what were two lots of the Depreciation Lands in Cunningham's District 4. Each lot was 206 acres. Main Street ran north and south between them. The lots, originally surveyed in 1783, had several owners, none of which were residents, before Thomas Baker bought them about 1810 (Richland Township, 2010). He laid out the crossroads community on which William Waddle built a tavern in 1820 at the crossroads of Packsaddle Trail (now Bakerstown Road) and the Venango Trail (now Route 8).

Gibsonia's rich history is interwoven with that of the family from which it takes its name. About the time of the Civil War, Charles Gibson, Jr., built the first steam flour mill west of the Alleghenies on Grubbs Road. The Gibson family homestead was built by Charles Gibson, Jr., in 1839. Just below the home, near the railroad crossing, the foundation of Charles Gibson's general store still remains. This building, destroyed by fire in 1908, was also the first Post Office in Gibsonia (Richland Township, 2010). For about ten years before it burned it was in use as a mission of the Christian and Missionary Alliance Church.

Ross Township

Ross Township was originally part of Pitt Township, Westmoreland County, until the establishment of Allegheny County in 1788. The township was formed on November 15, 1808 when thirty residents of an area in Pine Township petitioned the country courts to divide the township "by a line from the eight-mile tree of Franklin Road, running due east and west," (Williams, 2010). On the affirmative report of the viewers, the court confirmed the line in the November term of 1809, and the new township was named Ross in honor of James Ross, the eminent attorney of Pittsburgh. The borough of Allegheny was formed in 1828 and took the part of Ross Township nearest the Allegheny River. In 1847, the formation of Shaler Township took away about two miles from the eastern side of Ross; since then, the township has remained as it is today, except for the formation of the West View Borough in 1905 (Williams, 2010).

Shaler Township

Lanpher Reservoir in Shaler Township, 1912

John Shaw, an early Shaler resident, bought 600 acres when he arrived in the area around 1800 (Smith, 1953). He built a sawmill and gristmill along Pine Creek, and remnants of the mill site are still visible today. His son Thomas later built a sickle factory, using power from Pine Creek, as well. Local distilleries, slaughterhouses, hotels, and blacksmiths' shops were also scattered along the main corridor of what we now call Route 8.

The Township, named after Judge Charles Shaler, was officially formed in March of 1847 with the original intent to name it Marion Township. Judge Shaler served in several judicial capacities and was appointed President Judge in the Fifth District, based in Beaver County, in 1824. Shaler Township originally stretched over the present Borough of Millvale and portions of Ross Township and Etna Borough in addition to its current bounds. When the Township acquired first-class status in 1900, Shaler's boundaries included 6,977

acres or 10.9 square miles (Smith, 1953).

The Township, like much of the Pine Creek watershed, has a primarily agrarian history, with most early settlement occurring along the Pine Creek valley and Girty's Run valley. For many years, the Township consisted mostly of farmlands interspersed with small villages such as Turkeyville, Wittmet, Glenshaw, and Elfinwild. Butler Plank Road played an important role in the development of these areas, as they often served as stopping points for travelers. In addition to farming, the Glenshaw Glass Company was located here (Smith, 1953).

Sharpsburg Borough

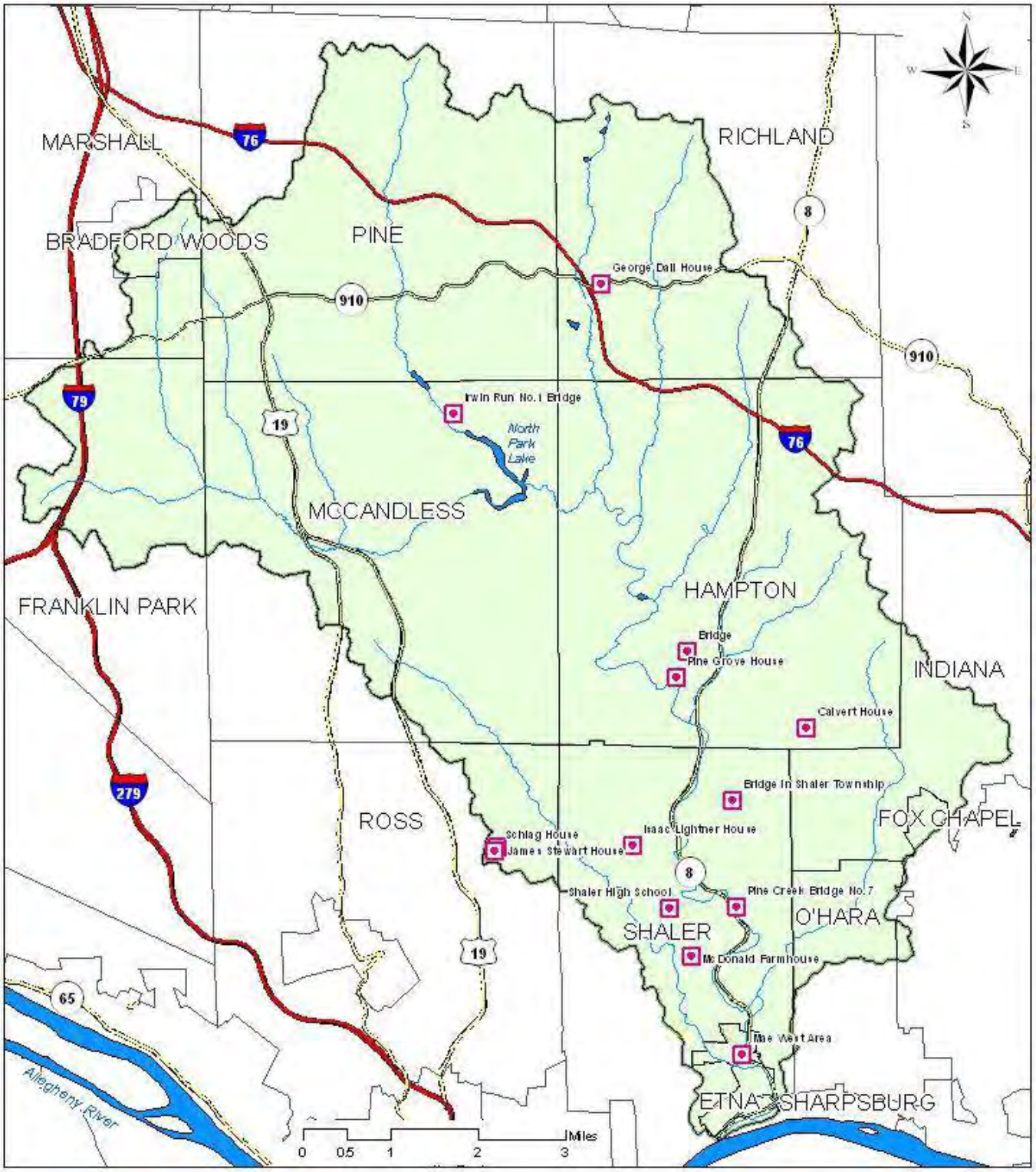
The history of the Borough can be traced back to the beginnings of the Pine Creek Watershed, when Guyasuta, a Seneca chief, was granted the land where Sharpsburg is located today as part of a peace treaty signed with the British in the 1760s. In 1826, James Sharp purchased 200 acres of land and built a log cabin in the hopes of creating a town. Opening the land to settlers, Sharp built a school and church while continuing to donate his land for the growing needs of the community. The Borough was formally incorporated in 1842 (Cushing, 1975).

Since its incorporation, Sharpsburg has been primarily an industrial town, manufacturing iron, brick, and glass, particularly during the heyday of the canal system and later during the railroad era. One of the most well-known industries that had its beginnings in Sharpsburg was the H.J. Heinz Company. The Heinz glass works in Sharpsburg once manufactured all of the glassware for Heinz products. In 1904, Heinz began crating and bottling his first horseradish in the kitchen of his Sharpsburg residence. Shortly thereafter, the house became Heinz's first factory. Although he moved his company down the Allegheny along the North Shore of Pittsburgh, he was still very involved and active in civic life and generous with donations to the Borough. One of these included the life-sized statue of Guyasuta that was installed at the intersection of Main and North Canal Streets (Cushing, 1975).

III. Historic Resources

Historic resources include standing structures and their remnants typically over 50 years old. Preservation and protection of these resources define the character of the communities throughout the watershed. Subsequent benefits of these historic resources can be the economic benefits of attracting out of town visitors and enhancing local interest and various other activities.

Figure VI-1 Historic Resources



There are numerous historic properties and structures identified by the Pennsylvania Historical Museum Commission (PHMC) as being listed or eligible for National Register of Historic Landmarks (NR) designation (**Figure VI-1** and **Table VI-1 Historic Resources**).

Of particular note are the two National Register sites as well as Hartwood Acres.

Address	Municipality	Historic Name	National Register Status	Resource Category	Material	Date Built
Unknown / N/A	Etna	Mae West Area	Eligible	District		1920
SR 7481*	Franklin Park	N/A	Eligible	Bridge	Stone	1891
4068 Mount Royal Blvd.	Hampton	Pine Grove House	Eligible	Building	Stone	1820
Mount Royal Blvd.	Hampton	N/A	Eligible	Bridge	Concrete	1920
2538 Middle Rd.	Hampton	Calvert House	Eligible	Building	Stone	1910
SR 7212*	Marshall	N/A	Eligible	Bridge	Concrete	1929
Babcock Blvd.*	McCandless	N/A	Eligible	Bridge	Stone	1936
Pearce Mill Rd.	McCandless	Irwin Run No. 1 Bridge	Eligible	Bridge	N/A	1936
3610 Gibsonia Rd.	Richland	George Dall, House	Eligible	Building	Wood	1850
Unknown / N/A*	Richland	Charles Gibson, House	Eligible	Building	N/A	1839
537 Sangree Rd.	Ross	Schlag House	Eligible	Building	Brick	1834
537 Sangree Rd.	Ross	James Stewart, House	Eligible	Building	Brick	1834
Evergreen Hamlet Rd.*	Ross	Evergreen Hamlet	Listed	District	Wood	1851
Birchfield Rd.	Shaler	Bridge	Eligible	Bridge	Stone	1915
Fall Run Rd.	Shaler	Pine Creek Bridge No. 7	Eligible		N/A	
Mount Royal Blvd.	Shaler	Shaler High School	Eligible	Building	Brick	1931
Butler Plank Rd.*	Shaler	N/A	Eligible	Structure	N/A	1915
1210 Mount Royal Blvd.	Shaler	McDonald Farmhouse	Eligible	Building	Wood	1880
2407 Mount Royal Blvd.	Shaler	Isaac Lightner, House	Listed	Building	N/A	1833

*CRGIS identified these resources as being located within the 14 municipalities of the PCW; however, their exact locations are not known. Thus, these historic resources may or may not be located within the PCW.

Table VI-1 Historic Resources

Evergreen Hamlet

Evergreen Hamlet

Evergreen Hamlet was founded in 1851 by a local lawyer, William Shinn, who with a group of five other well-to-do citizens formed a community with the purpose of securing to themselves the advantages of both city and country living. The charter drawn up for the community, "The Constitution of Evergreen Hamlet," set forth the aim of the project; that of securing for the members of the association "the advantages and comforts of the country at a moderate cost, without doing violence to the social habits incident to city life," (Fleming, 1922). The founders envisioned recruiting only sixteen families as they believed that would be all "that is required for the support of a suitable school, and form a sufficient neighborhood to exclude all the fear of that loneliness which so many persons dread in country life," (Fleming, 1922). The original founders besides Shinn were Wade Hampton, Robert Emory Sellers, William A. Hill, and William B. Scaife (Fleming, 1922).

It was a middle class community where members retained their property and owned their own houses in the settlement. There was a communal schoolhouse where the children of the associates were taught. Each member contributed to the school in proportion as his family used it. The tract of 85 acres was surveyed and laid out by Hastings and Preiser a local firm of surveyors. Work was begun in 1851 in grading and laying out the land in roads, residential areas, and farm plots. Construction of the houses was then begun and completed from 1851-1852. The concept of Evergreen Hamlet did not work. The experiment in community living under close rules failed in 1866, as so many others had before. By 1866, only four of the houses had been built (Fleming, 1922). The association was dissolved, but the four houses still stand today, all in excellent condition with very little noticeable alteration.

Isaac Lightner House

Isaac Lightner House

The Isaac Lightner House is on Mt. Royal Boulevard across from the Mt. Royal Cemetery. The house is distinctive because of its gabled porch with pillars. The house was built in 1833 in the Greek Revival architectural style (PHMC, 2010).

Hartwood Acres

Hartwood is an Allegheny County Park consisting of 629 acres located in Hampton and Indiana Townships. Preserved within the park is one of the largest and most spectacular country estates in the region. Hartwood consists of a stately Tudor Mansion (erected in 1929)

cottage, stable complex and gate lodge (erected in 1927). Designed by Alfred Hopkins for John and Mary Flinn Lawrence, the mansion houses an excellent collection of original English and American antiques.

IV. The Creation of North Park

Lumber tycoon Edward V. Babcock used this area as a summer home in Pine Township. Sunday drivers ventured into the area and its beautiful surroundings on a regular basis, so he set aside a number of acres for people to enjoy the wildlife and the area near his home. Eventually this area became known as North Park.

North Park in 1965

Illustrative Map of North Park

V. Transportation

The Native Americans were very mobile and traveled on a complex series of hunting paths and migration trails, many of which later acted as foundations for roads. The early trails followed the tops of long ridges in order to avoid the swampy ground and stream crossings in the lowlands as well as the gullies that washed in the sloping hillsides. The Venango Path was perhaps one of the most important of these

early trails. It wound along the tops of a series of long ridges from Fort Pitt (now Pittsburgh) northward, and passed through many Pine Creek Watershed communities. In December of 1753, George Washington traveled the route with frontiersman Christopher Gist as they returned from Fort LeBoeuf on a mission for Virginia Governor Robert Dinwiddie (PHMC, 2010). In 1796, the Venango Path became Franklin Road (now known as Perry Highway or U.S. Route 19), the first wagon road north of Pittsburgh. Mount Royal Boulevard, originally called Butler Pike, was another such instance of an important stagecoach road following an earlier Native American trail.

Canal System

In 1826 over 1,000 workers camped at the mouth of Pine Creek while building the Pennsylvania Canal.

Water transit was vital in the region's early days. In the early 1800s boatbuilding was the region's third largest industry behind iron and textiles. Pittsburgh residents pushed officials hard to keep up with other cities by building a canal from Philadelphia to Pittsburgh. By 1838, with the Pennsylvania canal in place, including several areas where boats were hauled over the mountains in trains, travel to and from Philadelphia was cut from 15 days to 3 and a half days. The canal crossed the mouth of Pine Creek and served a wide array of businesses and facilitated an increase in commerce with Ohio and Kentucky to the west.

After the canal was completed, larger industries developed along the rivers, such as Vesuvius Nail and Iron Works in Sharpsburg in 1846, Heinz horseradish plant and glass factory in Sharpsburg in 1849, and the Etna Iron Works (later Spang Chalfant Co.) in 1850. The logging, oil, and coal booms also became major markets for water transit. The Drake oil well of 1859 launched the oil boom, with storage and refineries set up in O' Hara Township. The Pennsylvania Railroad viewed the canal as competition, and eventually maneuvered to buy and close the canal in 1861 (Fleming, 1922). The railroad owners filled the canal and built tracks along much of the canal's earlier route.

Perry Highway in Ross Township

Franklin Road / Perry Highway

As mentioned above, the Venango Path became the highway of travel northward to the new town of Franklin, which was quickly growing near the mouth of French Creek upon the Allegheny, where Fort Venango had once stood; hence, Franklin Road was the name of the road that supplanted the packhorse trail. Stagecoaches ran regularly via Franklin Road to Mercer, Meadville, and Erie; and stage relay stations were established at Perrysville, Wexford, Warrendale,

Harmony, and so forth. Weekly mail routes were established as early as 1801, twice weekly in 1818, and up to three times a week in 1824. In addition to mail, men carried munitions, ropes, and other supplies along Franklin Road for the fleet built in Erie for Commodore O. H. Perry; hence, the original turnpike took on the name of Perry Highway. The heavy travel along this road eventually resulted in inns and hostels such as the Wellers Hotel or the Eleven Mile House at the intersection of Pine Creek Road and Perry Highway in McCandless. Other inns and stops included Four Mile House and Five Mile House in Ross Township.

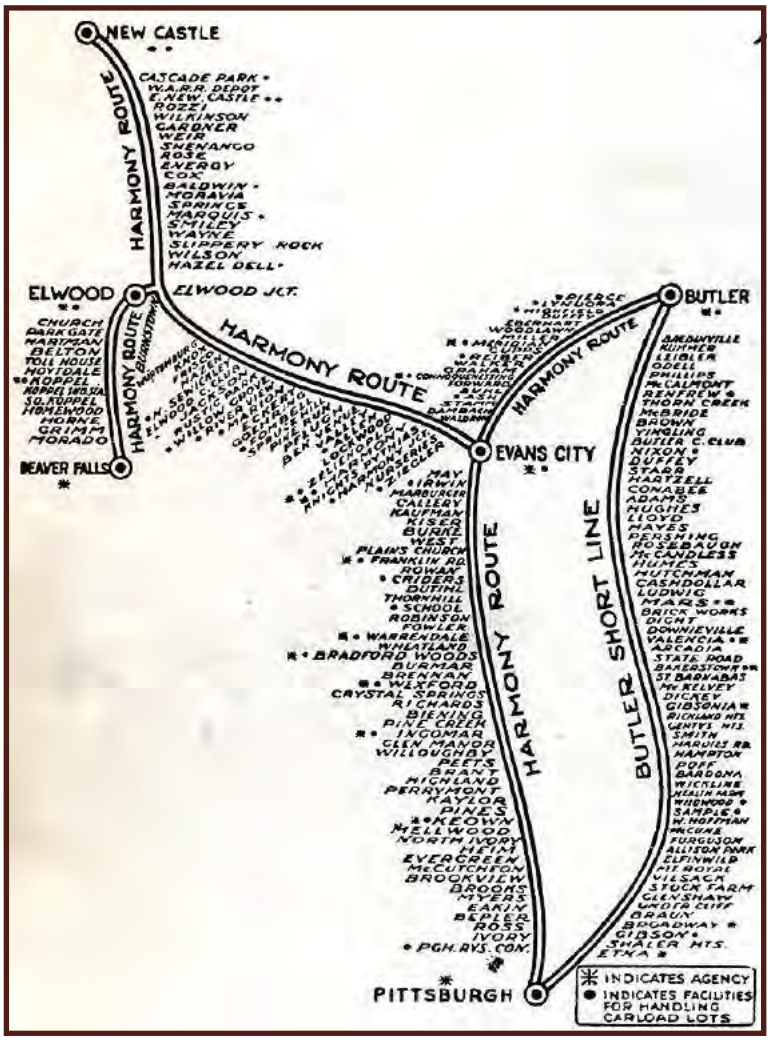
In 1849, a charter was granted to the Allegheny and Perrysville Turnpike Road Company to construct a turnpike or plank road, allowing the turnpike right-of-way for seven miles, with power to extend it when necessary. By 1863, the road was planked to Wexford, about fifteen miles. The advent of the automobile made the bumpy plank road obsolete, and in 1911 half the width of the road was covered with brick as far as Keown's Hotel (near what is now West Ingomar Road in McCandless Township). In 1929, the West View link of Perry Highway had been completed, at a cost of $40,000; thirty-foot wide reinforced concrete stretched from the Five Mile House to the City Line.

Harmony Short Line

As with many cities in the first decades of the twentieth century, Pittsburgh had an extensive network of suburban streetcar lines. Numerous companies operated networks of streetcar lines that connected Pittsburgh to many other regional communities in both the North and South Hills. Two companies built interurban trolley lines through the North Hills -- each branching off from Pine Creek near Millvale (Harmony Line online history, 2010). Beginning in 1908, the Harmony Short Line (Pittsburgh, Harmony, Butler, and New Castle Railway Company) followed Girty's Run through Ross and McCandless Townships as it ventured northward (Harmony Line, 2010). In 1917, the Harmony Short Line purchased the Butler Short Line and the merged companies became the Pittsburgh, Mars, and Butler Railway. After this line ceased trolley operations in favor of busses, the route for the Harmony Short Line along Girty's Run was taken over by Allegheny County and rebuilt as Babcock Boulevard.

The Harmony Short Line

During the years it operated, the Harmony Short Line was responsible for developing entire areas of the townships along its route, and made suburban life possible as many people moved out to the country and commuted to the city. In 1913-1914, the line extended to Ellwood City and Beaver Falls, and in 1919, the Pittsburgh, Mars, Butler Route, at first a separate company, became part of the same system with the



The Harmony Short Line and the Butler Short Line Route Map

Harmony line. However, the advancement of the automobile spelled the end for many streetcar lines, with the Harmony line among these. The last car traveled up the Harmony line in 1931 (Harmony Line, 2010).

Butler Short Line

The Butler Short Line was one of two trolley routes that provided transportation for many communities in the North Hills including portions of the Pine Creek Watershed. The Pittsburgh and Butler Street Railway opened its line in 1907, roughly following present day Route 8. Valencia, State Road, Bakerstown Station, St. Barnabas, McKelvy's, Dickey's, Austin's, Girty's, Hardies Road and Sample were all scheduled stops (Williams, 2010).

Remnants of the route can be seen in the Crouse Run ravine where old concrete bridge abutments remain. The route can also be seen as it winds through the community adjacent to Route 8, along Ewalt Road, paralleling Meridian Road and crossing near St. Barnabas Home. Stops were provided with passenger waiting rooms in octagonal buildings with round peaked roofs (Williams, 2010). The consolidated streetcar line went bankrupt in 1932, leaving the community with only automotive and railroad transportation.

The B&O Railroad

Winter scene from the late nineteenth century of the B & O tracks along Pine Creek

This right of way was originally granted to the Pittsburgh, New Castle and Lake Erie Railroad and a single narrow gauge track was laid in 1870. This line ran from the City of Allegheny to New Castle, with connections from there to the West. About 1880, the name of the railroad was changed to the Pittsburgh and Western; and double track, standard gauge replaced the narrower single track. Stations were built along the line and telegraph operators were on duty at each of them 24 hours a day (Williams, 2010).

In 1920 the Pittsburgh and Western was absorbed into the Baltimore and Ohio system and the southern terminus was shifted to the B. & O. station in Pittsburgh (Williams, 2010). Since then, the B & O has been

absorbed through acquisitions and mergers several times, most recently by CSX. The advent of the Short Line and improved highways gradually reduced passenger traffic, but it is still the main CSX route from Pittsburgh to Buffalo.

VI. Rachel Carson

Rachel Carson

Rachel Carson was a marine biologist and early ecologist, born and raised in Springdale. She graduated from the Pennsylvania College for Women, now Chatham College, and then earned a Master's degree in zoology at John Hopkins and the University of Maryland before becoming a biologist with the U.S. Bureau of Fisheries (Rachel Carson Homestead, 2010). In 1962, Rachel Carson's book *Silent Spring* was published. The book was a key piece in the new environmental movement, warning Americans of the dangers of pesticides and herbicides and other chemicals, in particular DDT.

While her hometown is not directly located within the Pine Creek watershed, Carson was an active hiker, bird watcher, outdoors explorer, and nature enthusiast who developed much of her love of outdoors at an early age. Rachel went with her family on many day trips, via the Butler Short Line, to the Crouse Run ravine, where they picnicked and enjoyed nature at a local recreation lodge and picnic area. These early childhood picnics led to Rachel to conduct field studies there in the ravine while in college at Chatham University. She also conducted field studies in what is now North Park, Crouse Run Nature Preserve, and along the current Rachel Carson Trail, which roughly follows Route 8.

VII. Flooding History

Increased commerce and development took its toll on the streams and rivers of the area. Concern over flooding, the acidity of the water, and inconsistent river flows led to the publication in 1912 of a visionary document titled the *Heinz Report* (Smith, 1953). This report by the Flood Commission of Pittsburgh concluded that floods were increasing in frequency and height, and that protection of the interior forests of the state as well as establishing reservoirs for flood control were necessary.

This report was written several decades before the devastating 1936 flood that was 24 feet above flood stage. The *Heinz Report's* recognition of the value of the forests in flood prevention was extremely progressive and contributed to the eventual formation of the

Allegheny and Monongahela National Forests. The report also helped prompt the construction of the numerous reservoirs that regulate flows in western Pennsylvania's waters today. Water quality issues were also addressed locally. In 1931, Shaler Township started to install sewer and water lines that served parts of Shaler, Hampton, Indiana, and O' Hara Townships (Smith, 1953).

Continued suburbanization since the World War II era has led to increased flooding concerns throughout the watershed. Local history sources state that flooding was particularly bad in 1986, when it reached the second story of many structures in Etna. Hurricane Ivan in September of 2004 also wreaked havoc throughout the Pine Creek watershed. Development – including man-made changes made to Pine Creek – has encroached on many former natural floodplain areas and wetlands, leaving the watershed vulnerable to more damaging flash flooding.

Brief History of Flooding in Etna Borough

The Borough of Etna has sustained major flooding on numerous occasions. In 1936, flooding from the Allegheny River was catastrophic and many homes sustained SECOND floor flooding. Seven lives were lost due to a fire at the Etna Forge & Rivet Company plant during this event, which occurred on March 17, 1936 and not only affected the river town of Etna, but Sharpsburg and Aspinwall as well (Etna Borough, Personal Communication, 2010).

On May 30, 1986, Pine Creek overflowed its banks and caused severe flooding to several hundred homes located in the Special Flood Hazard Area. Almost to the day, one year later, heavy rainfall and debris buildup, again, caused Pine Creek to overflow its banks, affecting a smaller area of the community.

On June 14, 1990, a storm run on Ganster Street clogged with debris including trees, concrete blocking and earth, causing the opening of the culvert to be blocked, which backed up the storm water and flooded approximately eight homes – including first floors.

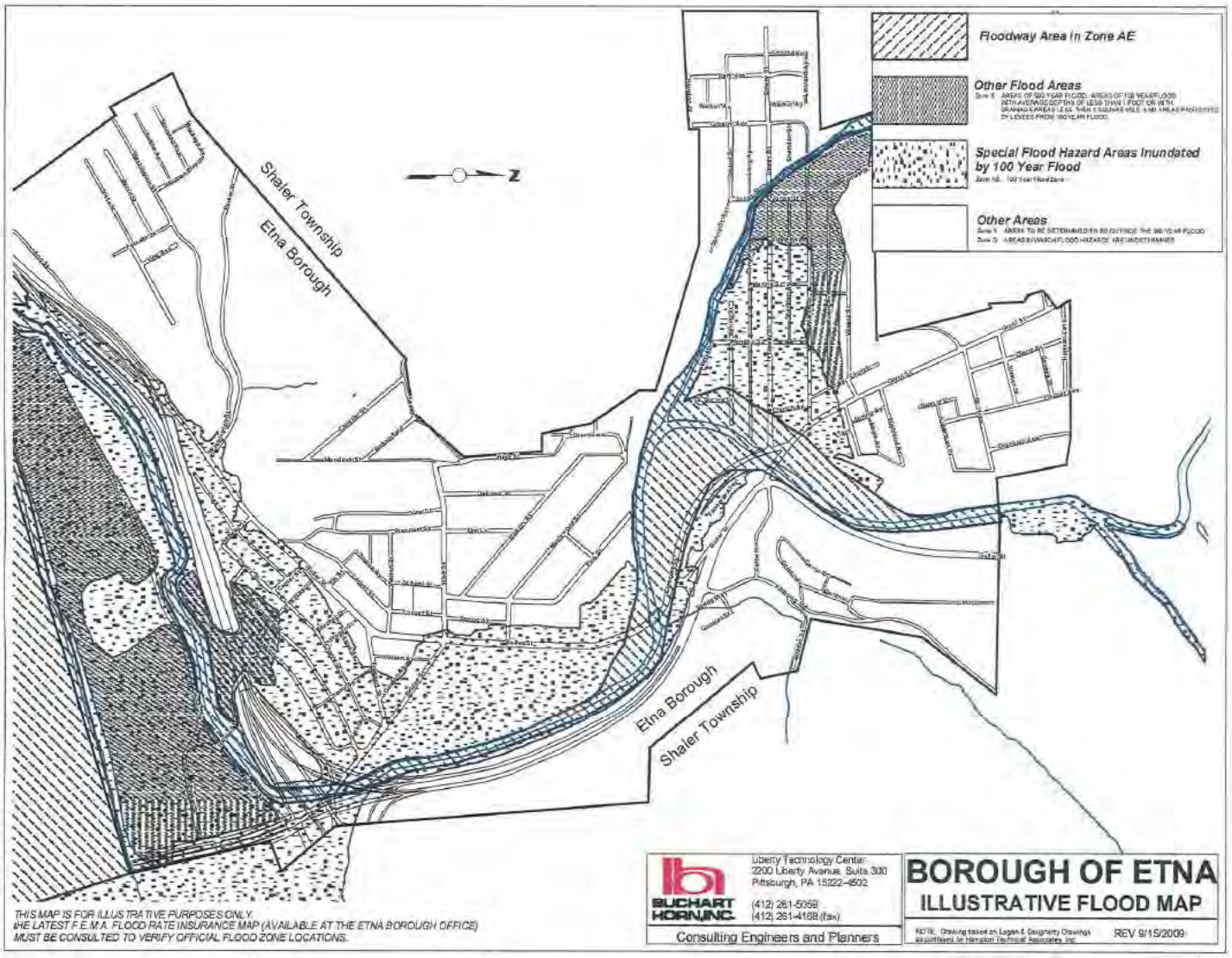
In January, 1995, due to ice jams on the Allegheny River and subsequent thaw, approximately twenty homes were also flooded.

In the late 1980's and early 1990's, localized flooding occurred several times during heavy rain events when storm runs from upstream communities, causing extensive damage to both residential and commercial properties. These events caused severe wash out of trees and earth, deepening the storm water 'gullies", bringing large amounts of debris down during the rain events, which completely clogged the storm water conveyance systems, which backed up and flooded the roads.

In the aftermath of Hurricane Ivan, four hundred residential properties

and forty commercial properties sustained either first floor or second floor flooding. This equates to 25% of the real estate within the Borough of Etna. Less than two weeks before, Pine Creek also overflowed its banks and flooded approximately forty homes in the Special Flood Hazard Area (**Figure VI-2 Borough of Etna Illustrative Flood Map**). The Municipal Building, which is located in both the 100 year flood boundary and the 10 year flood boundary, had seven feet of water in it in the aftermath of Ivan, causing the loss of all contents – records, equipment, etc. (Etna Borough, Personal Communication, 2010).

Figure VI-2 Borough of Etna Illustrative Flood Map



VIII. Agricultural Heritage

As the individual municipal histories suggest, the Pine Creek watershed is a region rich in agricultural history. For much of its past,

the municipalities within it have been marked by active farming activities and have been some of the most productive agricultural areas in Pennsylvania. With the rapid suburbanization following World War II, and in particular, the widespread commercial and residential development spurred by the improvements to transportation in the watershed (i.e., I-79), active farming has taken a slightly less significant role. However, it should be noted that the majority of the municipalities retain their original rural charm, with mature woodlands, rolling fields and meadows interspersed with small hamlets and villages. Commercial farms in the watershed include Soergel Orchards and the Shenot farm in Wexford; other major farms include the nature preserve of Beechwood Farms in Fox Chapel.

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CHAPTER VII—

ISSUES, CONCERNS, OPPORTUNITIES

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In order to identify the issues, concerns and opportunities within the watershed, opinions and information were gathered from local stakeholders, the study committee, the public, local agencies, and government entities.

The study committee was intimately involved with the project and plan's direction from the very beginning. They guided all aspects of the project from commencement to fruition as well as provided input on the issues and opportunities within the Pine Creek Watershed.

A public outreach initiative was developed and carried out through the planning process to provide the public with ample opportunities to comment on the plan. The public outreach initiative included three public meetings (including exit surveys), a public survey, and a project website.

1. Public Meetings

Public Meeting #1

Concurrently and throughout the process, public meetings were held to also obtain the public's input on the issues and opportunities within the watershed. In total, three public meetings were held with the first round encompassing two separate meetings—one in the northern section of the watershed at the Rose Barn, North Park and one in the southern section of the watershed at the Shaler Municipal Building. Prior to each Public Meeting, a Public Officials Session was held to obtain their input.

The first two public meetings for the Pine Creek Watershed Conservation Plan were held on June 3rd and 4th at the Shaler Municipal Building and the Rose Barn at North Park, respectively. The purpose of these meetings was to obtain input from the public about protections, improvements, and their future vision for natural resources (land, water, and biological), recreational resources (parks, trails, open space, creek access, etc.), and cultural resources (historical and archaeological sites, and education and watershed awareness).

The second public meeting was held on Thursday, March 25, 2010 at the Rose Barn in North Park. The purpose of the meeting was to obtain public input on the project to date and the draft management strategies that have been developed. As the pathway to implementation of project recommendations, the management strategies are one of the most important results of the project. With 62 attendees, valuable input on the management strategies was received and was incorporated into the Draft and Final Versions of the Plan.

The third public meeting was held on October 13, 2010 at the Rose Barn in North Park. The purpose of the meeting was to present the Draft Plan to the public and obtain input on the overall plan and management strategies. A presentation was delivered that outlined the project and identified some of the priority management strategies. The process and timeline regarding the submission of public comment was explained. The discussion following the presentation included the status of the Act 167 plan, watershed specific rain data, active participation of NAEC, local landowner erosion and flooding issues, EPA 219 Plan, the purpose of the WCP and how to use it, and how to get involved in the watershed.

Public Meeting #2

Public Meeting flyers and surveys can be found in Appendix A.

II. Public Comment Period

The public comment period extended from October 1, 2010 until October 31, 2010. A hard copy of the draft plan was located at all 14 municipal buildings within the watershed and four of the local libraries. In addition, it was linked online at the following websites:

- The Plan's website: www.mackinengineering.com/pinecreekwcp/
- NAEC's website: www.naecwpa.org
- Pine Creek Watershed Coalition's website: www.pinecreekwpa.org

Six individuals submitted comments on the draft plan. These comments were reviewed and, where appropriate, revisions and additions were made to the plan.

III. Public Survey

In addition to being available at the first public meeting, the public survey was also made available through the project's website, local libraries, and municipal buildings for several weeks during the summer of 2009.

The public survey was also available at community events throughout the project area. Study committee members attended the Town of McCandless Community Day on September 12, 2009 and Richland Community Day on August 8, 2009. Informational booths were set up to provide the public with information on the plan. Study committee members were also on hand to talk to the public and obtain their input through the public survey.

The results of the public survey can be found in Appendix H.

IV. Project Website

A project website—www.mackinengineering.com/pinecreekwcp/—was established to keep the public up-to-date of the plan's status and development. Project updates were posted as necessary to keep the public current on the plan's development.

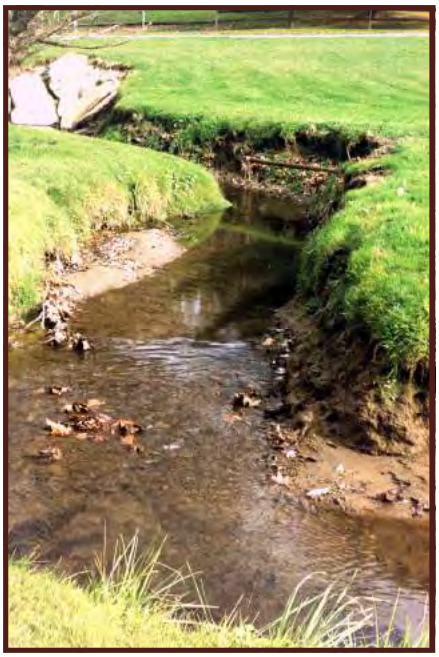
V. Stakeholder Interviews

The study committee identified 32 key stakeholders within the Pine Creek Watershed. Twenty-two stakeholder interviews were conducted to obtain their input on the issues and opportunities within the watershed based on their expertise. The stakeholder interview questionnaire can be found in Appendix A. Stakeholders represented the following organizations:

- Pittsburgh Trails Advocacy Group
- Allison Park Sportsman's Club
- Allegheny County Parks Department
- Trout Unlimited, Penn Woods Chapter West Chapter
- North Allegheny Historic Museum
- The Villa Association
- Local Troup, Boy Scouts
- Friends of North Park Lake
- Venture Outdoors
- Bradford Woods Conservancy
- Shaler Township Water Treatment Plant
- CSX Railroad
- Western Pennsylvania Conservancy
- Audubon Society of Western Pennsylvania
- North Hills Community Outreach

- Hampton Township Environmental Advisory Council
- North Park
- Pine Creek Land Conservation Trust
- Etna Economic Development Corporation
- North Allegheny School District
- Allegheny Land Trust
- PA Fish and Boat Commission

The stakeholder interviews provided background information on the land, water, biological, recreational, and cultural resources of the Pine Creek Watershed as well as insight on the issues, concerns, and opportunities.



Eroded bank along unnamed tributary to Rinaman Run

VI. Identified Issues and Opportunities

Once all this input was collected, the information was combined, reviewed, and analyzed to form a list of issues or focus items. A brief description is provided for each:

- Stream Corridor Protection -

  Involves protecting riparian areas and preventing erosion along the stream, which would in-turn improve water quality, wildlife habitat, and flood control. Preserve areas that are in good condition and restore areas that have been degraded.

- Natural Resource Management -

  Utilizing natural resources wisely and efficiently. Protecting the biological, recreational and cultural resources for future generations. In the case of development, using Green Designs and Smart Growth Practice as well as Best Management Practices (BMP) for stormwater to prevent erosion and protect the streams.

- Stormwater Runoff -

  Utilize stormwater BMP's for future development. Update sanitary sewer infrastructure to prevent runoff from entering local waterways. Re-establish riparian areas along streams to slow stormwater and mitigate for any pollution that does enter the waterways.

Natural riparian buffer—Pine Creek

- Public Education -

  Hold education programs that educate the public, residents, and public officials about the watershed and its issues and opportunities. Get the public involved in their local community as stewards for the watershed.

- Township Coordination

  Develop partnerships between individual municipalities as well as between local organizations and the municipalities to implement the proposed projects.

- Recreation

  Protect and maintain the recreational opportunities that are existing and develop new recreational opportunities (i.e. trails, etc.) based on the desires of the public.

- Future Development

  Guide future development within the watershed to preserve the natural and rural feel of the watershed. Encourage future development to be sustainable and use green designs where possible.

- Riparian & Channel Assessment -

  Protect and restore the riparian areas along the stream. Address water quality issues and stabilize stream banks.

- Litter Management

  Continue to offer hard-to-recycle events to discourage illegal dumping; encourage carry in, carry out practices at parks and all areas within the watershed.

- Natural Areas -

  Protect and preserve natural areas through conservation easements, land donations, and homeowner programs. Protect biologically diverse areas as wildlife habitat.

Many of the identified issues and concerns are interrelated and cannot be addressed separately. For example, stormwater runoff, future development, stream corridor protection, and public education are all interrelated. To best utilize limited resources, projects should be designed to address issues collectively, whenever possible.

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CHAPTER VIII—
MANAGEMENT STRATEGIES BY GOAL

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Goal #1: Encourage future development that protects the natural, cultural, and recreational heritage of the Pine Creek Watershed.

Objective #1.1 Utilize existing ordinances

Management Strategy		Priority	Lead Party	Potential Partners	Potential Funding	Resource
#1.1A	Enforce steep slope ordinances to prevent landslides.	**Immediate**	Municipalities/ DEP	ACCD	N/A	L
#1.1B	Enforce E&S controls to protect water quality.	**Immediate**	Municipalities	ACCD	N/A	L, W
#1.1C	Enforce existing land use ordinances and alter the existing negative perceptions of zoning through cooperation and education.	Long-range	Municipalities	DCED/ Smart Growth Initiative	DCED	L

Objective #1.2 Use incentives

Management Strategy		Priority	Lead Party	Potential Partners	Potential Funding	Resource
#1.2A	Create incentives for developers and contractors to use "Green" techniques in new developments (e.g. low-impact development, sustainable practices, smart growth principles, conservation subdivision).	**Immediate**	Municipalities	ALT/ local conservancies/ Chamber of Commerce/ conservation groups	DEP, DCED	L
#1.2B	Create incentives such as tax breaks to encourage the restoration of historic buildings; address regulatory problems that discourage reuse of historical buildings and sites.	**Immediate**	County/ Municipalities	NAHM/County Historical Societies	Private foundations, PHMC	C
#1.2C	Engage in a multi-phase cost/benefit analysis utilizing multiple build out scenarios that evaluate traditional versus conservation design for future development (Phase I is complete).	**Immediate**	NAEC	Municipalities, ALT, County	DEP, DCED, Private foundations	L

Objective #1.3 Update existing ordinances by collecting additional inventories, incorporating existing information, and coordinating with local groups

Management Strategy		Priority	Lead Party	Potential Partners	Potential Funding	Resource
#1.3A	Develop a brownfield / grayfield sites inventory.	Mid-range	Allegheny County/ NH COG	DEP/ EPA	EPA Brownfield grants, DCED	L
#1.3B	Develop an inventory of local cultural and historical sites within the watershed.	Long-range	NAHM	Civic groups/ Municipalities	Private foundations, PHMC	C
#1.3C	Incorporate existing wetlands into new development plans as scenic opportunities and/or flood control measures.	**Immediate**	Municipalities/ Contractors	N/A	N/A	W
#1.3D	Preserve local churches as symbols of cultural and ethnic identity within the watershed.	Long-range	County Historical Societies	Citizens	Private foundations	C
#1.3E	Construct new development in accordance with the municipal comprehensive plans.	Mid-range	Municipalities	NH COG	DEP, DCED	L
#1.3F	Coordinate with Pennsylvania Historic Museum Commission (PHMC), individuals, and agencies to determine if local historical sites and structures could be added to the National Register.	Long-range	County Historical Societies/ PHMC	Municipalities/ NAHM	Private foundations, PHMC	C
#1.3G	Encourage regional coordination between historical groups and municipalities through PHMC.	Long-range	County/ Municipalities	NAHM/ County Historical Societies	Private foundations, PHMC	C
#1.3H	Offer educational workshops for municipal officials and staff on enforcement of ordinances to protect the watershed.	**Immediate**	FEMA/DCED	Municipalities	DEP, PEMA, DCED	L
#1.3I	Support efforts to increase local, state, federal, and private funding for historic preservation.	Mid-range	NAHM/ Historical Societies	Municipalities	N/A	C

L = Land; W = Water; B = Biological; R = Recreation; C = Cultural

Please see Table of Contents for list of Acronyms

Goal #2: Manage the land, water, biological, and recreational resources within the Pine Creek Watershed to maintain their integrity for future generations.

Objective #2.1 Develop new and support existing natural resource management in the watershed.

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#2.1A	Develop a management plan to prevent sediment from entering or exiting North Park Lake.	**Immediate**	ACPD/ Municipalities	PFBC/ DCNR/ DEP/ Local contractors	Allegheny County, municipalities, DCNR, DEP, PFBC	W, R
#2.1B	Develop & enforce Best Management Practices (BMPs) for preserved woodlands, natural areas, and riparian zones to maintain them as wildlife habitat (i.e. wildlife habitat enhancements, sustainable timbering practices, etc.). Enforce BMPs through municipal ordinances.	**Immediate**	Municipalities/ EAC	PCWC/ NAEC/ WPC	NRCS, DCNR, private sources, foundations.	B
#2.1C	Utilize Fox Chapel's deer management cooperative program with the PA Game Commission as an example for other municipalities to allow controlled hunting as a wildlife management strategy.	Long-range	Municipalities	PGC	N/A	B, R
#2.1D	Continue to manage Canada Geese overpopulation throughout the watershed, including North Park.	Long-range	Allegheny County Parks & Recreation Dept	PGC/ USDA/ USFWS	PGC, DCNR, DEP, private sources.	B

Objective #2.2 Support and enhance programs by collecting additional inventories, incorporating existing information, and coordinating with local groups

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#2.2A	Update the Natural Heritage Inventory for Allegheny County.	Long-range	WPC	Civic groups/ Universities	DEP, DCNR	B
#2.2B	Develop a wetland database to identify and assess the functionality of wetlands in the watershed, starting with hydric soil areas within the watershed. Assessment divided into subwatersheds for more manageable units.	**Immediate**	PCWC/ NAEC	USACE/ USFWS/ DCNR/ WPC	DEP, DCNR, EPA, USACE, private foundations	W
#2.2C	Coordinate with the Amphibian and Reptile Technical Committee for the PA Herpetological Atlas program to conduct studies on amphibian and reptile species and develop recommendations to protect species of concern.	Mid-range	NAEC/ PCWC	WPC/ ASWP/ local experts/ local colleges / universities	DEP, DCNR, private sources, foundations.	B
#2.2D	Continue to offer tax incentive programs, such as Clean and Green, Agricultural Security Areas, conservation easements, and farmland preservation programs.	Mid-range	ACCD/ Allegheny County	PDA/ PennState Cooperative Extension	USDA, PDA, NRCS, DEP, Private sources, foundations	L
#2.2E	Identify owners of Biological Diversity Areas and seek funding to purchase conservation easements.	Long-range	Landowners/ ALT	N/A	DCNR, private foundations, WPC	B
#2.3F	Coordinate with local certified arborists to improve the contribution (environmentally, aesthetically, etc.) of the existing tree population and increase the tree population with appropriate species in appropriate locations.	Long-range	Municipalities / NAEC	Certified arborists	DCNR, private foundations	B

Goal #2: Manage the land, water, biological, and recreational resources within the Pine Creek Watershed to maintain their integrity for future generations. (*continued*)

Objective #2.3 Encourage participation and provide education.

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#2.3A	Provide education programs for landowners to allow hunting on their properties, as a wildlife population management strategy.	Long-range	PGC/ Sportsmen Groups/ Conservation Groups	Landowners	PGC, Private Sources, Foundations	R
#2.3B	Continue to provide educational programs for farmers about agricultural BMP's, the various federal and state conservation programs that can provide funding and technical assistance in planning, designing, permitting, implementing, and maintaining agricultural BMPs. BMPs include cover crops, contour strips, grassed waterways, riparian buffers, streambank fencing, and responsible pesticide/herbicide use.	Long-range	ACCD/ PDA/ NRCS	PennState Cooperative Extension	USDA, PDA, NRCS, DEP, Private sources, foundations	L, W
#2.3C	Encourage water conservation through green building and technologies for new buildings (i.e. low flow devices--toilets, faucets, showerheads). Develop a program for retrofitting homes and businesses for water conservation through tax breaks and rebates.	Long-range	Municipalities	Contractors/ businesses/ landowners	DEP, private foundations	W
#2.3D	Encourage public participation in the Online Herpetological Atlas program to collect data on identified species of special concern within the watershed.	Long-range	Amphibian & Reptile Technical Committee	NAEC/ PCWC	N/A	B
#2.3E	Partner with local business owners to encourage sustainable management of their properties and buildings, especially those in floodplains and other critical habitat areas.	Long-range	NAEC/ PCWC	Businesses / landowners	DEP, private foundations	B, W

L = Land; W = Water; B = Biological; R = Recreation; C = Cultural

Please see Table of Contents for list of Acronyms

Goal #3: Protect and improve the recreational resources within the Pine Creek Watershed.

Objective #3.1 Develop new and support proposed trails in the watershed.

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#3.1A	Construct the proposed trails--North Hills and Spur, and Millvale Trail, and coordinate with other organizations to incorporate these trails into the trail network. Obtain funding for trail development and maintenance. Continue to expand on the trail network by creating new trails, extending existing trails, and adding trailhead parking and restrooms.	**Immediate**	Conservation groups/ RTC	DCNR/ NAEC	Private foundations, DCNR, local businesses	R
#3.1B	Create/improve signage for existing trails and develop consistent signage.	Mid-range	Allegheny County/ Municipalities	DCNR / PTAG	DCNR	R
#3.1C	In the future, if the CSXT railroad is no longer in service, support the conversion of the ROW to a trail. In the meantime, consider Rail-with-Trail in Hampton and Richland Townships, where possible.	Long-range	RTC	DCNR / PTAG	Private foundations, DCNR, local businesses	R
#3.1D	Investigate opportunities for the development of multi-use trails near local waterways.	Long-range	Allegheny County/ Trail organizations	DCNR/ Municipalities/ local groups / PTAG	Allegheny County, DCNR, private foundations	R
#3.1E	Create and/or designate trails and/or areas specifically for horses, ATVs, and motorized bike users.	Long-range	Municipalities/ DCNR/RTC	PTAG	Private foundations, DCNR	R
#3.1F	Create and distribute literature of additional Watershed Walks.	Mid-range	NAEC	N/A	N/A	R
#3.1G	Continue to work with PTAG on improving trails and creating a sustainable trails system based on IMBA best practices.	Mid-range	PTAG / Allegheny County	DCNR/ Municipalities/ local groups	Allegheny County, DCNR, private foundations	R

Objective #3.2 Improve recreation resources through administration

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#3.2A	Develop a recreational website that contains trail mapping, user information, and recreational guidance for the area (i.e. fishing, kayaking, hunting, picnicking, trail users, etc.).	**Immediate**	Allegheny County/ Municipalities	Civic groups	Allegheny County, municipalities, DCNR, DEP	R
#3.2B	Create an overarching trail committee or coordinate with the existing trail committee to manage and conduct routine maintenance on the local trails.	Mid-range	Trail organizations	N/A	N/A	R
#3.2C	Erect Road Share signage to alert motorists of trails along roadways and develop a trail safety public outreach program.	Mid-range	Municipalities/ PennDOT/ RTC	N/A	DCNR, PennDOT, Municipalities	R

Objective #3.3 Use planning studies and resources to improve recreational resources

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#3.3A	Identify publicly-owned areas of open space that can be utilized for passive recreation (i.e. soccer fields, model airplane, bocce ball, frisbee, picnicking, birdwatching etc.) or provide scenic views. Coordinate with landowner for opportunities to open these areas to public access.	**Immediate**	Allegheny County/ Municipalities	Civic groups	DCNR	R
#3.3B	Create connections between recreational facilities, parks, stream corridors, schools, and communities using trails or greenways.	Mid-range	RTC/ ACPD	DCNR	Private foundations, DCNR, local businesses	R
#3.3C	Inventory picnic areas and shelters; construction of new facilities, if needed.	Long-range	Allegheny County/ Municipalities	Civic groups	DCNR	R

Goal #3: Protect and improve the recreational resources within the Pine Creek Watershed. (*continued*)

Objective #3.4 Enhance fishing opportunities

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#3.4A	Coordinate with private landowners to provide access to waterways for anglers and small non-powered watercraft.	Long-range	PFBC/ Conservation Groups/ DCNR/ APSC/ TU	Landowners	PFBC, DCNR, Private Sources, Foundations	R
#3.4B	Investigate additional opportunities to stock Main Stem Pine Creek and its tributaries.	Long-range	PFBC/ sportsman's associations/ watershed groups	N/A	PFBC, DCNR, Private Sources, Foundations	R

Objective #3.5 Enhance hunting opportunities

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#3.5A	Encourage agricultural landowners to participate in the Cooperative Farm Game and Forest Game Programs to make additional land available to public hunting.	Long-range	PGC/ Sportsmen Groups	Conservation Groups/ Landowners	PGC, Private Sources, Foundations	R
#3.5B	Encourage woodlot landowners to participate in the Cooperative Forestry Program opening additional land to public hunting.	Long-range	PGC/ DCNR/ Sportsmen Groups	Conservation Groups/ Landowners	PGC, DCNR, Private Sources, Foundations	R

L = Land; W = Water; B = Biological; R = Recreation; C = Cultural

Please see Table of Contents for list of Acronyms

Goal #4: Protect open space, green space, and wildlife habitat within the Pine Creek Watershed.

Management Strategy		Priority	Lead Party	Potential Partners	Potential Funding	Resource
#4.1	Support the implementation of the recommendations from the Parks, Open Space, and Greenways Plan of the Allegheny County Comprehensive Plan--Allegheny Places--and Allegheny Land Trust's GREENPRINT.	**Immediate**	Allegheny County/ Municipalities	DCNR/ PFBC/ USFWS/ PGC	Allegheny County, municipalities, DCNR, DEP	R
#4.2	Using the data from the Allegheny County Greenways Plan and ALT GREENPRINT, develop a coalition dedicated to each specific greenway to secure funding for land acquisition, identify property owners, and work with landowners to develop management plan. Greenway strategy should encourage protection of biodiverse areas, floodplains, steep slopes, forested areas, landslide prone areas, riparian corridors and wildlife corridors; Update the Tool kit to assist municipalities and others with the conservation of identified greenways.	**Immediate**	NAEC/PCWC	WPC/ local conservation groups/ DEP/ PFBC/ PGC/ DCNR / ALT / local land trusts	DEP, Allegheny County, DCNR, Private sources, foundations	B, L, R
#4.3	Create a municipal-level conservation fund supported through a dedicated percent from the annual local real estate revenues to purchase land for conservation.	Mid-range	Municipalities	N/A	N/A	B
#4.4	Utilize county open space preservation program funds and/or raise local money for open space preservation/land acquisition to protect critical resource areas and promote watershed conservation.	Mid-range	Municipalities	Land Trusts/ Local Conservancies	DEP, Allegheny County, DCNR, Private sources, foundations	B

L = Land; W = Water; B = Biological; R = Recreation; C = Cultural

Please see Table of Contents for list of Acronyms

Goal #5: Protect and improve the waterways within the Pine Creek Watershed.

Objective #5.1 Utilize natural stream channel design principles

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#5.1A	Implement the strategies from the Riparian Assessment that was conducted by the North Area Environmental Council.	**Immediate**	Municipalities	NAEC/ PCWC	DEP, DCNR, PFBC, private sources, foundations.	B
#5.1B	Update the Riparian Visual Assessment study	Long-range	NAEC/ PCWC	N/A	DEP, DCNR, private foundations	W
#5.1C	Implement fluvial geomorphic-based restoration approaches such as Natural Stream Design, where appropriate, to achieve channel and streambank stability, restore sediment transport, reduce erosion and sedimentation, and improve water quality and aquatic habitats.	**Immediate**	Municipalities	DEP/ PAFBC DCNR/ Civic groups	DEP, DCNR, private foundations	W

Objective #5.2 Encourage participation and provide education.

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#5.2A	Develop a database of riparian buffer landowners to encourage them to establish conservation easements to permanently protect riparian areas.	Mid-range	NAEC	Municipalities	DEP, private foundations	W
#5.2B	Encourage property owners to voluntarily plant native vegetation as landscaping.	Mid-range	Municipalities/ Civic groups	N/A	N/A	W

Objective #5.3 Address Abandoned Mine Drainage issues

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#5.3A	Designate funding for and execution of regularly scheduled Operations and Maintenance checks on the Wildwood Mine AMD treatment facility.	Mid-range	DEP/ WPCAMR	Municipalities	DEP, OSM, WPCAMR, EPA, private foundations	W
#5.3B	Identify any additional AMD discharges within the watershed.	Long-range	DEP/ WPCAMR	Municipalities	DEP, OSM, WPCAMR, EPA, private foundations	W

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Please see Table of Contents for list of Acronyms

Goal #6: Protect the area surrounding the waterways and improve water quality within the Pine Creek Watershed.

Objective #6.1 Enhance fishing opportunities

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#6.1A	Continue to protect and manage Pine Creek as a Trout Stocked Fishery.	**Immediate**	PAFBC/ USACE/ DEP	Civic groups	DEP, PAFBC, USACE, EPA, private foundations	W, R
#6.1B	Continue improvement projects on area waterways to maintain or expand fisheries and fishing opportunities (i.e. rock deflectors, log vanes, fish ladders, riparian plantings/improvements, etc.).	**Immediate**	PFBC	APSC/ TU/ civic groups	PFBC, DCNR, DEP, private foundations	R

Objective #6.2 Encourage Act 537 compliance

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#6.2A	Encourage municipalities to comply with the Act 537 consent orders to properly update and maintain existing sewage infrastructure.	Mid-range	DEP/ ACHD / NAEC	Municipalities	N/A	W

Objective #6.3 Continue evaluating water quality

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#6.3A	Coordinate with DEP to conduct TMDL studies every 2 years on streams within the watershed identified on the Integrated Waterway List.	Mid-range	DEP	Civic groups	DEP, private foundations	W
#6.3B	Develop a database of all background monitoring data and existing reports; could potentially be stored on Pine Creek Watershed Coalition's website.	Mid-range	PCWC	NAEC/ PEC	DEP, private foundations	W
#6.3C	Continue biological and chemical monitoring projects on the streams within the watershed that utilize citizen volunteers.	Mid-range	NAEC/ PCWC	WPC/ local conservation groups/ DEP/ PFBC/ PGC/ DCNR	DEP, DCNR, private sources, foundations.	B, W
#6.3D	Determine acceptable pH for streams within the watershed and whether acid rain is negatively impacting aquatic life.	Long-range	PCWC/ NAEC	Universities/ Colleges/	DEP, private foundations	W
#6.3E	Continue to coordinate with PA Fish & Boat Commission (PFBC) to conduct water quality and fish surveys on Main Stem Pine Creek; Coordinate with PFBC to conduct studies on the remaining tributaries.	Long-range	PFBC	Civic groups	EPA, PFBC, legislature	B

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Please see Table of Contents for list of Acronyms

Goal #7: Manage stormwater runoff within the Pine Creek Watershed.

Objective #7.1 Encourage individual lot efforts

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#7.1A	Create tax incentives for private landowners who implement conservation practices, such as rain gardens, freedom lawns (no chemical treatments), rain barrels, compost bins, invasive species management, etc.	**Immediate**	Legislators	Conservation groups/ NRCS/ DCNR/ DEP	DEP, DCNR, EPA, Private sources, foundations, legislature	B

Objective #7.2 Support Act 167 efforts

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#7.2A	Use the Act 167 plan to identify flood prone areas within the watershed and, where possible, re-establish as natural floodplain and protect as flood control areas through zoning and municipal ordinances.	Mid-range	Municipalities	Civic groups/ public	Municipalities, DEP, FEMA	W
#7.2B	Incorporate updated Act 167 Plan recommendations into municipal stormwater ordinances.	Mid-range	Municipalities	DEP/ PCWC	DCED, DEP, private foundations	W
#7.2C	Complete Phase II of the Act 167 Updates	**Immediate**	Municipalities	DEP/PCWC	DCED, DEP, private foundations	W
#7.2D	Identify areas of consistent flooding (waterways overflow their banks) and determine if plantings, wetland creation, or other natural flood control measures may assist with slowing and curbing flood waters.	**Immediate**	Municipalities/ NAEC	PCWC/ Citizens	DEP, DCNR, private sources, foundations	B
#7.2E	Enforce stormwater management Best Management Practices (BMPs) for new construction to reduce stormwater volumes and improve water quality at the discharge point.	**Immediate**	Municipalities	Contractors/ businesses/ landowners	DEP, private foundations	W

Objective #7.3 Support municipal/watershed-wide efforts

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#7.3A	Conserve large tracts of woodlands in the upper reaches of watersheds as a natural way to intercept rain water before it becomes stormwater.	**Immediate**	Land Trusts/ NAEC/ PCWC	Municipalities	DCNR, private foundations, WPC	B
#7.3B	Develop a multi-municipal strategy for identifying and removing downed trees and/or potential obstructions and debris from streams to alleviate flooding.	**Immediate**	Municipalities	Civic groups	Municipalities, DEP	W
#7.3C	Temporarily landbank developable lands within the watershed that suffer from frequent flooding and sewer overflows until degraded infrastructure is repaired or upgraded, to prevent problems from worsening.	Mid-range	Allegheny County/ Municipalities	ALT	N/A	B
#7.3D	Use public lands and public right-of-ways as an opportunity for stormwater runoff Best Management Practices (BMPs). Examples include land under bridges and overpasses, the median strips of roads and highways, and the exit ramp right-of-way off major roads.	Long-range	Municipalities/ PennDOT	N/A	N/A	W

Goal #7: Manage stormwater runoff within the Pine Creek Watershed. (*continued*)

Objective #7.4 Improve impaired areas and reduce further degradation

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#7.4A	Identify and restore degraded or impaired habitats, including wetlands, floodplains, riparian buffers. Update FEMA Mapping.	**Immediate**	Municipalities/ NAEC/ PCWC	DEP/ ACCD/ PFBC/ local colleges/ universities	DEP, DCNR, private sources, foundations	B, W
#7.4B	Routinely maintain publicly and privately-owned unpaved roads to prevent erosion and sediment from entering local streams.	Long-range	Municipalities	Civic groups	N/A	W
#7.4C	Encourage municipalities to use all road salt, pesticides, herbicides, and fertilizers sparingly.	Long-range	Municipalities	Civic groups	N/A	W

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Please see Table of Contents for list of Acronyms

Goal #8: Provide programs that control littering and educate the public about waste management.

Management Strategy		Priority	Lead Party	Potential Partners	Potential Funding	Resource
#8.1	Encourage public participation in programs/events such as Adopt-A-Highway, Great PA Cleanup, Adopt-A-Park (County Parks program), Adopt-A-Stream, Allison Park Sportsman's Club annual clean-up.	**Immediate**	Allegheny CleanWays/ Civic groups	Allegheny County/ Muncipalities/ PRC	DEP, Private sources	L
#8.2	Continue to support "Hard to Recycle" events for electronics, household hazardous wastes, etc., as well as free drop-off locations to make it convenient and affordable for area residents.	**Immediate**	Municipalities	PRC/ SWPAHHW	DEP, PA Cleanways, Private sources	L
#8.3	Create public service announcements on the proper disposal of waste, including advertisements for upcoming recycling events and promotion of the municipal curb-side recycling programs.	Mid-range	Allegheny County/ Municipalities	PRC/ Construction Junction/ DEP/ PA Cleanways/ SWPAHHW	DEP, PA Cleanways, Private sources, foundations	L
#8.4	Update Allegheny County Illegal Dump survey (Allegheny CleanWays to update 2005 survey).	Long-range	Allegheny CleanWays	Local citizens	DEP, Allegheny Cleanways	L
#8.5	Create a hotline for residents to report dump sites or recent dump activity.	Long-range	DEP/ PA Cleanways/ Municipalities	NAEC/ PRC/ local organizations/ Local Law Enforcement	PA Cleanways, DEP, Private sources	L

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Please see Table of Contents for list of Acronyms

Goal #9: Educate the public and public officials about the issues and opportunities within the Pine Creek Watershed.

Objective #9.1 Continue to utilize and develop new volunteer efforts

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#9.1A	Offer educational programs for the public and municipal officials about watersheds and the importance in protecting streamside areas such as riparian buffers, wetlands, and floodplains.	Immediate	PCWC/ NAEC/ PRC	APSC/ TU	DEP, DCNR, private foundations	W
#9.1B	Organize public stream corridor, park, greenway, and trail clean-up/maintenance days, which also provide opportunities for education.	Immediate	APSC/ TU/ Civic groups/ municipalities	N/A	Municipalities, local businesses	R
#9.1C	Organize a Leave No Trace public education campaign to encourage a "carry-in, carry-out" ethic for park users to discourage littering. Add to contract for pavilion rentals.	Immediate	ACPD/ Civic groups/ municipalities	N/A	Allegheny County, municipalities, private foundations	R
#9.1D	Education program to teach trail users how to be good land stewards while utilizing the trail system (i.e. Leave No Trace Ethics, Dog Leash requirements, etc.).	Mid-range	Local trail organizations/ civic groups	Allegheny County/ Municipalities	DCNR, private foundations	R
#9.1E	Continue to offer ecological restoration activities for the public to assist, such as tree planting, removal of invasive species, planting native species, and bank stabilization.	Immediate	Civic groups/ NAEC/ APSC/ TU	PGC/ DCNR/ PFBC/ USFWS	DEP, DCNR, private sources, foundations.	B
#9.1F	Continue to hold Audubon Society of Western PA Christmas Bird Counts for the Pittsburgh Region to identify birds in the area.	Long-range	ASWP	volunteers	N/A	B
#9.1G	Establish an invasive species hotline or website for residents to report and obtain information about invasive species. Create a municipal level inventory and management plan.	Mid-range	NAEC/ EAC/ Municipalities/	NHCOG/ Citizens	DCNR, DEP, municipalities	B
#9.1H	Create an Environmental Advisory Council (EAC) in municipalities that don't already have one--Bradford Woods, Etna, Indiana, McCandless, Marshall, O'Hara, Richland, Ross, Shaler, and Sharpsburg.	Mid-range	Municipalities	N/A	N/A	W

Objective #9.2 Educate the public regarding individual lot efforts

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#9.2A	Offer homeowner education about natural alternative ways of lawn care and pest control, and the effects of the overuse of fertilizers, pesticides, and herbicides on the watershed.	Immediate	PCWC/ NAEC/ PRC	ASWP/ WPC	DEP, DCNR, private foundations	W
#9.2B	Provide workshops to educate the public about the implementation of on-lot stormwater management systems.	Mid-range	Municipalities/ PCWC/ ACCD	Local citizens	DEP	W
#9.2C	Encourage land owners to voluntarily incorporate a backyard wildlife habitat program, such as the National Wildlife Federation and Audubon Society of Western PA programs.	Mid-range	NAEC/ PCWC/ Municipalities	ASWP	DEP, DCNR	B
#9.2D	Provide workshops for on-lot septic system owners about property maintenance and cleaning procedures.	Long-range	Septic contractors/ businesses	PCWC/ NAEC	Private foundations	W
#9.2E	Offer public education programs about the importance of planting native species for landscaping.	Mid-range	Municipalities/ NAEC/ PCWC/ ASWP	DCNR/ PennState Master Gardeners	DCNR, DEP	B

Goal #9: Educate the public and public officials about the issues and opportunities within the Pine Creek Watershed. (*continued*)

Objective #9.2 Educate the public regarding individual lot efforts (*continued*)

#9.2F	Offer public awareness and education materials on Best Management Practices and watershed conservation targeting homeowners, property managers, and public work employees.	Mid-range	Municipalities/ EAC	PCWC/ NAEC/ WPC	NRCS, DCNR, private sources, foundations.	B
#9.2G	Educate community residents about point and non-point sources of pollution and associated threats to the public water supply, how to report point source violations, and how to research permit information.	Mid-range	Municipalities/ NAEC/ PCWC	DEP	DEP, private foundations	W

Objective #9.3 Continue to support and develop new centralized envrionmental education areas

Management Strategy		*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#9.3A	Utilize and promote local environmental education centers, such as Latodami Nature Center in North Park and Beechwood Farms Reserve, that educate the public about environmental stewardship.	**Immediate**	ACPD/ WPC	Civic groups	Allegheny County, private foundations	R
#9.3B	Develop partnerships between schools, local environmental groups, and park naturalists to utilize local resources and environmental education centers as environmental education opportunities.	**Immediate**	North Park Naturalists/ public & private schools/ Beechwood Farms	Civic groups	DEP, DCNR, private sources, foundations.	B
#9.3C	Identify natural education areas and add interpretive signage. Encourage educators to utilize areas as educational opportunities.	Mid-range	Local parks/ civic groups	Schools	DCNR, DEP, private foundations	R
#9.3D	Offer a lecture series addressing watershed conservation strategies.	Mid-range	PCWC/ NAEC/ PRC	N/A	DEP, DCNR, private foundations	B

Objective #9.4 Support local farming

Management Strategy		*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#9.4A	Encourage community support of small "family" farms through "Buy Local" campaigns and Farmer's Markets to promote agricultural heritage.	**Immediate**	PDA	ACCD/ PennState Cooperative Extension Municipalities	Private sources, foundations	L
#9.4B	Promote the importance and economic viability of small farms through marketing, education and creation of avenues for adding value to locally produced agriculture commodities.	Long-range	PDA	ACCD/ PennState Cooperative Extension/ Municipalities	Private sources, foundations	L

Objective #9.5 Encourage local school activities

Management Strategy		*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#9.5A	Offer watershed education programs that provide field trip opportunities for school-age students.	Mid-range	Local schools/ watershed groups	N/A	N/A	W
#9.5B	Incorporate environmental education programs (i.e. recycling, watershed education, water conservation, being green, etc.) as part of schools' curriculum.	Mid-range	School districts	NAEC/ PCWC/ ACPD/ civic groups	DEP, DCNR, schools, private sources, foundations.	B

Goal #9: Educate the public and public officials about the issues and opportunities within the Pine Creek Watershed. (*continued*)

Objective #9.6 Preserve local history

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#9.6A	Develop/update local history booklets by municipality to engage and educate the public about local cultural and historical resources.	**Immediate**	NAHM	Civic groups/ Municipalities	Private foundations, PHMC	C
#9.6B	Identify historic resources through interpretative signs/historical markers posted along hiking/biking trails and highways to increase awareness of local waterway history.	**Immediate**	NAHM/ Municipalities/ Civic Groups	N/A	Private foundations, PHMC	C
#9.6C	Incorporate local history into history classes taught in local school districts.	**Immediate**	School Districts/ NAHM	Conservation groups/ DEP/ DCNR/ PAFBC	School Districts, Private foundations, PHMC	C
#9.6D	Create a local historical society to preserve historical sites and relics.	Mid-range	Citizens/ County Historical Societies	N/A	Private foundations, PHMC	C
#9.6E	Continue to utilize the North Allegheny Historical Museum as the central clearinghouse of cultural and historical information for the area.	Long-range	NAHM	Civic groups/ Municipalities/ School Districts	Private foundations, PHMC	C
#9.6F	Identify and advertise community events or festivals commemorating local historical events and places and establish associated tours highlighting the local historical site, structures, and history.	Long-range	NAHM/ NAEC/ DLM/ NAHM	Civic groups/ RCHA/ Municipalities	Private foundations, PHMC	C

Objective #9.7 Offer education regarding non-renewable resources

	Management Strategy	*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#9.7A	Offer public education program about Marcellus Shale extraction, associated wastewater issues, how to report violations, and how to research permit information. Educate the public about the laws to protect surface owner's rights and property from damage caused by subsurface mineral rights owners' access and resource extraction operations.	**Immediate**	NAEC/PCWC	DEP	Private sources, foundations	L, W
#9.7B	Educate homeowners in reference to the existing PADEP web-based Mine Subsidence Insurance and the maps included in the appendix of this plan to determine if they are at risk for mine subsidence, and, if so, the encouragement of the use of insurance from the Mine Subsidence Insurance Fund.	Long-range	Municipalities	DEP/ OSM	N/A	L

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Goal #10: Create or update municipal ordinances.						
Management Strategy		*Priority*	*Lead Party*	*Potential Partners*	*Potential Funding*	*Resource*
#10.1	By using tax incentives and municipal ordinances, encourage reuse/redevelopment of abandoned sites instead of new development to prevent forest fragmentation.	**Immediate**	Legislators	Conservation groups/ NRCS/ DCNR/ DEP	DEP, DCNR, EPA, Private sources, foundations, legislature	B
#10.2	Update/create municipal ordinances that encourage low-impact, context-sensitive, and green design developments.	**Immediate**	Municipalities	Green developers	N/A	B
#10.3	Update/create ordinances to protect ecologically-sensitive areas (i.e. wooded steep slopes, stream headwaters, wetlands, floodplains, BDAs, critical habitat, and other natural areas). Make mapping of these areas available at all municipal meetings when land use development plans are to be discussed. The EAC should be involved in discussions.	**Immediate**	Municipalities/ NAEC/ PCWC	WPC/ local conservation groups/ DEP/ PFBC/ PGC/ DCNR	DEP, Allegheny County, DCNR, Private sources, foundations	B
#10.4	Update/create natural resource protection ordinances to protect wetlands and streams, including a designated buffer of a minimum of 50 feet; Natural resource protection ordinances to protect headwater areas, including a designated buffer--150 feet recommended, but a minimum of 50 feet.	**Immediate**	Municipalities/ EAC	Land trust	N/A	W, B
#10.5	Update/create natural resource protection ordinances for timbering, clear-cutting, and revegetation (with native species) to protect forested areas.	**Immediate**	Municipalities/ EAC	Land trusts	N/A	B
#10.6	Update/create municipal ordinances and policies regarding landscaping recommendations; use native species by developing a model native species list for the municipalities to distribute.	**Immediate**	Municipalities/ EAC	WPC/ DCNR	DCNR	B
#10.7	Update/create municipal ordinances to protect agricultural lands, prime farmland soils, and soils of statewide importance to prevent conversion of agricultural areas to residential / commercial development.	Mid-range	Municipalities	PDA/ NRCS/ ACCD	USDA, PDA, NRCS, DEP, Private sources, foundations	L
#10.8	Update/create Subdivision and Land Development Ordinances and Zoning Ordinances based on current events and case law that is occurring within the state.	Long-range	Municipalities	N/A	N/A	L
#10.9	Update/create municipal ordinances that mandate recycling and discourage illegal dumping and littering.	Long-range	Allegheny County/ Municipalities	N/A	N/A	L
#10.10	Create Allegheny County Health Department wellhead protection ordinances and programs in Shaler and Sharpsburg.	Long-range	Municipalities/ ACHD	N/A	N/A	W
#10.11	Create municipal ordinances to require proper maintenance and operation of on-lot septic systems.	Long-range	Municipalities	N/A	N/A	W

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CHAPTER IX—
AN ALTERNATIVE VISION—PHASE I

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Pine Creek

An Alternative Vision

Prepared for:

NORTH AREA ENVIRONMENTAL COUNCIL

Prepared by:

Mackin

DECEMBER
2010

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The Pennsylvania Rivers Conservation Program

Pine Creek

An Alternative Vision

Final December 2010

Prepared for:

North Area Environmental Council

Prepared by:

Mackin Engineering Company
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Introduction

GOAL: This exercise is to demonstrate the beneficial economic, environmental and quality of life impacts of concurrently applying the recommended strategies of the Pine Creek Watershed Conservation Plan.

STRATEGY: Using actual portions of the landscape of the Pine Creek Watershed, develop several development scenarios with related cost/benefit analyses that compare build-out under current comprehensive plans and land planning and design ordinances to the impacts of alternative development practices and strategies such as conservation by design and those recommended in the PCWCP.

This project will be completed in a two phase approach as a result of limited funding and time constraints. Phase I will be completed and submitted to DCNR by December 30, 2010 and will include reviews of background information, development of build out scenarios to prepare for a cost/benefit analysis, model municipal fund programs and ordinances, and the preparation of a Phase II scope. Phase II will commence upon receipt of additional project funding and will include a cost/benefit analysis of the restructuring of development scenarios and their impact on stream flows, stream elevations, flood area extents, infrastructure costs, downstream damage costs, and tax revenues and other municipal/school district costs.

PROJECT AREA:

The project area will include three subwatersheds Montour Run, Willow Run, and North Fork Pine Creek, located in Pine and Richland Townships.

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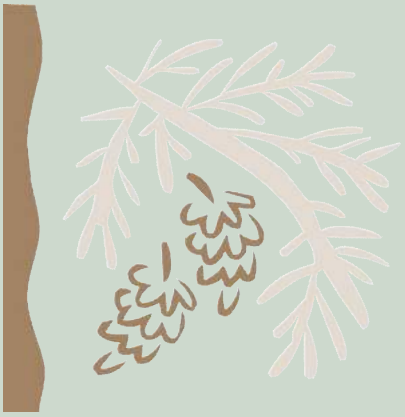

Pine Creek

An Alternative Vision

SECTION I

EXISTING ORDINANCE REVIEW

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The Zoning Ordinance and Subdivision and Land Development Ordinance

Zoning ordinances are land use regulations that municipalities can use to restrict the way land is used in certain neighborhoods or areas, called "districts," as depicted on the official Zoning Map. Each district has a distinct purpose which typically encapsulates the pattern of development the community wishes to see occur in that district, and a set of requirements regarding the types of land uses permitted, required lot size, setbacks from streets, height and size of buildings, and related issues such as landscaping, lighting, and so forth. Zoning also imposes specific standards on particular uses that may pose a concern for a community. Municipalities enact zoning ordinances to protect the health, safety, and welfare of its citizens, and in Pennsylvania, zoning is enabled via the Municipalities Planning Code (MPC).

In addition to the zoning districts, zoning ordinances can also contain overlay districts, which are typically developed in conjunction with the preparation of a comprehensive land use plan. In simple terms, an overlay district is an additional zoning requirement that is placed on a geographic area but does not change the underlying zoning requirements. Overlay districts have been used in many instances to impose additional development restrictions to protect natural resources in specific areas. In addition to protecting natural resources, overlay districts can also promote the use of innovative zoning techniques that may not fit the mold of "traditional" zoning, which tends to focus more on use rather than architectural style or pattern. As such, many overlay districts take the form of Planned Residential Districts (PRD's) or Planned Unit Districts (PUD's). Both PRD's and PUD's focus more on the style, density, and placement of structures rather than their use, and also tend to emphasize amenities such as pedestrian connections, recreational facilities, stormwater management, and lighting. The primary distinction between a PRD and a PUD is that a PRD focuses on residential land uses while a PUD incorporates non-residential uses.

The Subdivision and Land Development Ordinance (SALDO) is commonly used in Pennsylvania as a type of land development control, and contains regulations for the creation of new lots or changes in property lines as well as the construction of public and private improvements to land. The major purposes of a SALDO include provision of adequate sites for development and public use, the maintenance and enforcement of reasonable and acceptable design standards, and the coordination of public improvements with private development interests. The SALDO typically regulates items such as stormwater management controls, steep slope restrictions, landscaping and street trees, street design and pavement standards, and driveway and parking lot access to lots and / or developments.

Pine and Richland Township's zoning ordinance as well as their SALDO are summarized below in regard to their districts and their associated dimensional and use requirements as well as any provisions that directly impact environmentally sensitive lands, local watersheds, other natural features, and general future development patterns.

Pine Township Land Use Controls

Both the Pine Township Zoning Ordinance and the accompanying Subdivision and Land Development Ordinance (SALDO) were enacted in 2005. The Zoning Ordinance consists of 8 general zoning districts in addition to five overlay or "floating" districts. Each respective district is summarized briefly below.

The ***E-1 Estate Residential District*** preserves the Township of Pine's distinctive, low-density residential areas and the promotion and protection of the quality of life for residents and the existing residential neighborhood

Permitted uses include accessory uses, agriculture, nature preserve, no-impact home-based business, parks, single-family detached dwellings

Permitted uses "subject to development review" include cemetery and essential facilities

Conditional uses include collocation communications facilities on existing facilities only, place of worship, public use, recreation facility, planned development option (PRD), recreation facility

E-1: Estate Residential	
Minimum Lot Area	3 acres
Minimum Lot Width	300 ft.
Minimum Front Yard	60 ft.
Minimum Rear Yard	
Principal Building	50 ft.
Accessory Building	20 ft.
Minimum Side Yard	
Residential Uses, Principal	40 ft.
Accessory Building	10 ft.
Churches, Schools, Public/ Semi-Public Use	50 ft.
Other Uses	80 ft.
Maximum Structure Height	
Principal Building	35 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	20%
Maximum Building Coverage	10%

The ***S-1 Special District*** preserves environmentally sensitive areas, and as such allows for similar uses to the E-1 District to maintain the single-family residential character that exists in these areas.

Permitted uses include accessory uses, agriculture, nature preserve, no-impact home-based business, parks, single-family detached dwellings

Permitted uses "subject to development review" include cemetery and essential facilities

Conditional uses include place of worship, public use, recreation facility, planned development option (PRD)

S-1: Special District	
Minimum Lot Area	2 acres
Minimum Lot Width	200 ft.
Minimum Front Yard	50 ft.
Minimum Rear Yard	
Principal Building	50 ft.
Accessory Building	20 ft.
Minimum Side Yard	
Residential Uses, Principal	30 ft.
Accessory Building	10 ft.
Churches, Schools, Public/ Semi-Public Use	50 ft.
Other Uses	80 ft.
Maximum Structure Height	
Principal Building	35 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	20%
Maximum Building Coverage	10%

R-1: Suburban Residence	
Minimum Lot Area	1 acre
Minimum Lot Width	125 ft.
Minimum Front Yard	40 ft.
Minimum Rear Yard	
Principal Building	50 ft.
Accessory Building	20 ft.
Minimum Side Yard	
Residential Uses, Principal	20 ft.
Accessory Building	10 ft.
Churches, Schools, Public/ Semi-Public Use	50 ft.
Other Uses	80 ft.
Maximum Structure Height	
Principal Building	35 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	40%
Maximum Building Coverage	20%

The ***R-1 Suburban Residence District*** is intended to be primarily a single-family residential area. Complementary community uses are allowed, but maintaining the overall residential character of the neighborhoods is the primary goal of the R-1 District. Agricultural uses are also allowed in this low-density residential district to complement the residential nature of the community.

Permitted uses include agriculture, accessory uses, nature preserve, no-impact home-based business, parks, single-family detached dwellings

Permitted uses "subject to development review" include essential facilities

Conditional uses include place of worship, public use, recreation facility, planned development option (PRD) with the additional uses of carriage homes and patio homes being available in this district

R-2: Community Residence	
Minimum Lot Area	3/4 acre
Minimum Lot Width	90 ft.
Minimum Front Yard	30 ft.
Minimum Rear Yard	
Principal Building	40 ft.
Accessory Building	20 ft.
Minimum Side Yard	
Residential Uses, Principal	15 ft.
Accessory Building	10 ft.
Churches, Schools, Public/ Semi-Public Use	50 ft.
Other Uses	80 ft.
Maximum Structure Height	
Principal Building	35 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	40%
Maximum Building Coverage	20%

The ***R-2 Community Residence District*** is similar in nature to the R-1 District, but smaller lot sizes characterize this district. The R-2 District is primarily residential in nature with support community services allowed. Agricultural uses are allowed as they complement the residential character of the community.

Permitted uses include agriculture, accessory uses, no-impact home-based business, parks, single-family detached dwellings

Permitted uses "subject to development review" include essential facilities

Conditional uses include collocation of existing communications facilities / towers, place of worship, public use, recreation facility, planned development option (PRD) with carriage homes and patio homes, Town Center Planned Residential Development (TC-PRD) with the available uses of carriage homes, garden apartments, college, civic clubs, day-care centers, hospitals, hotel / motel, theaters, kennels, life care communities, mixed uses, retail sales, restaurants without drive-through, trade schools, vehicle service stations, etc.

The ***R-3 Neighborhood Residence District*** is to provide for the development of neighborhoods that include a mixture of single- and multi-family housing in a primarily residential setting, but encouraging higher densities of new development. Lot sizes are generally smaller than the R-1 or R-2 Districts to accommodate the denser housing types.

Permitted uses include agriculture, accessory uses, no-impact home-based business, parks, single-family detached dwellings

Permitted uses "subject to development review" include essential facilities, garden apartment (new development), attached single-family dwelling (new development)

Conditional uses include carriage homes, collocation of existing communications facilities / towers, place of worship, public use, and recreation facility

R-3: Neighborhood Residence	
Minimum Lot Area	1/2 acre
Minimum Lot Width	70 ft.
Minimum Front Yard	25 ft.
Minimum Rear Yard	
Principal Building	40 ft.
Accessory Building	20 ft.
Minimum Side Yard	
Residential Uses, Principal	10 ft.
Garden apartments, attached single-family, carriage homes	0 ft.
Churches, Schools, Public/ Semi-Public Use	50 ft.
Other Uses	80 ft.
Maximum Structure Height	
Principal Building	35 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	50%
Maximum Building Coverage	35%

The ***B-1 Rural Business District*** is provides locations to accommodate small scale, rural retail, service, finance, insurance, and real estate and related structures and uses. These districts are often adjacent to residential districts to ensure Township residents are adequately serviced.

Permitted uses include agriculture, parks

Permitted uses "subject to development review" include animal day care, day-care center, kennel, mixed uses in structures less than 6,000 square feet, retail sales and services without drive-through, veterinary services, wineries

B-1: Rural Business	
Minimum Lot Area	1/2 acre
Minimum Lot Width	70 ft.
Minimum Front Yard	20 ft.
Minimum Rear Yard	
Principal Building	40 ft.
Accessory Building	20 ft.
Minimum Side Yard	
Principal Uses	25 ft.
Accessory Uses	10 ft.
Maximum Structure Height	
Principal Building	35 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	50%
Maximum Building Coverage	30%

Conditional uses include accessory use, bed and breakfast, carriage homes, collocation, garden apartment in structures less than 6,000 square feet, light manufacturing in less 6,000 square feet, mortuary, no-impact home-based business, patio home developments, place of worship, public and semi-public, recreation facility, restaurant without drive-through, attached single-family dwelling, detached single-family dwelling, vehicle repair and sales and service station

C-1: Community Service Center	
Minimum Lot Area	1 acre
Minimum Lot Width	150 ft.
Minimum Front Yard	
Principal Building	50 ft.
Accessory Building	10 ft.
Minimum Rear Yard	
Principal Building	50 ft.
Accessory Building	20 ft.
Minimum Side Yard	
All Uses	15 ft. unless attached
Maximum Structure Height	
Principal Building	45 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	80%
Maximum Building Coverage	50%

The ***C-1 Community Service Center District*** provides diverse commercial development along transportation corridors and in neighborhoods. The district includes a mixture of uses that serve the adjacent neighborhood and the community as a whole. The C-1 District is preserved through appropriate design elements, amenities or treatments that create, enhance and reinforce the design relationships between the buildings, sites and streets and still establish an ambience that reflects the character of the Township.

There are no permitted uses "by right"

Permitted uses "subject to development review" include animal day care, automotive dealership, college, carriage homes, car wash, day-care center, entertainment facilities, indoor theater, life care community, light manufacturing, hotel or motel, hospital, offices, kennel, parks, place of worship, mixed uses, public or semi public uses, recreation facility, restaurants, retail sales and services

Conditional uses include accessory use, adult-oriented establishments, alcohol rehabilitation clinics, animal hospital, commercial or public parking garage or lot, essential facilities, self-storage units, garden apartments, group care, heliport, kennels, communications facility, mobile home park, nursery, methadone clinic, patio homes, park and ride facility, attached single-family dwellings, vehicle sales and repair, warehouse, PRD option, including civic clubs, nature preserve, patio homes, detached single-family dwellings

C-2: Planned Transition	
Minimum Lot Area	1 acre
Minimum Lot Width	100 ft.
Minimum Front Yard	
Principal Building	50 ft.
Minimum Rear Yard	
Principal Building	50 ft.
Accessory Building	20 ft.
Minimum Side Yard	
Principal Building	25 ft.
Accessory Building	10 ft.
Maximum Structure Height	
Principal Building	45 ft.
Accessory Building	20 ft.
Maximum Lot Coverage	80%
Maximum Building Coverage	50%

The ***C-2 Planned Transition District*** provides diverse commercial development in transitional areas of the Township. The District includes a mixture of uses such that serve the adjacent neighborhood and the community as a whole. The C-2 District also requires appropriate design elements, amenities or treatments that create, enhance and reinforce the design relationships between the buildings, sites and streets and still establish an ambience that reflects the character of the Township.

Uses permitted by right include detached single-family dwellings

Permitted uses "subject to development review" include civic clubs, day care centers, medical clinic, mixed uses in less than 6,000 square feet, no-impact home-based business, nursing home, offices, parks, patio homes, place of worship,

public and semi-public use, recreation

Conditional uses include accessory use, carriage homes, college, communications towers, essential facilities, garden apartments, group care, hospital, nursery, attached single-family dwellings, trade school, warehouse

Special Overlay Districts and Planned Residential Districts

Pine Township has five overlay districts, which are summarized briefly below.

Greenways Overlay District (GWO)

Greenway standards include a wooded or landscaped strip not less than 15 feet in width in commercial zones and 40 feet in width in all other zones along the frontage of the property except for ingress / egress of vehicles

- The strip shall be comprised of an existing stand of mature trees meeting minimum quantity and size requirements
- For other portions of the Greenways Overlay District (GWO), a wooded and landscaped strip, not less than 15 feet in width in commercial zones and 40 feet in width in all other zones shall be created along the entire frontage of the property except for ingress / egress for vehicles
- This landscaped strip shall include:
  - ⇒ In commercial districts, one tree 2 ½ inches minimum caliper for every 30 linear feet on center
  - ⇒ For other districts, one tree 2 ½ inches minimum caliper spaced no less than 50 feet from the center of each tree to the center of another tree
  - ⇒ Shrubs, grasses, and groundcover plants permitted in addition to the planting required
  - ⇒ Earthen mounding shall be utilized in appropriate areas to help screen parking and off-street loading areas as well as mechanical systems and other "questionable" elements
  - ⇒ No structures permitted within GWO or within the building setback line unless the setback line is reduced through provisions of the Traditional Village Overlay or Town Center Design Districts
  - ⇒ Setbacks from road right of way shall be 100 feet for structures in the GWO in a noncommercial district

Easements and connections to trails shall be provided.

Traditional Village Overlay District

Purpose of this overlay is to enhance and preserve the Old Wexford area as a traditional village. It promotes the development of "livable" streets, with pedestrian-oriented design and redevelopment and streetscape features, etc. Includes additional design criteria for buildings to encourage compatibility with local village patterns.

Requires landscaping for off-street parking (if the developer chooses not to locate off-street parking requirements in any nearby public or semi-public lots), including buffer strips of trees, shrubs, groundcovers, and fencing.

Town Center Design Overlay District (TCDO)

The purpose of this overlay is to encourage the development of a pedestrian oriented corridor that links a variety of uses through streetscape amenities and design treatments which include sidewalks, street lighting, landscaping, street trees, screened and pedestrian friendly parking lots or garages and coordinated signage. The overlay is also to serve as a transitional zone unifying the unique development patterns of the Old Wexford area.

- Façade colors, spacing, etc. are all regulated to help blend this area with traditional surrounding patterns of development

Includes greenway requirement along Route 19 corridor no less than 15 feet shall be provided in all commercial zones.

Commercial Development Control Overlay (CDC)

The purpose of this overlay is to reinforce the principles of the Town Center design concepts and to maintain the character of the SR 19 corridor by providing additional regulations for the use of land located within certain of the existing zoning districts

Regulations regarding uses, dimensions, design criteria, etc. aimed at reducing the visual impacts of uses that require or generate the need for a large number of parking spaces, promotes the development of smaller-scale buildings, reduces the intensity and impact of large-scale buildings along the northern segment of SR 19

Town Center Planned Residential Development (TC-PRD)

This district encourages the development of a special activity center which will serve as a focal point for the Township, and will support a compatible mix of business, office, service, and residential uses with a compact Town Center Core Area. This small-scale core area will support small scale specialty retail, office, and residential uses, and be designed to include a defined public plaza and open space area as a central unifying design element. Includes provisions to provide for a central public green space.

- Open space requirement: a minimum of 25 percent of the total site area shall be designed for public or common open space
- Also requires detention ponds to be integrated into overall site design features and incorporate passive recreational amenities and furniture such as benches, fountains, pathways, etc. with side slopes not to exceed a ratio of four to one
- Planting strips between sidewalk and roadway, and also between parking and roadway and / or parking and sidewalk

Trails may be incorporated in lieu of sidewalks.

Supplemental Regulations

Pine Township has a number of "supplemental" regulations that help control the intensity and impacts of development upon Township land. These regulations are incorporated into both the Zoning Ordinance and the SALDO and are summarized below.

In all districts where "planned residential development" is an option, the following is required:

- Lots for detached single-family must be at least 21,780 square feet
- Overall density cannot exceed the density if the site were developed under standard subdivision regulations
- Existing natural features such as slopes, wetlands, watercourses, historic sites, etc. shall be preserved and no cutting or filling permitted within 50 feet of stream or watercourse

Common open space requirements, including a minimum of 35 percent to be set aside

Landscaping Requirements Highlights

- Residential lots less than 100 feet in width shall be landscaped with at least 3 trees for every dwelling unit
- Nonresidential developments must have at least one tree for every 1,000 square feet of floor area

Buffer yards between uses, including 10 feet between "compatible" land uses, 20 feet between detached large lot single family and denser single family, 30 feet between residential and nonresidential, and 40 feet between residential and major commercial and planned residential developments

Parking Requirements Highlights

- Encourages the use of shared parking facilities, including providing a connection or easement between lots when properties are redeveloped / developed (incentive to do this: reduction of parking requirements by 10 to 15 percent)
- One landscaped parking island for every 15 spaces and at the end of each row
- Includes provisions for bicycle parking

Permits alternative methods for achieving parking ratio (i.e., public lots, street parking, etc.)

Recreation and Open Space Requirements Highlights

- Residential developments greater than 10 acres in size and having over 10 residential units and land developments over 10 acres in size shall be required to set aside a portion of their development for recreation
- All developments must provide trails or easements if their site is marked on the Trail Feasibility Study and Design
- Open space and passive recreation areas are required for 15 percent of land area of all subdivision

greater than 10 acres, 35 percent of planned residential developments, and 10 percent of land developments over 10 acres

Active recreation area of ½ acre in size required for developments with more than 10 dwelling units, 1 acre for more than 100 units, 2 ¼ acres for more than 250 units, 3 ½ acres for more than 500 units, 6 acres for those with more than 600 units

Stormwater Management

Easements shall have a required minimum width of 20 feet.

Where a subdivision or land development is or will be traversed by a watercourse there shall be provided a stormwater or drainage easement of a width sufficient for the purpose not less than 20 feet

Residential Yards

- No portion of a residential front yard shall be paved with asphalt or concrete except for walkways or driveways

Rear yards must be graded to ensure proper drainage.

Vegetation preservation

No removal of trees, shrubbery, foliage, grass, or other natural growth shall be permitted except the activity of "grubbing," i.e, removing underbrush from well-treed area.

Steep Slope Regulations

- Slopes greater than 40% may not be disturbed

Slopes 35% to 30% may be altered granted alteration is no greater than 60% of slope area.

Buffer Requirements for watercourses:

- Standards for preservation. Subdivision or land development may not affect any wetland, perennial stream, or watercourse as follows:
- No disturbance shall be permitted within 50 feet of any watercourse or perennial stream. For the purpose of this subsection, "watercourse or perennial stream" shall mean any non-intermittent stream, run, river, or other flow of water that supports or is capable of supporting year-round aquatic fauna.
- No disturbance shall be permitted that would require encroachment, regrading or the placement of fill in wetlands either in violation of any state or federal regulations or within 50 feet of such wetlands.

Richland Township Land Use Controls

The updated and amended Richland Township Zoning Ordinance was enacted in 2009 and consists of 10 general zoning districts in addition to 2 overlay or "floating" districts as well as a Planned Residential Development (PRD) option. Each respective district is summarized briefly below.

The purpose of the ***Residential RR District – Rural Residential*** is to maintain land use characteristics of rural development with the Township.

The ***Residential RA District*** seeks to encourage land use characteristic of larger lot, single-family development now present in many areas of the Township with lots being approximately one (1) acre in size.

The ***Residential RL District, Low Intensity Residential*** provides for low-density suburban single-family residential opportunities.

The ***Residential RM District, Medium-Intensity Residential*** seeks to preserve the character of the existing moderate-density suburban neighborhoods and to create a favorable basis for additional development of single family neighborhoods.

The purpose of the ***Residential RH District, High-Intensity Residential*** is to permit multi-family oriented developments within the community and to provide a variety of housing types in districts conducive to such development.

The ***Mixed Use MU District*** includes the built-up residential areas of the community which were divided into small lots long before zoning was adopted by the Township. These areas are nearly completely developed so the district simply affirms the existing land use pattern.

The ***Commercial NC District, Neighborhood Commercial*** includes land strategically located in areas developed or developing for commercial activities that support the daily shopping needs of residents of the neighborhoods in the vicinity.

The ***Commercial CC District, Community Commercial*** includes land intended for community-wide and regional retail shopping, office and service opportunities.

The ***CM, Commerce/Industrial District*** includes land generally in large parcels that has access to arterial and/or collector roads, is fairly level and acts as a buffer between adjacent residential areas and nearby downgrading influences, such as heavily traveled highways or heavier industrial operations, and as a transitional zone between existing commercial and industrial districts. Uses that will be less disruptive to residential areas are permitted in this district.

The ***M, Restricted Light Industrial District*** includes land in relatively large, flat parcels with good highway and/or rail access that has been developed, or is suited for development by light manufacturing or similar industry-oriented uses that are compatible neighbors in a basically residential community.

The ***PCO, Planned Campus Overlay*** generally includes large parcels of land within various residential zoning districts where the uses and scale of campus-style development, whether accommodating residential, non-residential and/or institutional activities, are designed in a manner which recognizes and respects both on-site needs and the activities of those of surrounding off-site residential areas.

The ***Route 8 Overlay*** encompasses smaller lots along State Route 8 which have historically been used

for residential and/or neighborhood-oriented non-residential development and are generally surrounded a combination of residential and non-residential development. Topography, lot orientation and surrounding development/land use patterns may be common challenges for obtaining lot access and/or ensuring safe site circulation.

Uses for each district are broken down by residential and non-residential (as well as the characteristic 'permitted,' 'special exception,' and 'conditional' use categories) and are summarized in the following multi-page table (**Table 1**).

District Designations

P	Permitted Use	RR	Rural Residential	CM	Commerce/Industry
S	Exception	RA/RL	One-Acre/Low Intensity	M	Restricted Light Industrial
C	Conditional Use	RM	Medium-Intensity Residential	MU	Mixed Use
		RH	High-Intensity Residential	PCO	Planned Campus Overlay
		NC	Neighborhood Commercial	Rt8	Route 8 Overlay
		CC	Community Commercial	PRD	Planned Residential Development

	Residential				Non-residential								
Use	RR	RA/RL	RM	RH	NC	CC	CM	M	MU	PCO	Rt 8	PRD	
Residential Use													
1 All Other Uses (Uses not Listed)							S	S				See Section 27-601	1
2 Apartment				P					P	C			2
3 Convalescent care facility	S	S	S		S	P			S	C	S		3
4 Group care home	S				P	P	P		P	C			4
5 Halfway house	S				S	S			S				5
6 Life care facility/Senior Living Community					S	P			S	C			6
7 Nursing home/personal care	S	S	S		S	P			S	C	S		7
8 Quad-plex			P	P					S	C	P		8
9 Rooming or boarding house	S	S	S	S	P	P	P		P	C	S		9
10 Single family dwelling	P	P	P	P	S	S	S		P	C	P		10
11 Townhouse				P					P	C			11
12 Two family dwelling		S	P	P					P	C	P		12
Non-Residential Use													
1 All Other Uses (Uses not Listed)							S	S					1
2 Adult theater							S	S					2
3 Alcohol Rehabilitation Facility							P						3
4 Bakery					S	P	P	P	S				4
5 Bank/financial						P	P	P	S				5
6 Bed and breakfast	S	S	P	P	P				P	P	S		6
7 Billboard								S					7
8 Boarding kennel	S						S	P					8
9 Brewery (micro)						S	S	P	S				9
10 Business services					P	P	P	P	P		S		10
11 Car wash						S	P	P					11
12 Cemetery	S	S					S		S	C			12
13 Cinema (movie theater, not including adult theater)						P	P	P					13
14 Communications antenna	P	P	P	P	P	P	P	P	P	P			14
15 Communications tower	S					S	S	S					15
16 Consumer/personal					P	P	P	P	P				16
17 Contractor yard or material storage facility						S	P	P	S				17
18 Convenience store, including gas and/or energy recharge station					S	P	P	P	P				18
19 Convenience store, not including gas and/or energy recharge station					P	P	P	P	P				19
20 Country club/golf course	S	S	S	S		S	P	P		C			20

Table 1: Zoning District Regulations

P	Permitted Use	RR	Rural Residential	CM	Commerce/Industry
S	Use by Special Exception	RA/RL	One-Acre/Low Intensity	M	Restricted Light Industrial
C	Conditional Use	RM	Medium Intensity Residential	MU	Mixed Use
		RH	High Intensity Residential	PCO	Planned Campus Overlay
		NC	Neighborhood Commercial	Rt8	Route 8 Overlay
		CC	Community Commercial	PRD	Planned Residential Development

	Residential				Non-residential								
Use	RR	RA/RL	RM	RH	NC	CC	CM	M	MU	PCO	Rt8	PRD	
21 Crematorium							S	S				See Section 27-601	21
22 Day care center (adult)					P	P			P	P	S		22
23 Day care center (youth), pre-school, nursery school or kindergarten					P	P			P	P			23
24 Day care home	S	S	S	S					P	P			24
25 Department store						S	P						25
26 Distribution facility								P					26
27 Drive-in theater						S	P	P					27
28 Driving range	S					S	P	P		C			28
29 Dry cleaning outlet					P	P	P	P	P				29
30 Dry cleaning processing						S	S	P					30
31 Emergency services	S	S	S	S	S	P	P	P	P				31
32 Essential services	P	P	P	P	P	P	P	P	P	P			32
33 Fairgrounds/carnival	S	S				S							33
34 Farm	P	S								P			34
35 Farmette	P	S								P			35
36 Farm stand, retail	P	S			S	P	P	P	S				36
37 Flea market							S	S					37
38 Flex space						S	P	P					38
39 Forestry	P	P	P	P	P	P	P	P	P	P			39
40 Funeral home or mortuary						P	P	P					40
41 Furniture sales or refinishing/upholstering					P	P	P	P	P				41
42 Gaming facility						S	S		S				42
43 Gas wells							S	S					43
44 Grocery/food store					S	P	P	P	S				44
45 Hardware store					P	P			P				45
46 Health/fitness club						P	P	P					46
47 Heliport services						P	P	P					47
48 Home improvement center						S	P	P					48
49 Home occupation, other	S	S	S	S	P	P	P	P	S	C	S		49
50 Home-based business, no impact	P	P	P	P	P	P	P	P	P	P	P		50
51 Hospital/Hospice	S					P	P			C			51
52 Hotel, motel, or motor court						P	P	P	S				52
53 Incinerator								S					53

Table 1: Zoning District Regulations (continued)

P Permitted Use	RR Rural Residential	CM Commerce/Industry	
S Use by Special Exception	RA/RL One-Acre/Low Intensity	M Restricted Light Industrial	
C Conditional Use	RM Medium-Intensity Residential	MU Mixed Use	
	RH High-Intensity Residential	PCO Planned Campus Overlay	
	NC Neighborhood Commercial	Rt8 Route 8 Overlay	
	CC Community Commercial	PRD Planned Residential Development	

	Residential				Non-residential								
Use	RR	RA/RL	RM	RH	NC	CC	CM	M	MU	PCO	Rt 8	PRD	
54 Junk storage and sales							S	P					54
55 Juvenile detention center									S				55
56 Laboratory						S	P	P					56
57 Landfill								S					57
58 Landscape nursery/retail sale of flowers, shrubbery and/or trees						P	P	P					58
59 Light manufacturing and/or assembly facility							P	P					59
60 Liquor/beer store						S			S				60
61 Lumber mill								P					61
62 Manufacturing							S	P					62
63 Medical clinic						P	P	P					63
64 Mobile home park			S	S									64
65 Municipal services center	P	P	P	P	P	P	P	P	P	P			65
66 Nightclub						P	S						66
67 Office (business, professional and/or public service)					P	P	P	P	P		S		67
68 Office (medical)					P	P	P	P	P	C	S		68
69 Other towers (non-communications/ non-water)	S						S	S				See Section 27-601	69
70 Package sorting facility							P	P					70
71 Park and ride facility						S	S	S					71
72 Parking garage/structure						P	P	P		C			72
73 Parking lot						P	P	P	S				73
74a Performance theatre, indoor						P	P	P	S	C			74a
74b Performance theatre, outdoor						P	P	P	S	C			74b
75 Pharmacy						P	P	P	P				75
76 Place of worship and/or assembly	S	S	S	S	S	S	S	S	S	C	S		76
77 Planned non-residential development					S	S	S	S	S				77
78 Post office					S	P	S	S	P				78
79 Power plant								S					79
80 Private club					S	P	P	P	S				80
81 Public park/open space, playground and municipal recreation facility	S	S	S	S	P	P	P	P	P	P			81
82 Public/private utility buildings	S	S	S	S	P	P	P	P	S				82
83 Recreation facility, large-scale indoor (private and semi-private)						S	P	P	S	C			83
84 Recreation facility, outdoor (private and semi-private)						S	P		S	C			84
85 Recreation facility, small-scale indoor (private and semi-private)					S	P	P	P	S	C			85

Table 1: Zoning District Regulations (continued)

Special Overlay Districts and Planned Residential Districts

As mentioned, Richland Township has three overlay districts. The overlay district regulations are summarized below.

Planned Residential Development (PRD) Overlay

Principal Permitted Uses include:

- *RA and RL* - Single-family detached dwellings; two-family dwellings; recreational facilities and nonresidential uses, which are permitted as conditional uses, and which are intended to function as support services for the PRD community.
- *RM* - Single-family detached dwellings; single family attached dwellings, limited to two-uses, which are permitted as conditional uses, and which are intended to function as support services for the PRD community.
- *RH* - Single-family detached dwellings; single family attached dwellings, limited to two family dwellings, quad-plexes and townhouses; garden apartments; recreation facilities and nonresidential uses, which are permitted as conditional uses and which are intended to function as support services for the PRD community.

Lot Requirements: The size for the planned residential development shall not be less than the following minimum contiguous land areas.

- RA and RL - Fifty acres
- RM - Twenty-five acres
- RH - Twenty-five acres

Open Space Requirements: The minimum percentage of land that shall be designated as permanent open space shall be thirty percent (30%) of the total site area.

PRD Density Calculations: The density for a PRD shall be calculated by multiplying the number of units permitted (using the values identified in Table 2) by the developable acreage of the lot.

Non-residential Area: The PRD may contain a defined nonresidential area designed to meet the following conditions.

- A note shall be placed on the tentative plan which requires that construction must begin on the nonresidential area of the tract when twenty-five percent (25%) of the residential development on site has been completed. Nonresidential construction can begin prior to the completion of twenty-five percent (25%) of the residential development.

In addition, no more than fifty percent (50%) of the nonresidential area shall be constructed until a maximum of forty percent (40%) of the residential development on site has been completed

Table 2: Residential Districts Area and Bulk Regulations

District	Land Use	Maximum Requirements: Units/Acre	Max. Lot Coverage	Max. Building Height** (Stories)	Minimum Requirements: Lot Area (Sq. Ft.)	Lot Width at Building Line	Lot Frontage	Front Setback	Rear Yard Setback	Side Yard Setback	Required Open Space (% of gross site)
RR	All Uses	0.54	10%	35' (2.5)	80,000	200'	100'	50'	60'	40'	0%
RA	All Uses	1.09	10%	35' (2.5)	40,000	150'	100'	50'	60'	25'	0%
	PRD Single-Family Dwelling	2.18	10%	35' (2.5)	20,000	100'	50'	35'	40'	10'	30%
	PRD Two Family Dwelling	2.18									
RL	All Uses	1.45	20%	35' (2.5)	30,000	100'	50'	50'	50'	15'	0%
	PRD Single-Family Dwelling	2.9	20%	35' (2.5)	15,000	85'	50'	35'	30'	10'	30%
	PRD Two Family Dwelling	2.9									
RM	All Uses	2.18	20%	35' (2.5)	20,000	100'	50'	50'	50'	15'	0%
	PRD Single-Family Dwelling	4.36	20%	35' (2.5)	10,000	85'	50'	35'	30'	10'	30%
	PRD Two Family Dwelling	4.36									
	PRD Townhouse	8.71			5,000	35'	25'	25'	75'*	75'*	
RH	Single-Family Dwelling	2.18	30%	40' (3)	20,000	100'	50'	35'	30'	10'	15%
	Two Family Dwelling	3.11			14,000	75'	50'				
	Townhouse	12.10			3,600	50'	25'				
	Garden Apt.	17.42			2,500	100'	50'				
	PRD Single-Family Dwelling	4.36	30%	40' (3)	10,000	85'	50'	25'	25'	10'	30%
	PRD Two Family Dwelling	4.36			10,000	70'	50'				
	PRD Townhouse	17.42			2,500	25'	25'		75'*	75'*	
	PRD Garden Apt.	17.42			2,500	50'	50'		50'*	50'*	
MU	Single-Family Dwelling	8.00	30%	40' (3)	5,000	30'	50'	25'	25'	10'	0%
	Two Family Dwelling	6.20			7,000	50'					
	All Other Uses	8.00			5,000	60'		25'			
PCO	Single-Family Dwelling	See Section 602	50%	See Section 602	10,000	50'	25'	25'	25'	25'	40%
	Other Residential				2,500	25'		25'	25'	25'	
	Non-residential				10,000	100'		50'	50'	50'	

*Setback from development tract rear or side boundary.

**: Does not include accessory structures

All lots on a cul-de-sac shall have a fifty (50) foot minimum lot frontage

Conformance of lots within lot averaging plans approved prior to 2008 shall be subject to Township review.

Setbacks for Planned Residential Development prior to 2008 shall be as approved in accordance with the conditional use as granted.

Table 3: Non-Residential Districts

District	Max. Lot Coverage	Max. Building Height (Stories)	Min. Lot Area (Sq. Ft.)	Min. Average Lot Depth	Min. Lot Width at Building Line	Min. Lot Frontage	Min. Front Setback	Min. Side Yard Setback when abutting...				Min. Rear Yard Setback when abutting...			
								NC or CC	CM or M	street R.O.W.	any R district	NC or CC	CM or M	street R.O.W.	any R district
NC	30%	40' (3)	20,000	200'	100'	50'	50'	0'	0'	35'	50'	15'	15'	20'	50'
CC										50'		30'	30'	40'	
CM	40%	45' (3)	40,000	50'	150'	50'	50'	20'	20'	50'	100'	50'	25'	50'	100'
M						50	30'								
MU	40%	40' (3)	5,000	80'	25'	25'	25'	0'	0'	25'	25'	15'	15'	25'	25'
PRD*	See §601 for non-residential requirements associated with Planned Residential Development														
	Also, setbacks from TCIP lines as defined by the Township shall be followed as applicable.														

Planned Campus Overlay (PCO)

Principal Permitted Uses: Outlined in Table 2.

Open Space Requirement: The minimum percentage of land that shall be designated as permanent open space, not to be further subdivided, and protected through a conservation easement shall be

forty percent (40%) of the total site area.

Density Calculations: Option to utilize residential densities which supersede the provisions of the underlying zoning district. The gross density for residential development within the Planned Campus Overlay shall be permitted to be designed in accordance with the following:

- RR 1.5 dwelling units per gross site acre
- RA 3.0 dwelling units per gross site acre

Route 8 Overlay

For uses, lot requirements, etc. refer to underlying zoning. The primary purpose of this overlay is to provide design standards that will lessen the visual impacts of development on the corridor and provide good traffic management and access. Standards include:

- In order to conserve the residential nature of the neighborhood in which the Route 8 Overlay occurs, an Hours of Operation Schedule defining customer visiting hours shall be submitted. At a maximum, hours shall be limited to 7:00AM to 8:00PM weekdays and 8:00AM to 5:00PM weekends (Saturday and Sunday).
- A Traffic Impact Study shall be submitted.
- Signage shall be limited to placement within the front portion of the lot abutting Route 8.
- Screening of any lot improvements other than those which are residential in nature shall be provided in accordance with Bufferyard C. Such improvements include but are not limited to parking, signage, and dumpsters.

Parking shall occur on the lot on which the use is located. Parking for non-residential purposes shall not occur within a public right-of-way. On the lot on which a use occurs, sidewalks shall be provided along any right-of-way that abuts a public street.

Supplemental Regulations

Richland Township has a number of "supplemental" regulations that help control the intensity and impacts of development upon Township land. These regulations are incorporated into both the Zoning Ordinance and the SALDO and are summarized below.

Bufferyard Highlights

Table 4, below, illustrates the following Bufferyard requirements.

Bufferyard A

No uses, buildings or structures including, but not limited to, accessory structures, parking spaces, and lighting devices, may be located closer than twenty-five (25) feet from any lot line

Bufferyard B

No uses, buildings or structures including, but not limited to, accessory structures, parking spaces, and lighting devices, may be located any closer than fifteen (15) feet to any lot line.

Bufferyard C

No uses, buildings or structures including, but not limited to, accessory structures, parking spaces, and lighting devices, may be located any closer than ten (10) feet to any lot line.

Bufferyard P

No uses, buildings or structures including, but not limited to, accessory structures, parking spaces, and lighting devices, may be located closer than sixty (60) feet from any lot line except that access drives may be located in the front bufferyard or other bufferyard.

Table 4. Required Bufferyards.
See 509.B. for information regarding existing trees

	A	B	C	P
MULTI-FAMILY				
Adjoining Single or Two Family	X			
Adjoining Multi-family		X		
Adjoining Undeveloped R	X			
Adjoining Any Commercial and MU		X		
Adjoining Any CM & M (Industrial)	X			
ALL USES IN NC and CC				
Adjoining Single or Two Family Use	X			
Adjoining Multi-family		X		
Adjoining Undeveloped R	X			
Adjoining Any Commercial and MU		X		
Adjoining Any CM & M (Industrial)			X	
ALL USES IN CM & M				
Adjoining Any R	X			
Adjoining Any Commercial and MU	X			
Adjoining Any CM & M (Industrial)			X	
ALL USES IN MU				
To be determined by the Township upon Review of lot dimensions, surrounding land uses and surrounding zoning district designations.				
ALL USES IN PCO				
Adjoining Any Other Use				X
ALL USES IN PRD				
Adjoining Any Other Use				X
Lot improvements in the RT. 8 Overlay Other than those which are residential in nature. See also 603.C.			X	

Required Parking Lot Landscaping Highlights

- To minimize impacts of excessive heat and glare, a landowner and/or developer shall provide landscaping with each parking lot with eight (8) or more parking spaces. The following required landscaping may be contained within either parking islands at the end of parking rows or parking medians.

One (1) tree shall be planted for every eight (8) parking spaces.

Resource Conservation Highlights:

To ensure public safety, minimize negative impacts of erosion and sedimentation as well as to promote the continuation of the community's historic semi-rural character, the following resources shall be conserved.

- Disturbance of streams and wetlands including conservation zones shall not occur. Road and utility crossings over streams are exempt from this provision provided that:
  - ⇒ No roadway or utility crossing exceeds one hundred (100) feet in width including paving and embankments;
  - ⇒ All road and utility crossings shall traverse streams at right angles where practical;
  - ⇒ A road and utility crossing is not located within two hundred (200) feet of another roadway crossing as measured from centerline to centerline.
  - ⇒ Road crossings shall include driveways to residential lots.
  - ⇒ Stream buffers shall be provided for new development sites as per the following requirements:
  - ⇒ A minimum stream buffer width of fifty (50) feet landward in each direction from the top of stream banks is required for all waterways having both a defined bank and a contributing watershed area of greater than one hundred (100) acres.
- A minimum stream buffer width of fifteen (15) feed landward in each direction from the centerline of the waterway is required for smaller waterways having a contributing watershed area of less than one hundred acres and greater than ten (10) acres.
- The stream buffer area should be maintained in a natural state.
- When wetland(s) extend beyond the edge of the required buffer width, the buffer shall be adjusted so that the buffer consists of the extend of the wetland plus a twenty-five (25) foot zone extending beyond the wetland edge.
- Stream buffer averaging may be applied to account for encroachments such as road crossings.
- The total width of the buffer shall not be less than twenty-five (25) feet at any location, except at approved stream crossings. Those areas of the buffer having a minimum width of twenty-five (25) feed (or less at approved stream crossings) can comprise no more than fifty (50) percent of the buffer length.

Floodplain Restriction Highlights:

- No subdivision or land development, or part thereof, shall be approved if the proposed development or improvements will individually or collectively, increase the one-hundred-year flood elevation more than one foot at any point.
- Building sites for residences or any other type of dwelling or accommodation shall not be permitted in any floodway area. Sites for those uses may be permitted outside the floodway area

in a Floodplain Area if the lowest floor (including basement) is elevated to the regulatory flood elevation. If fill is used to raise the elevation of a site, the fill area shall extend laterally for a distance of at least 15 feet beyond the limits of the proposed structures.

- Building sites for structures or building other than for residential uses shall not be permitted in any floodway area. However, the Board of Supervisors may allow the subdivision or development of areas or sites for commercial and industrial uses at an elevation below the regulatory flood elevation if the developer otherwise protects the area to that height or assures that the buildings or structures.

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SECTION II

DEVELOPMENT SCENARIO METHODOLOGY

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CommunityViz Scenario 360 is GIS-based decision support software for planners and resource managers. It is an ArcGIS® extension that adds interactive analysis tools and a decision-making framework to the ArcGIS platform. Scenario 360 helps you view, analyze and understand land-use alternatives and impacts." (http://placeways.com/communityviz/). CommunityViz allows land use planners and other professionals to evaluate development scenarios based on current and proposed land uses regulations. Users can input regulations such as type of use (residential, commercial, etc.), density, setbacks, and other requirements to assist in determining potential impacts on a community from future land use changes. It can help municipal officials make educated decisions regarding future land use.

The CommunityViz build-out analysis allows for the creation of models showing various development scenarios based upon existing conditions using a certain set of assumptions including existing land use regulations (e.g., zoning) and environmental constraints. The emphasis of this type of analysis is to estimate new residential development and the municipality's capacity or ability to meet those future needs or implement land use goals such as land preservation and conservation.

Development Scenario Methodology

The Pine Creek Watershed Build-Out Analysis was completed by preparing a series of development scenarios for three (3) subwatersheds (North Fork Pine Creek, Montour Run, and Willow Run), which span Pine Township and Richland Township in northern Allegheny County. The build-out process utilized Geographic Information Systemsm ESRI's ArcGIS and CommunityViz software, to illustrate the impact of the various development scenarios. Data for the analysis was provided by the North Area Environmental Council (NAEC) and the North Hills COG. The primary geographic data sets that were used for each scenario include the parcel coverage, building footprints, zoning districts, and development constraint data.

Step 1. Preparation of Data for Build-Out Analysis

The first step included gathering and preparing the data to be used for the development scenarios.

A. Parcel Dataset Preparation

i. The parcel shapefile (Allegheny County, 2008) was clipped to only include the parcels that are within the three (3) subwatersheds in Pine Township and Richland Township.

ii. Existing building footprint data (Allegheny County, 2008) was added.

iii. Each parcel was assigned a zoning classification based on current zoning district maps (Pine Township and Richland Township).

iv. For each zoning district, the minimum lot size was determined based on current zoning ordinances and then multiplied by two (2) to determine the threshold for parcels that are too small to be subdivided.

v. Parcels that had both an existing structure and were smaller than the threshold for each zoning district were removed from the dataset as they were deemed "built-out."

vi. The remaining parcels were considered to be developable (labeled "nonbuilt" in the build-out scenario tables). These include parcels that have existing structures but can be further subdivided based on current zoning regulations.

B. Gather Development Constraints Layers

The following layers were used as development constraints in order to determine the buildable area within the appropriate development scenarios.

i. Agricultural Security Areas (Allegheny County, 2006)

ii. Allegheny Land Trust (ALT) Greenprint (protected lands) – includes public parks and other permanently protected open space

iii. Allegheny Land Trust (ALT)Greenprint (unprotected lands) – includes lands that contribute to scenic character (land that can be seen from major highways and trails); lands that harbor biodiversity (biological diversity areas, quality watersheds based on a study completed by Carnegie Mellon University); and lands that help manage stormwater (woodlands, forested areas)

iv. Existing Building Footprints (Allegheny County, 2008)

v. Lakes and Ponds Buffer(Allegheny County LiDAR, 2008) Pine Township – this layer was created based on Pine Township's zoning regulations that no development can take place within 50' of a body of water

vi. Lakes and Ponds Buffer (Allegheny County LiDAR, 2008) Richland Township – this layer was created based on Richland Township's zoning regulations that no development can take place within 25' of a body of water

vii. Natural Heritage Inventory (Allegheny County, 2000) – there are no biological diversity areas (BDA) within the subwatersheds

viii. NWI Wetlands Buffer, Pine Township (PASDA, 2000) – this layer was created based on Pine Township's zoning regulations that no development can take place within 50' of the stream centerline

ix. NWI Wetlands Buffer, Richland Township (PASDA, 2000) – this layer was created based on Richland Township's zoning regulations that no development can take place within 25' of the stream centerline

x. Prime Agricultural Soils (Allegheny County, 1995)

xi. Red Bed Soils (Allegheny County, unknown)

xii. Slopes 25% or Greater (Allegheny County, 2010) – based on both Township's zoning regulations which restrict development on slopes 25% or greater. *Note: there are methods in which development can occur on such slopes but for build-out purposes, 25% was used as a threshold for no development.*

xiii. Stream Buffer, 50' (Allegheny County LiDAR, 2008) – this layer was created based on Pine Township and Richland Township's zoning regulations that no development can take place within 50' of the stream centerline

xiv. Stream Buffer, 150' (Allegheny County LiDAR, 2008) – this layer was created based on conservation practices that recommend a 150' buffer along streams (from the centerline) to protect riparian areas and habitat

Step 2. Determine the Parameters of the Development Scenarios

As agreed upon with North Area Environmental Council (NAEC), maximum build-outs for residential dwelling units were developed for each of the following development scenarios.

A. Development Scenario 1 – Existing zoning regulations

i. Existing zoning regulations were used for Pine Township and Richland Township. Scenario 1 reflects the maximum build-out of all parcels in the watersheds after applying the following development constraints:

a. Steep Slopes 25% or greater

b. Stream Buffers, 50'

c. Lakes/Ponds Buffers, 50' in Pine Township and 25' in Richland Township

d. NWI Wetland Buffers, 50' in Pine Township and 25' in Richland Township)

e. ALT Greenprint (protected lands)

B. Development Scenario 2 –Existing zoning regulations with ALT Greenprint (unprotected lands)

i. Existing zoning regulations were used for Pine Township and Richland Township. Scenario 2 reflects the maximum build-out of all parcels in the watersheds after applying the following development constraints:

a. Steep Slopes 25% or greater

b. Stream Buffers, 50'

c. Lakes/ Ponds Buffers, 50' in Pine Township and 25' in Richland Township

d. NWI Wetland Buffers, 50' in Pine Township and 25' in Richland Township)

e. ALT Greenprint (protected lands)

f. ALT Greenprint (unprotected lands)

C. Development Scenario 3 – Existing zoning regulations: traditional residential development versus conservation subdivisions

Scenario 3A – Baseline

i. Traditional residential development principles were applied to all parcels (table displays <10 acres and 10+ acre parcels) and greater to generate a baseline for development

Scenario 3B – 30%

i. Traditional residential development principles were applied to 70% of the parcels 10 acres and greater and conservation subdivision principles to 30% of the parcels 10 acres and greater

Scenario 3C – 60%

i. Traditional residential development principles were applied to 40% of the parcels 10 acres and greater and conservation subdivision principles to 60% of the parcels 10 acres and greater

Scenario 3D – 90%

i. Traditional residential development principles were applied to 10% of the parcels 10 acres and greater and conservation subdivision principles to 90% of the parcels 10 acres and greater

Conservation subdivision principles:

a. *Only parcels at least 10 acres in size were used, based on the assumption that smaller parcels would not yield a benefit from a density increase.*
b. *Required the preservation of 50% of the total acreage of the parcel, prior to the removal of development constraints*
c. *Increased the maximum dwelling unit density by 20% for each parcel based on current zoning regulations for each district*
d. *Decreased the minimum separation distance by 50%*
e. *Decreased the front yard setback by 50%*

The following development constraints were removed to determine the buildable land:

a. *Steep slopes 25% or greater*
b. *Stream buffers, 50'*
c. *Lakes/ponds buffers, 50' in Pine Township and 25' in Richland Township*
d. *NWI wetland buffers, 50' in Pine Township and 25' in Richland Township)*
e. *ALT Greenprint (protected lands)*

The additional land preserved was calculated as follows:

a. *Divide the total parcel acreage in half*
b. *Subtract the undevelopable land (per constraints)*
c. *The result is the additional land preserved as a result of developing the parcel as a conservation subdivision instead of using traditional development principles*

Development Scenario 4 –Existing zoning regulations with maximum preservation

i. Existing zoning regulations were used for Pine Township and Richland Township, Scenario 4 reflects the maximum build-out of all parcels in the watersheds after applying the following development constraints:

   a. Steep Slopes 25% or greater

   b. Stream Buffers, 50'

   c. Lakes/Ponds Buffers, 50' in Pine Township and 25' in Richland Township

   d. NWI Wetland Buffers, 50' in Pine Township and 25' in Richland Township)

   e. ALT Greenprint (protected lands)

   f. ALT Greenprint (unprotected lands)

   g. Agricultural Security Areas (ASA)

   h. Prime Agricultural Farmland

   i. Red Bed Soils

   j. 150' Stream Buffers (from centerline)

Scenario 4A – Traditional Development

i. Traditional residential development principles were applied to all of the parcels

Scenario 4B – Traditional Development and Conservation Subdivision

i. Traditional residential development principles were applied to all of the parcels that were less than 10 acres and conservation subdivision principles were applied to all of the parcels that were 10 acres and greater

Step 3. Run the Development Scenarios through the CommunityViz Build-Out Wizard

Each of the development scenarios was run through the CommunityViz Build-Out Wizard, as detailed below.

A. Numeric Build-Out

i. **Base Layer:** The "buildable" parcel file, with "built-out" parcels removed, was used as the baseline.

ii. **Designation:** Zoning classifications for each parcel was used as the attribute.

iii. **Density Rules:** For each zoning district, the following density rules were applied:

   a. Residential, Pine Township – minimum lot sizes per the zoning ordinance

   b. Residential, Richland Township – maximum dwelling units (DU) per acre for the base zoning district, not accounting for a Planned Residential Development (PRD)

i. E1 Pine – 3 acres

ii. R1 Pine – 1 acre

iii. R2 Pine – 0.75 acres

iv. R3 Pine – 0.5 acres

v. S1 Pine – 2 acres

vi. RR Richland – 0.54 DU per acre

vii. RA Richland – 1.09 DU per acre

viii. RL Richland – 1.45 DU per acre

ix. RM Richland – 2.18 DU per acre

c. Non-Residential – estimated the floor area ratio (FAR) using maximum building height, minimum lot size, and building setbacks (front, side, and rear)

i. B1 Pine – 1.13 FAR

ii. C1 Pine – 1.71 FAR

iii. C2 Pine – 1.51 FAR

iv. CM Richland – 0.75 FAR

v. NC Richland – 0.77 FAR

vi. M Richland – 0.9 FAR

iv. **Efficiency:** Assumed 90% efficiency for each zoning district to allow for 10% of the lot to be used for right-of-way (roadways, infrastructure easements, etc.)

v. **Building Information:** Assumed one (1) dwelling unit per building, based on current zoning ordinance regulations

vi. **Development Constraints:** The following development constraints were applied to Development Scenario 1:

a. Building Footprint

b. ALT Greenprint (protected)

c. Stream Buffer (50' in Pine and 25' in Richland)

d. Lake/Pond Buffer (50' in Pine and 25' in Richland)

e. NWI Wetland Buffer (50' in Pine and 25' in Richland)

vii. **Existing Buildings:** Existing buildings were removed from the development capacity of a parcel

B. Spatial Build-Out Layout

i. **Minimum Building Separation:** The existing side yard setbacks were doubled within each zoning district to ensure new buildings met the setback requirements

ii. Minimum Building Separation (in feet)

a. E1 Pine – 80

b. R1 Pine – 40

c. R2 Pine – 30

d. R3 Pine – 20

e. S1 Pine – 60

f. RR Richland – 80

g. RA Richland – 50

h. RL Richland – 30

i. RM Richland – 30

j. B1 Pine – 50

k. C1 Pine – 30

l. C2 Pine – 50

m. CM Richland – 100

n. NC Richland – 70

o. M Richland – 100

iii. Front Yard Setback (in feet)

a. E1 Pine – 60

b. R1 Pine – 40

c. R2 Pine – 30

d. R3 Pine – 25

e. S1 Pine – 50

f. RR Richland – 100

g. RA Richland – 50

h. RL Richland – 50

i. RM Richland – 50

j. B1 Pine – 20

k. C1 Pine – 50

l. C2 Pine – 50

m. CM Richland – 50

n. NC Richland – 50

o. M Richland – 30

iv. **Layout Pattern:** A grid pattern was chosen for all development scenarios; however, the new structures appear on the maps in a random pattern due to the small setbacks used.

v. **Setback:** The front yard setback was used for all zoning districts

Step 4: Analysis of Development Scenario Build-Out Results

CommunityViz Build-Out Wizard was applied to each development scenario in order to generate the following analysis:

A. Total Land Area (acres)

i. The total land area zoned residential and nonresidential in the watershed.

B. Nonbuilt (acres)

i. The total amount of land available for development after the "built-out" parcels had been removed.

C. Existing Homes/Structures

i. The total number of principal structures in existence in the watershed.

D. Buildable Area (acres)

i. The total amount of land that is able to be developed after the built-out parcels and constraints had been removed.

E. New Homes/Structures

i. The total number of new principal structures that can be built according to the development scenario.

ii. New residential structures represent one (1) dwelling unit each.

F. Undevelopable Area (acres)

i. The total amount of land that is unable to be developed due to the development constraints applied within each development scenario.

G. Additional Open Space Preserved (acres)

i. The total amount of land that would be preserved as a result of applying conservation subdivision principles (must preserve 50% of total acreage—includes constraints—and a 20% dwelling unit density increase).

ii. Only applicable for Scenarios 3B, 3C, 3D, and 4B.

iii. In Scenario 4B, the additional open space preserved, as shown in the table, is the acreage above and beyond what would be required by the conservation subdivision principles (50% of each parcel required to be set aside as open space) but would be preserved due the additional development constraints used in Scenario 4 as compared to Scenario 3.

H. Additional Homes

i. The increase in single family homes that would be developed as a result of applying conservation subdivision principles rather than traditional development principles to the parcels that are 10 acres or greater.

ii. Only applicable for Scenarios 3B, 3C, 3D, and 4B.

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SECTION III

DEVELOPMENT SCENARIO RESULTS

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DEVELOPMENT SCENARIO 1

Maximum build-out uisng existing zoning regulations.

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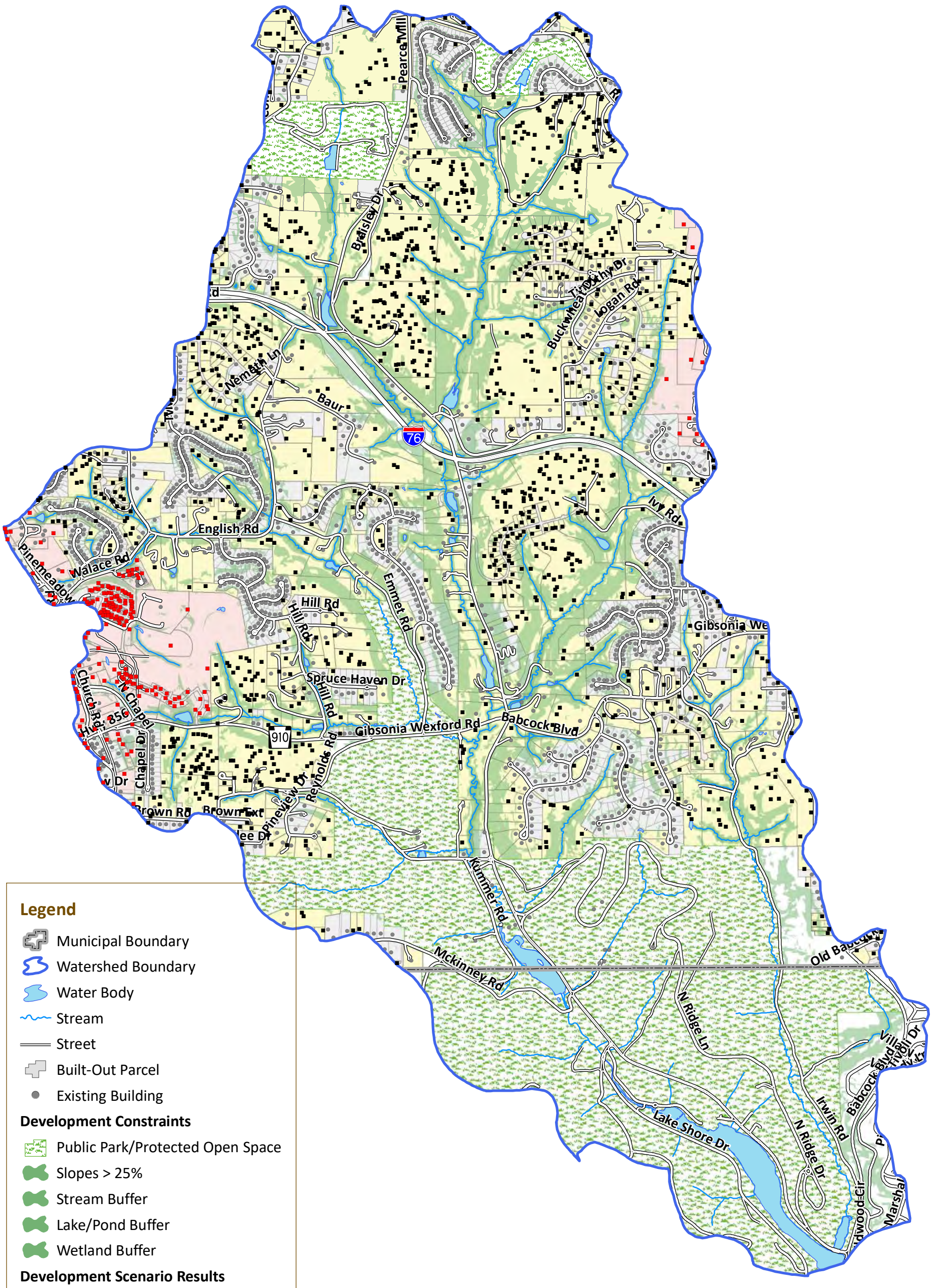
S

0 1,000 2,000
Feet

Pine Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Non-Residential Structure
- New Residential Structure

North Fork Pine Creek Watershed
Map 1.1—Development Scenario 1

DEVELOPMENT SCENARIO 2

Maximum build-out uisng existing zoning regulations and adding the ALT Greenprint (unprotected lands) to the development constraints.

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Feet

Pine Township

Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer
- ALT Greenprint (unprotected lands)

Development Scenario Results

- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Non-Residential Structure
- New Residential Structure

North Fork Pine Creek Watershed
Map 1.2—Development Scenario 2

DEVELOPMENT SCENARIO 3A

Maximum build-out uisng existing zoning regulations applied to all parcels 10+ acres.

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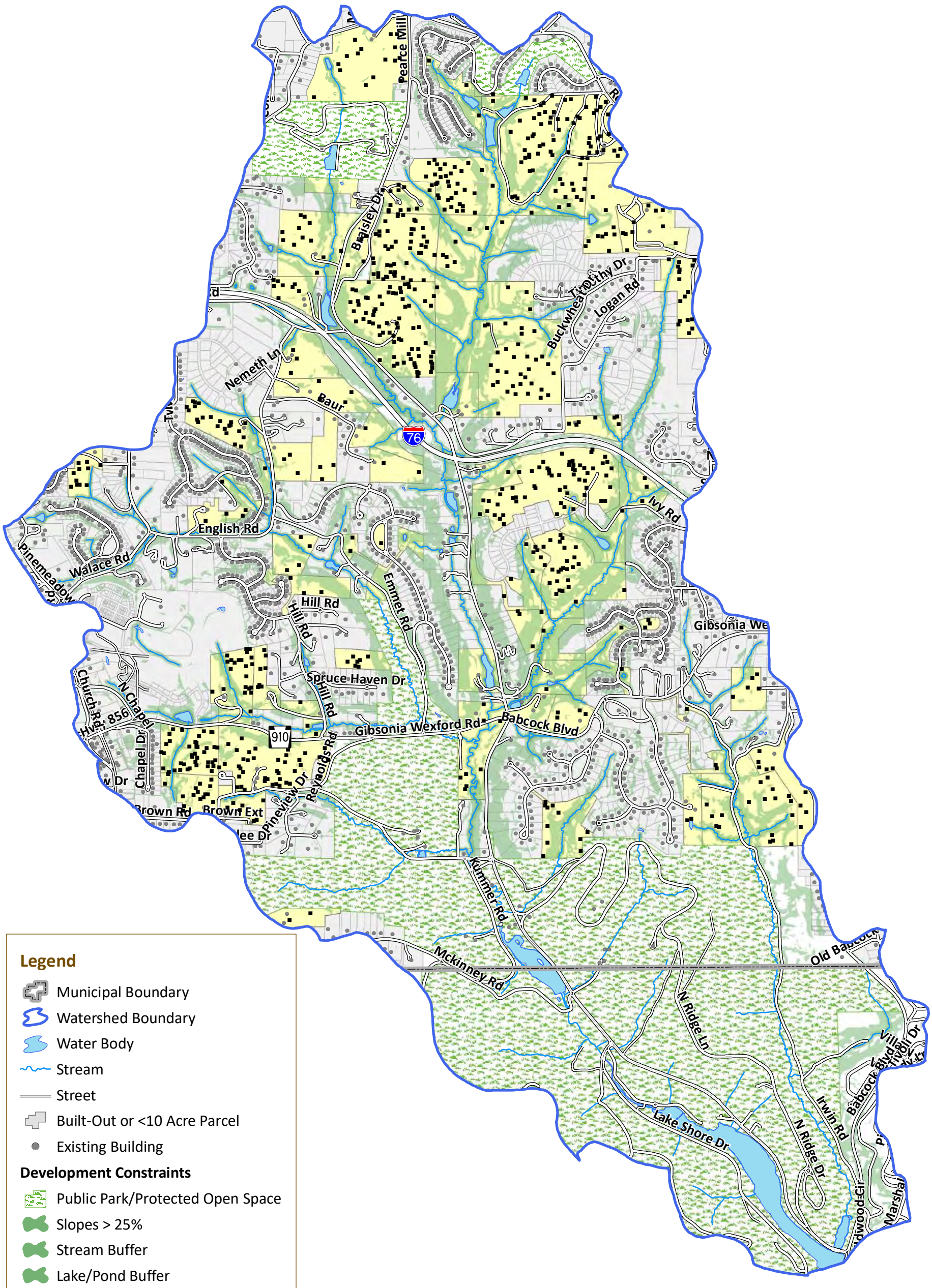
Feet

Pine Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres
- New Residential Structure

North Fork Pine Creek Watershed
Map 1.3A—Development Scenario 3A

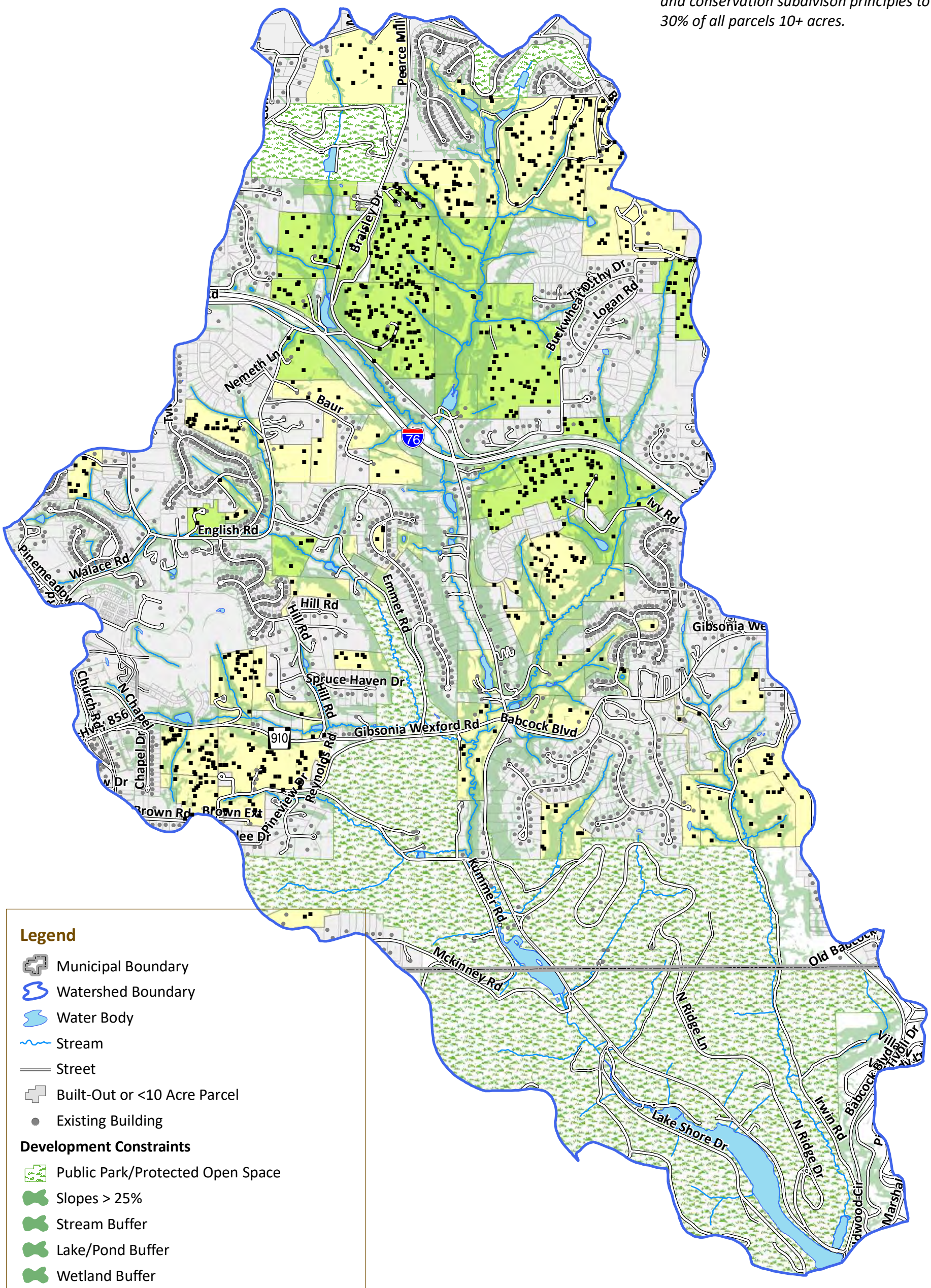
DEVELOPMENT SCENARIO 3B

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 70% of all parcels 10+ acres and conservation subdivison principles to 30% of all parcels 10+ acres.

N
W E
S

0 1,000 2,000
Feet

Pine Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

North Fork Pine Creek Watershed
Map 1.3B—Development Scenario 3B

DEVELOPMENT SCENARIO 3C

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 40% of all parcels 10+ acres and conservation subdivison principles to 60% of all parcels 10+ acres.

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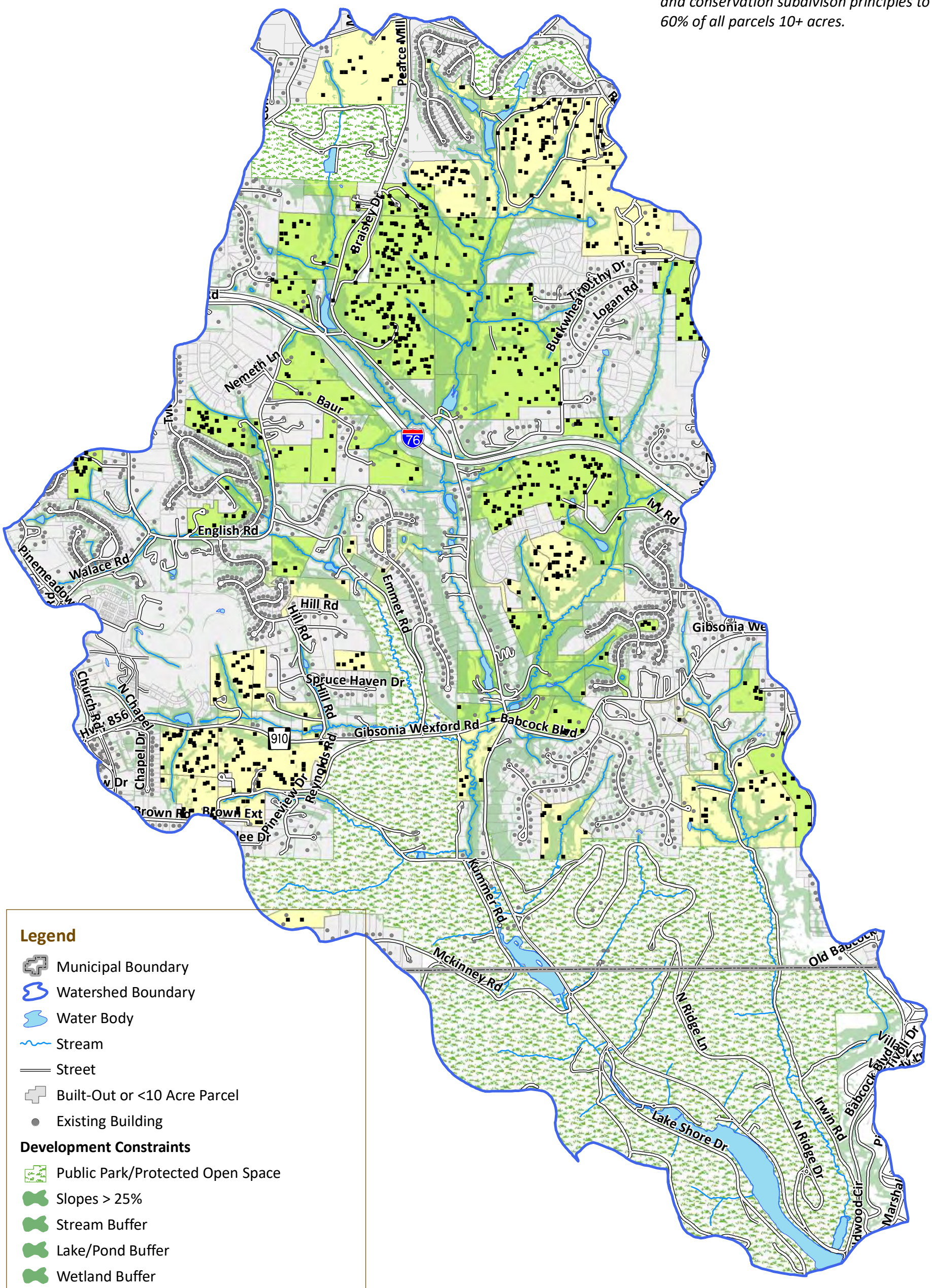
Pine Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

North Fork Pine Creek Watershed
Map 1.3C—Development Scenario 3C

DEVELOPMENT SCENARIO 3D

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 10% of all parcels 10+ acres and conservation subdivison principles to 90% of all parcels 10+ acres.

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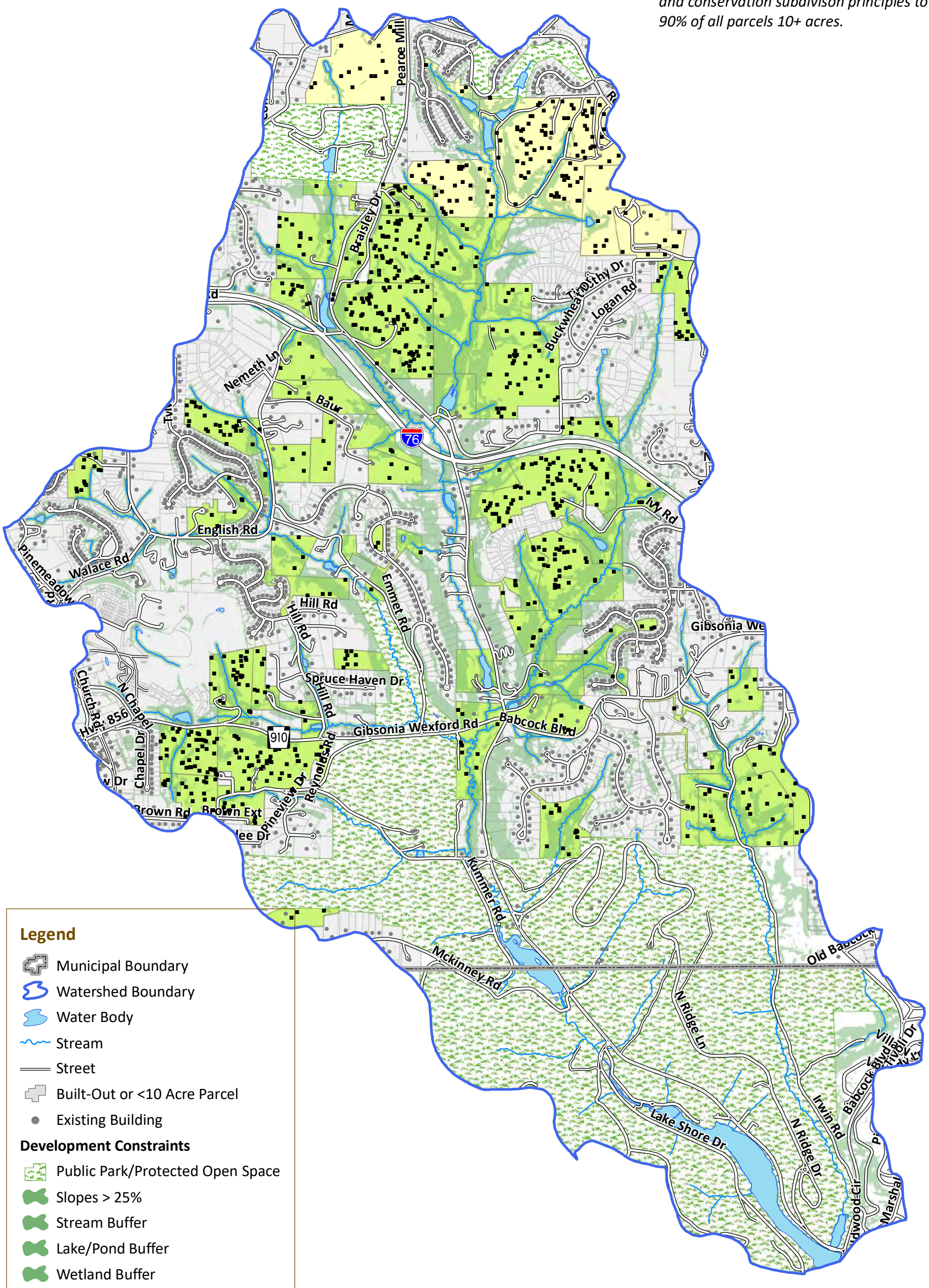

Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Residential Structure

North Fork Pine Creek Watershed
Map 1.3D—Development Scenario 3D

DEVELOPMENT SCENARIO 4A

Maximum build-out uisng existing zoning regulations and adding the ALT Greenprint (unprotected lands), Agricultural Security Areas (ASA), Prime Agricultural Soils, Red Bed Soils, and 150' Stream Buffers (from centerline) to the development constraints.

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Pine Township

North Fork Pine Creek Watershed
Map 1.4A—Development Scenario 4A

DEVELOPMENT SCENARIO 4B

Maximum build-out uisng existing zoning regulations, applying conservation subdivision principles to all parcels 10+ acres and adding the ALT Greenprint (unprotected lands), Agricultural Security Areas (ASA), Prime Agricultural Soils, Red Bed Soils, and 150' Stream Buffers (from centerline) to the development constraints.

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Pine Township

Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Lake/Pond Buffer
- Wetland Buffer
- ALT Greenprint (unprotected lands)
- Agricultural Security Areas (ASA)
- Prime Agricultural Soils
- Red Bed Soils
- 150' Stream Buffer

Development Scenario Results

- Buildable Commercial Parcel
- Parcel <10 Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

North Fork Pine Creek Watershed
Map 1.4B—Development Scenario 4B

DEVELOPMENT SCENARIO 1

Maximum build-out using existing zoning regulations.

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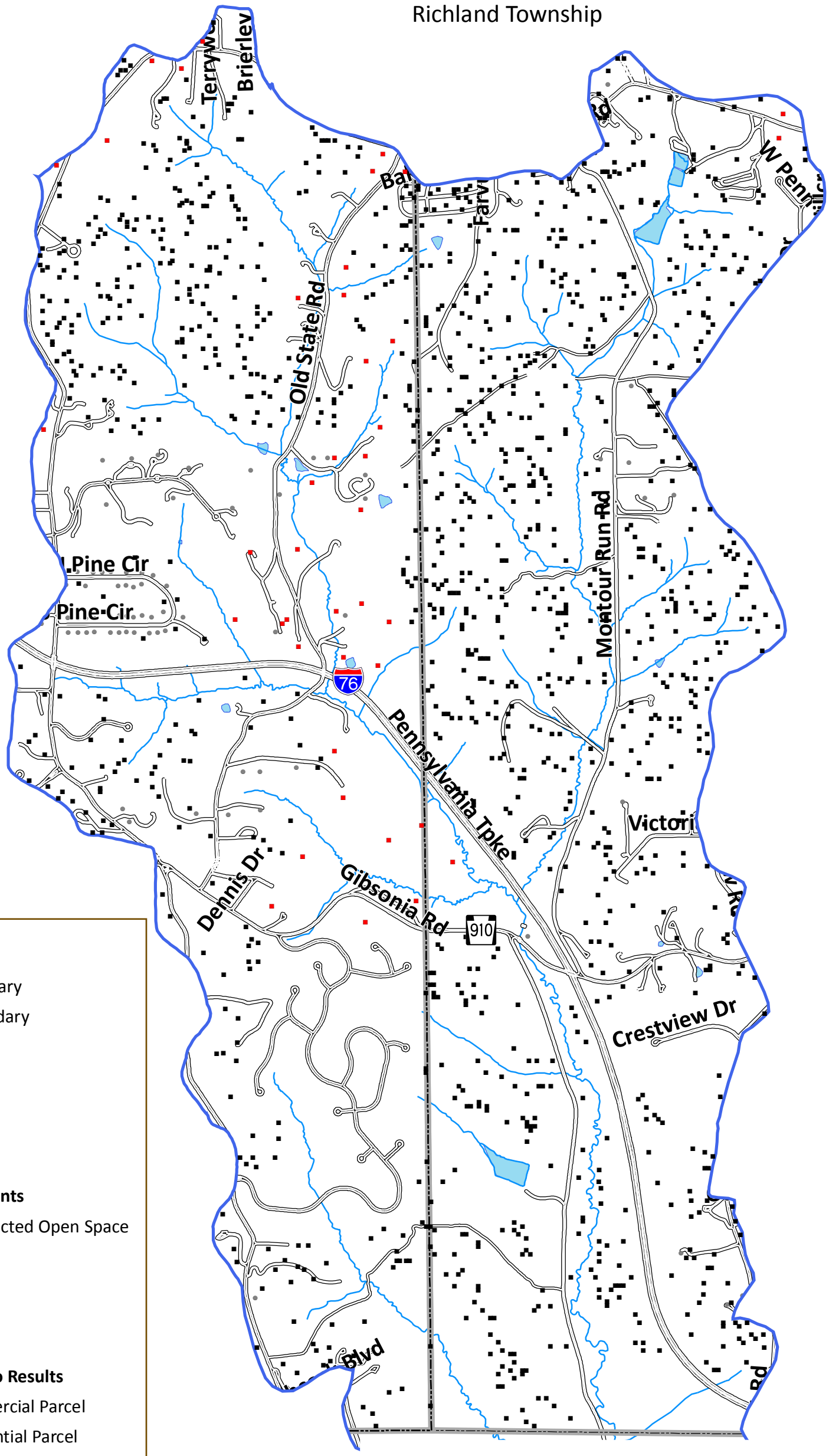
Pine Township

Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

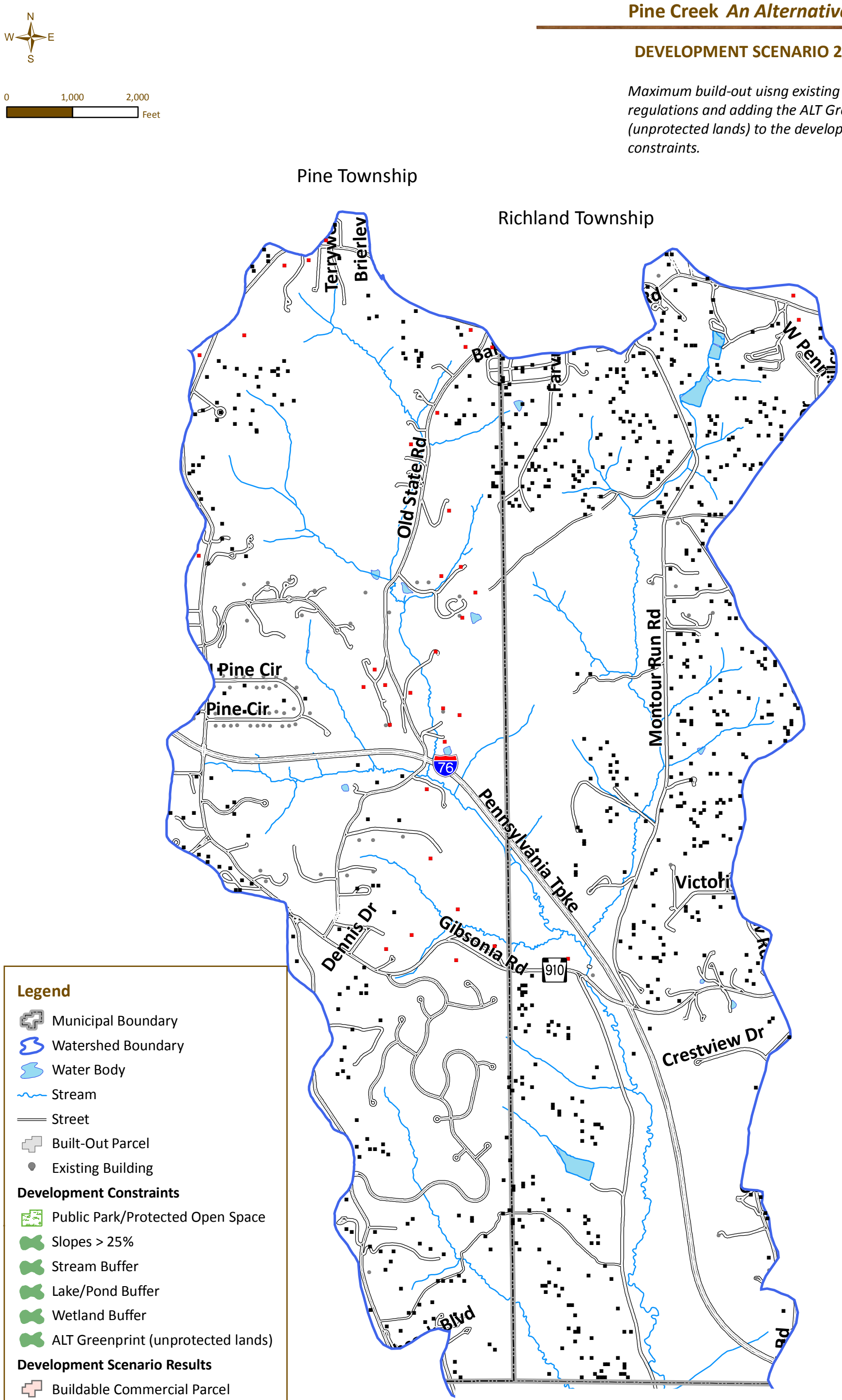
Development Scenario Results

- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Non Residential Structure
- New Residential Structure

Montour Run Watershed
Map 2.1—Development Scenario 1

DEVELOPMENT SCENARIO 2

Maximum build-out uisng existing zoning regulations and adding the ALT Greenprint (unprotected lands) to the development constraints.



Montour Run Watershed
Map 2.2—Development Scenario 2

DEVELOPMENT SCENARIO 3A

Maximum build-out uisng existing zoning regulations applied to all parcels 10+ acres.

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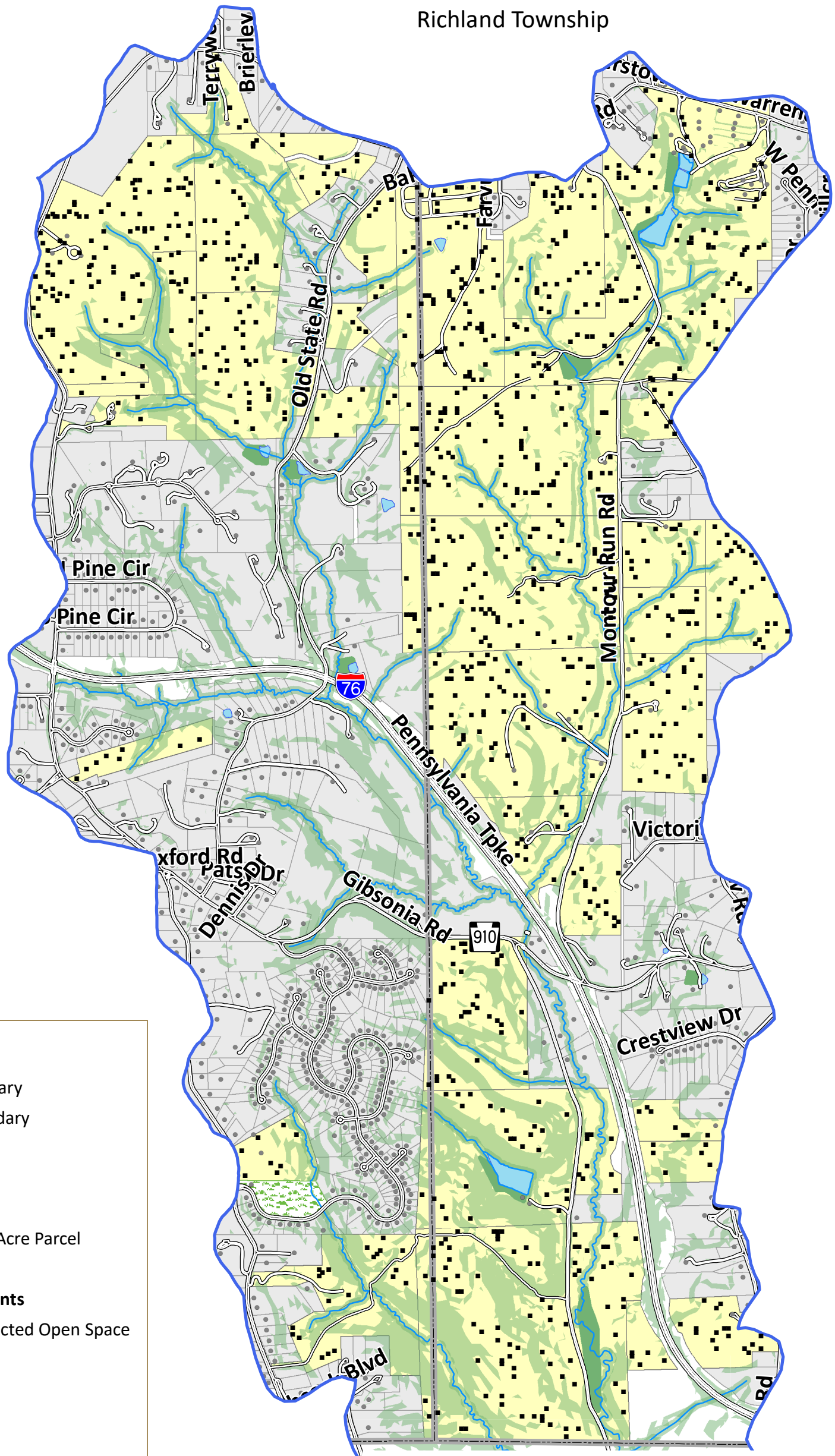
Pine Township

Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres
- New Residential Structure

Montour Run Watershed
Map 2.3A—Development Scenario 3A

DEVELOPMENT SCENARIO 3B

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 70% of all parcels 10+ acres and conservation subdivison principles to 30% of all parcels 10+ acres.

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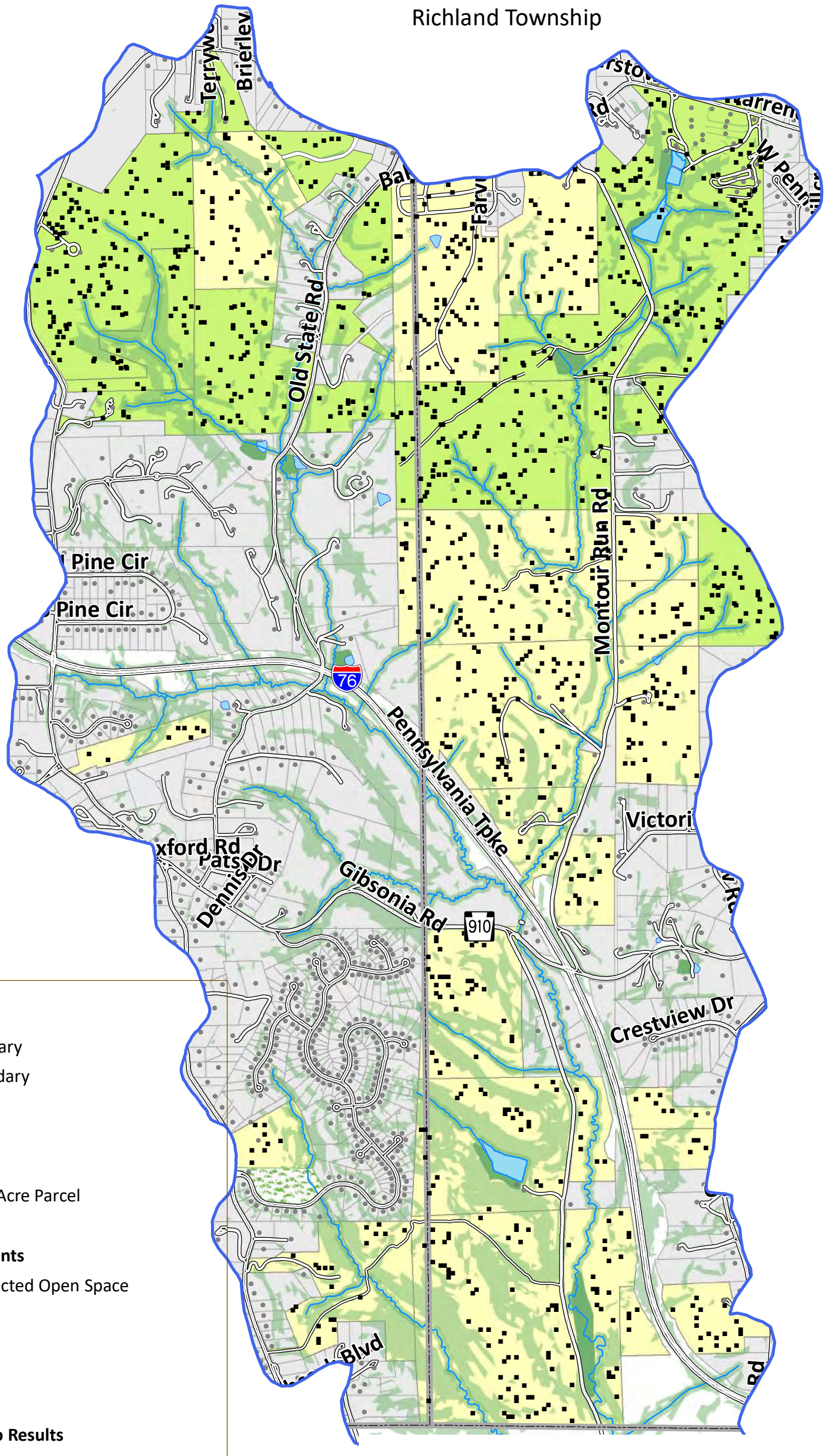
Pine Township

Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

Montour Run Watershed
Map 2.3B—Development Scenario 3B

DEVELOPMENT SCENARIO 3C

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 40% of all parcels 10+ acres and conservation subdivison principles to 60% of all parcels 10+ acres.

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Pine Township

Richland Township

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Pine Cir
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Pennsylvania Tpke
Montour Run Rd
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Victori
xford Rd
Patsy Dr
Dennis Dr
Gibsonia Rd
910
Crestview Dr
Blvd
Rd

Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

Montour Run Watershed
Map 2.3C—Development Scenario 3C

DEVELOPMENT SCENARIO 3D

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 10% of all parcels 10+ acres and conservation subdivison principles to 90% of all parcels 10+ acres.

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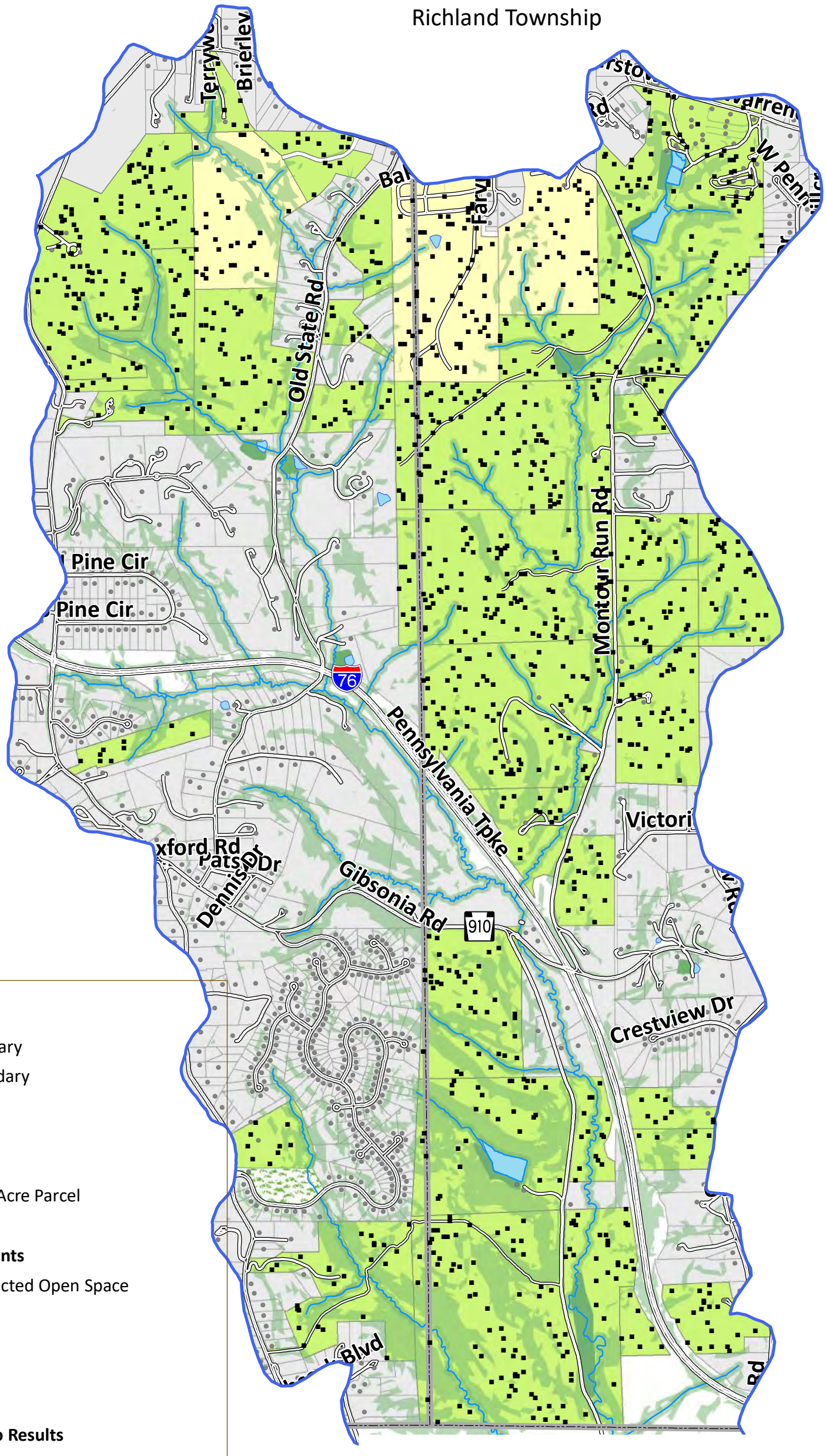
Pine Township

Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

Montour Run Watershed
Map 2.3D—Development Scenario 3D

DEVELOPMENT SCENARIO 4A

Maximum build-out uisng existing zoning regulations and adding the ALT Greenprint (unprotected lands), Agricultural Security Areas (ASA), Prime Agricultural Soils, Red Bed Soils, and 150' Stream Buffers (from centerline) to the development constraints.

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Pine Township

Richland Township

Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Lake/Pond Buffer
- Wetland Buffer
- ALT Greenprint (unprotected lands)
- Agricultural Security Areas (ASA)
- Prime Agricultural Soils
- Red Bed Soils
- 150' Stream Buffer

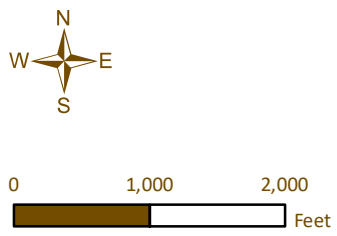
Development Scenario Results

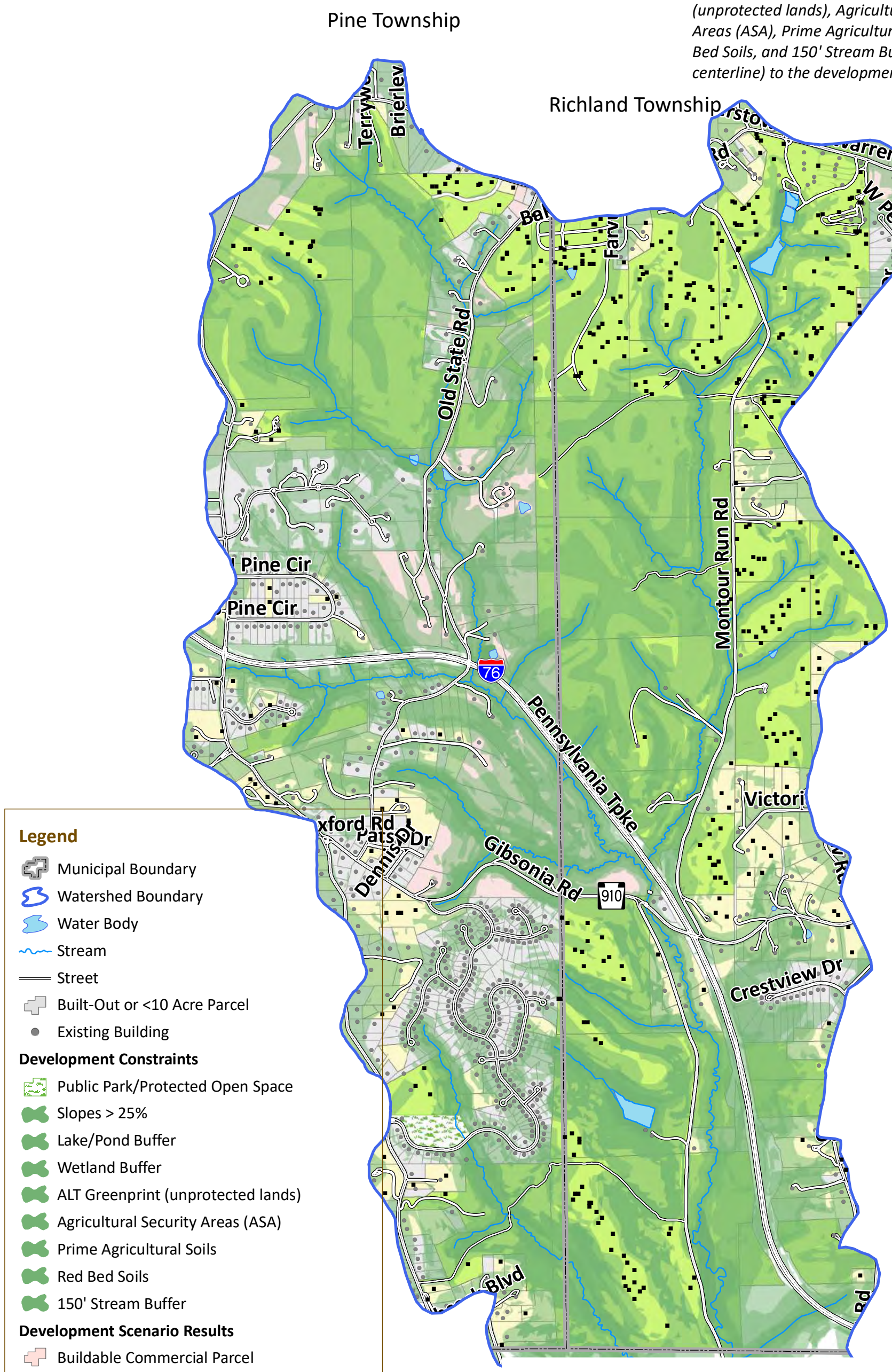
- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Non-Residential Structure
- New Single Family Residential

Montour Run Watershed
Map 2.4A—Development Scenario 4A

DEVELOPMENT SCENARIO 4B

Maximum build-out uisng existing zoning regulations, applying conservation subdivision principles to all parcels 10+ acres and adding the ALT Greenprint (unprotected lands), Agricultural Security Areas (ASA), Prime Agricultural Soils, Red Bed Soils, and 150' Stream Buffers (from centerline) to the development constraints.





Montour Run Watershed
Map 2.4B—Development Scenario 4B

DEVELOPMENT SCENARIO 1

Maximum build-out using existing zoning regulations.

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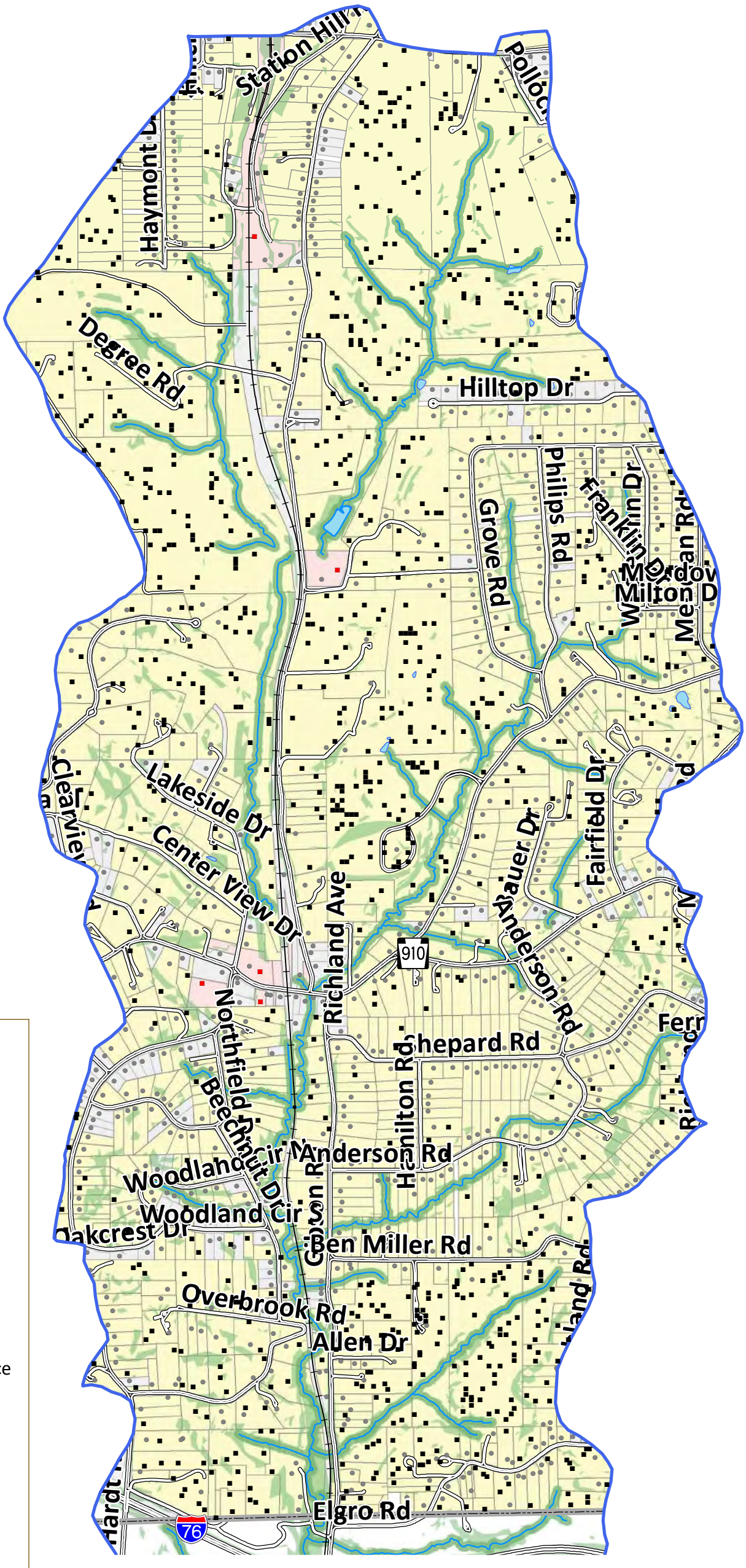
Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Non Residential Structure
- New Residential Structure

Willow Run Watershed
Map 3.1—Development Scenario 1

DEVELOPMENT SCENARIO 2

Maximum build-out uisng existing zoning regulations and adding the ALT Greenprint (unprotected lands) to the development constraints.

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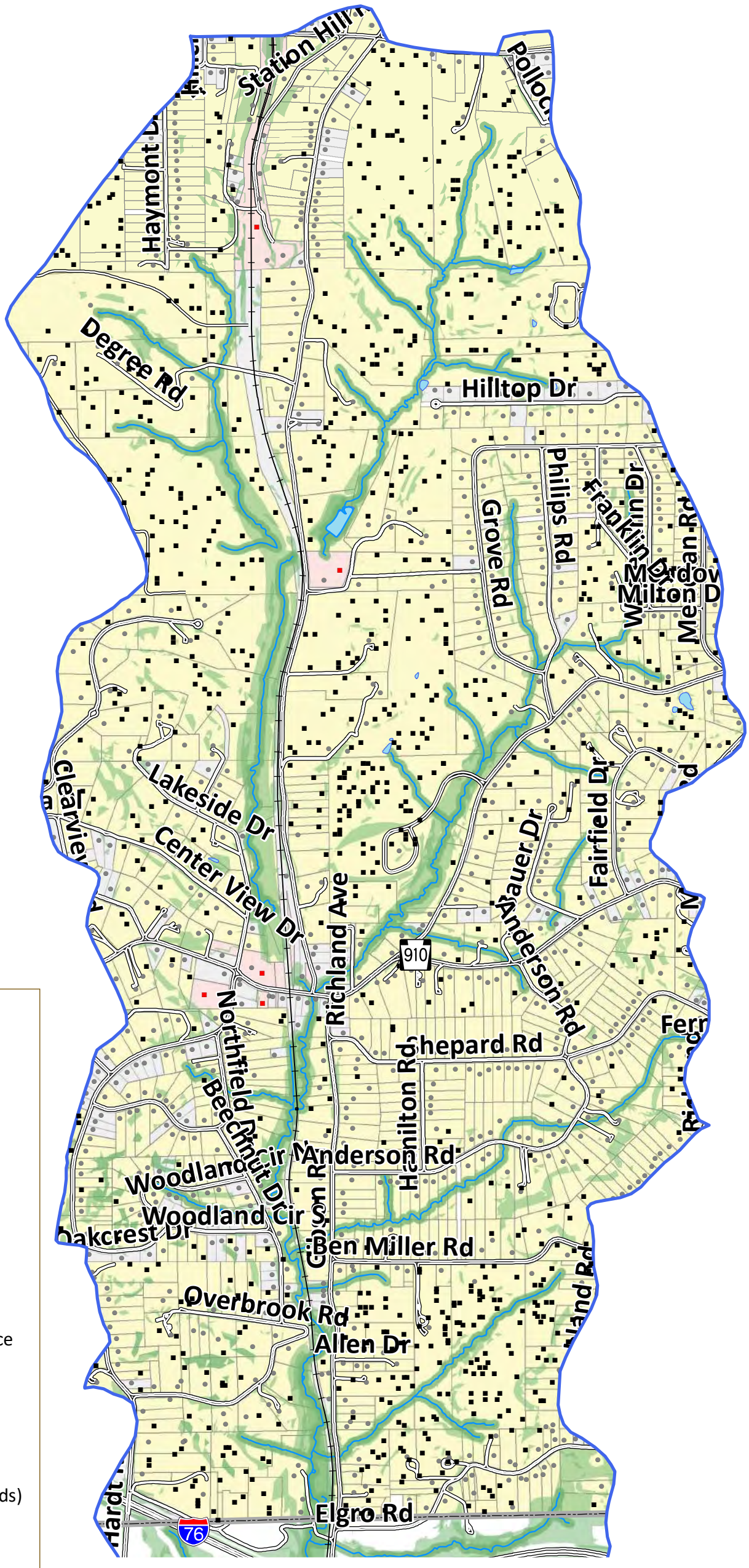

Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer
- ALT Greenprint (unprotected lands)

Development Scenario Results

- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Non-Residential Structure
- New Single Family Residential

Willow Run Watershed
Map 3.2—Development Scenario 2

DEVELOPMENT SCENARIO 3A

Maximum build-out uisng existing zoning regulations applied to all parcels 10+ acres.

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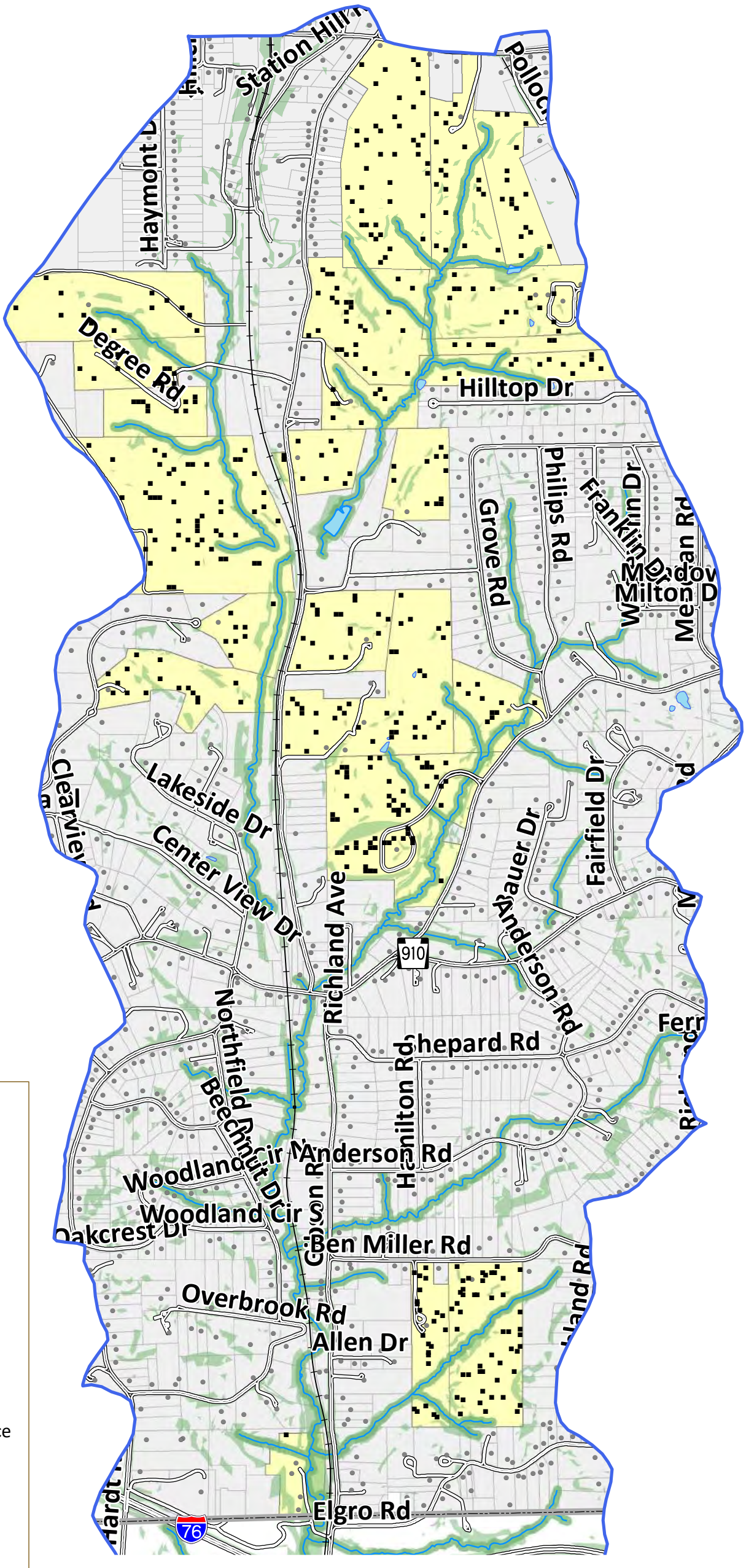
Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres
- New Residential Structure

Willow Run Watershed
Map 3.3A—Development Scenario 3A

DEVELOPMENT SCENARIO 3B

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 70% of all parcels 10+ acres and conservation subdivison principles to 30% of all parcels 10+ acres.

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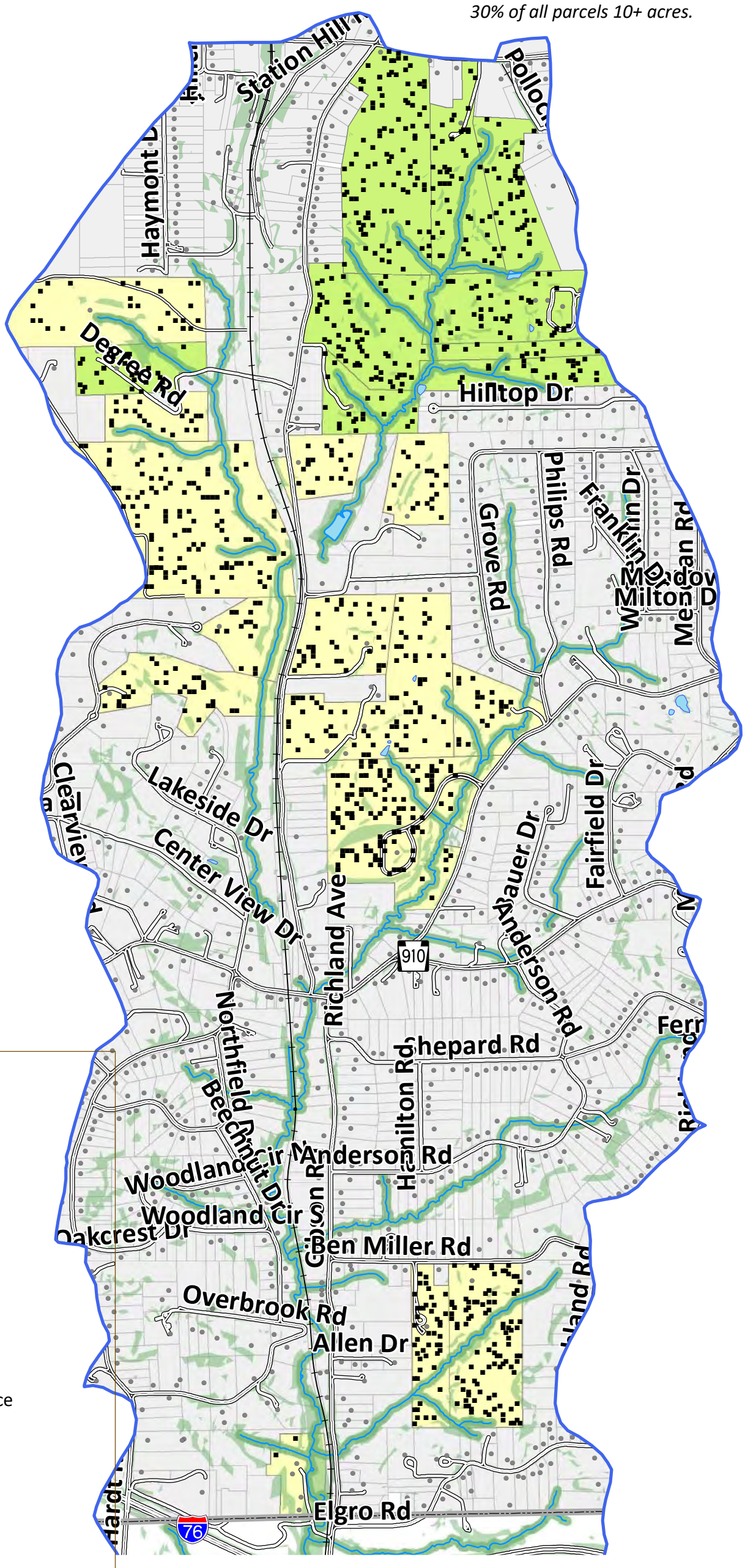
Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

Willow Run Watershed
Map 3.3B—Development Scenario 3B

DEVELOPMENT SCENARIO 3C

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 40% of all parcels 10+ acres and conservation subdivison principles to 60% of all parcels 10+ acres.

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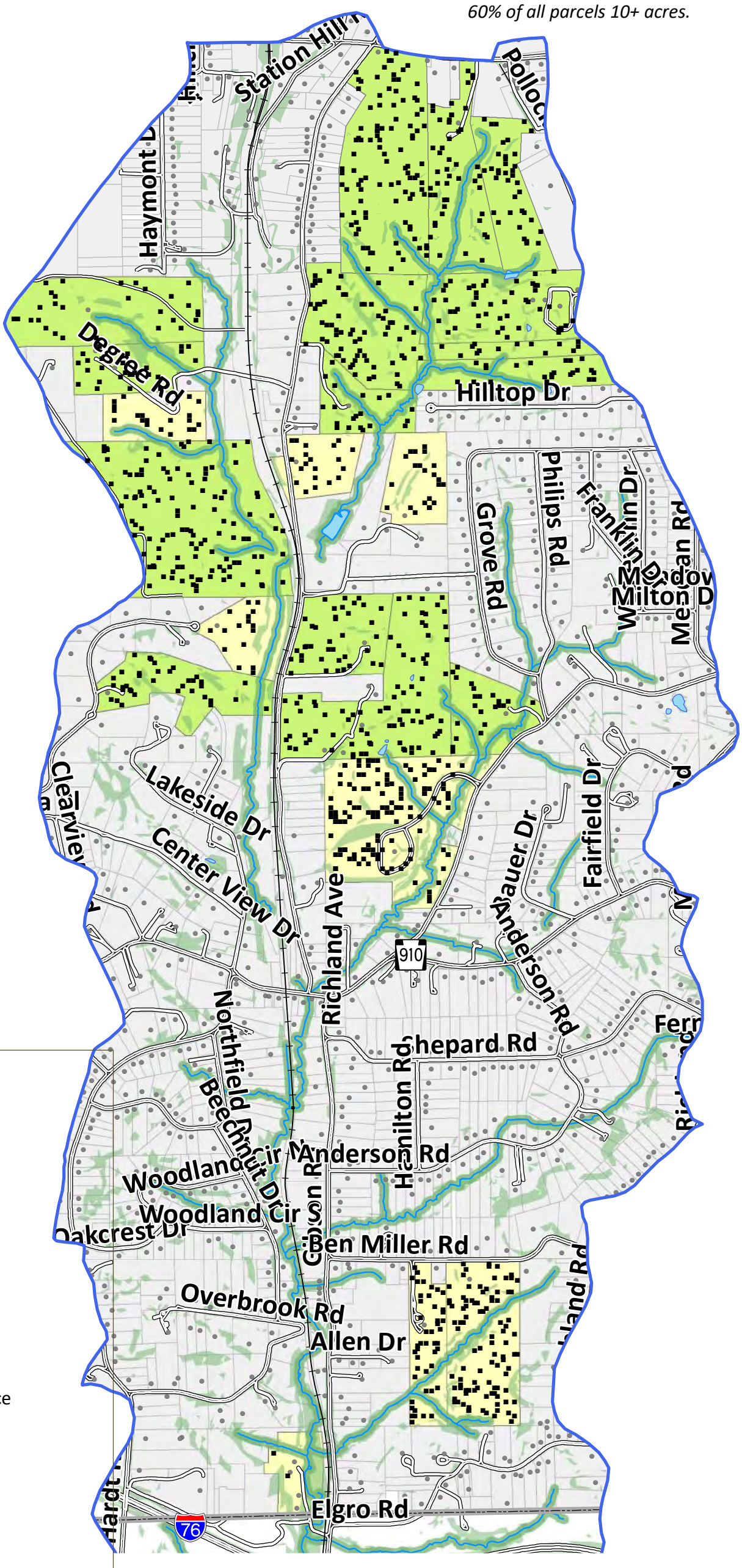
Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

Willow Run Watershed
Map 3.3C—Development Scenario 3C

DEVELOPMENT SCENARIO 3D

Maximum build-out uisng existing zoning regulations, applying traditional development principles to 10% of all parcels 10+ acres and conservation subdivison principles to 90% of all parcels 10+ acres.

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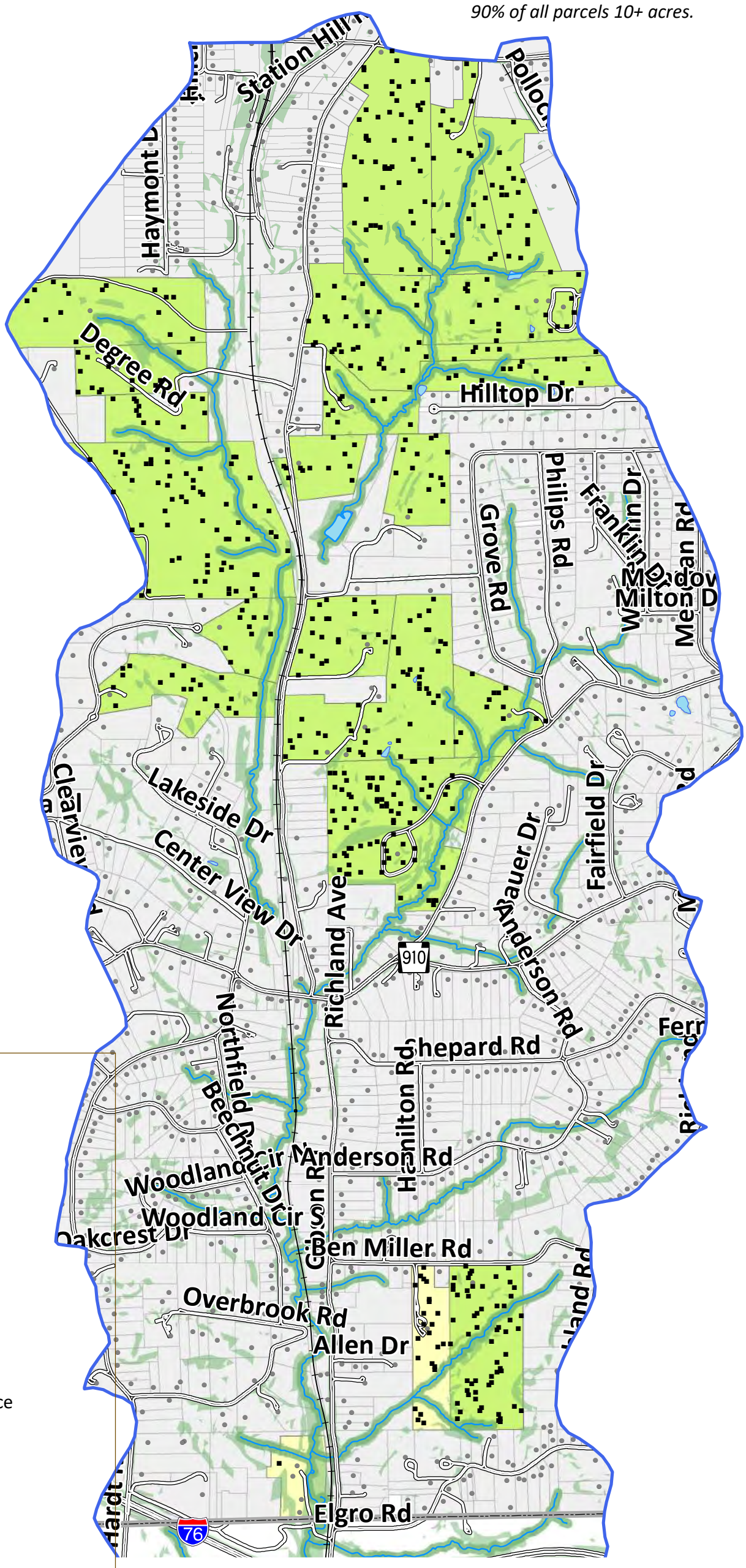
Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out or <10 Acre Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Stream Buffer
- Lake/Pond Buffer
- Wetland Buffer

Development Scenario Results

- Parcel 10+ Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

Willow Run Watershed
Map 3.3D—Development Scenario 3D

DEVELOPMENT SCENARIO 4A

Maximum build-out uisng existing zoning regulations and adding the ALT Greenprint (unprotected lands), Agricultural Security Areas (ASA), Prime Agricultural Soils, Red Bed Soils, and 150' Stream Buffers (from centerline) to the development constraints.

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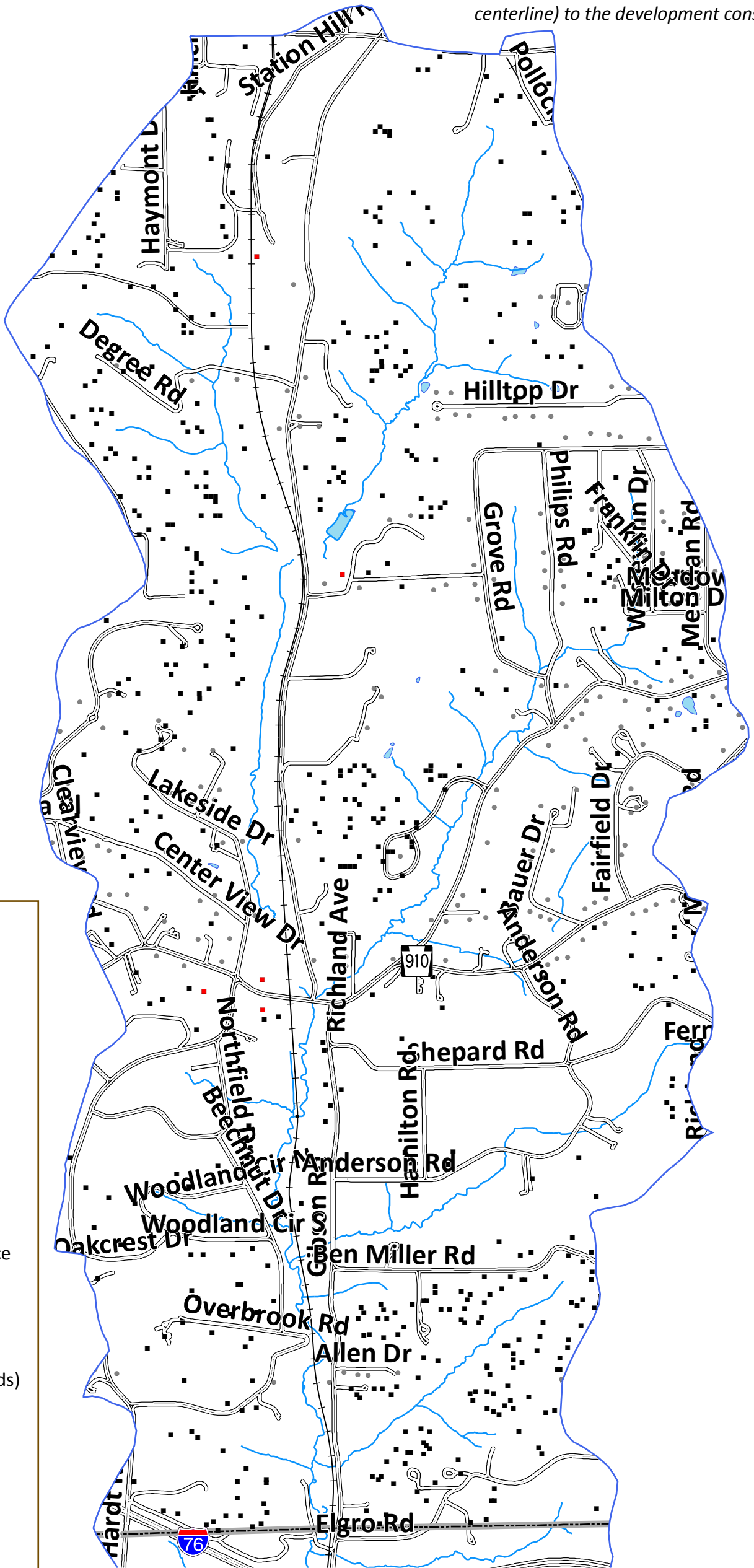
Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Lake/Pond Buffer
- Wetland Buffer
- ALT Greenprint (unprotected lands)
- Agricultural Security Areas (ASA)
- Prime Agricultural Soils
- Red Bed Soils
- 150' Stream Buffer

Development Scenario Results

- Buildable Commercial Parcel
- Buildable Residential Parcel
- New Non-Residential Structure
- New Single Family Residential

Willow Run Watershed
Map 3.4A—Development Scenario 4A

DEVELOPMENT SCENARIO 4B

Maximum build-out uisng existing zoning regulations, applying conservation subdivision principles to all parcels 10+ acres and adding the ALT Greenprint (unprotected lands), Agricultural Security Areas (ASA), Prime Agricultural Soils, Red Bed Soils, and 150' Stream Buffers (from centerline) to the development constraints.

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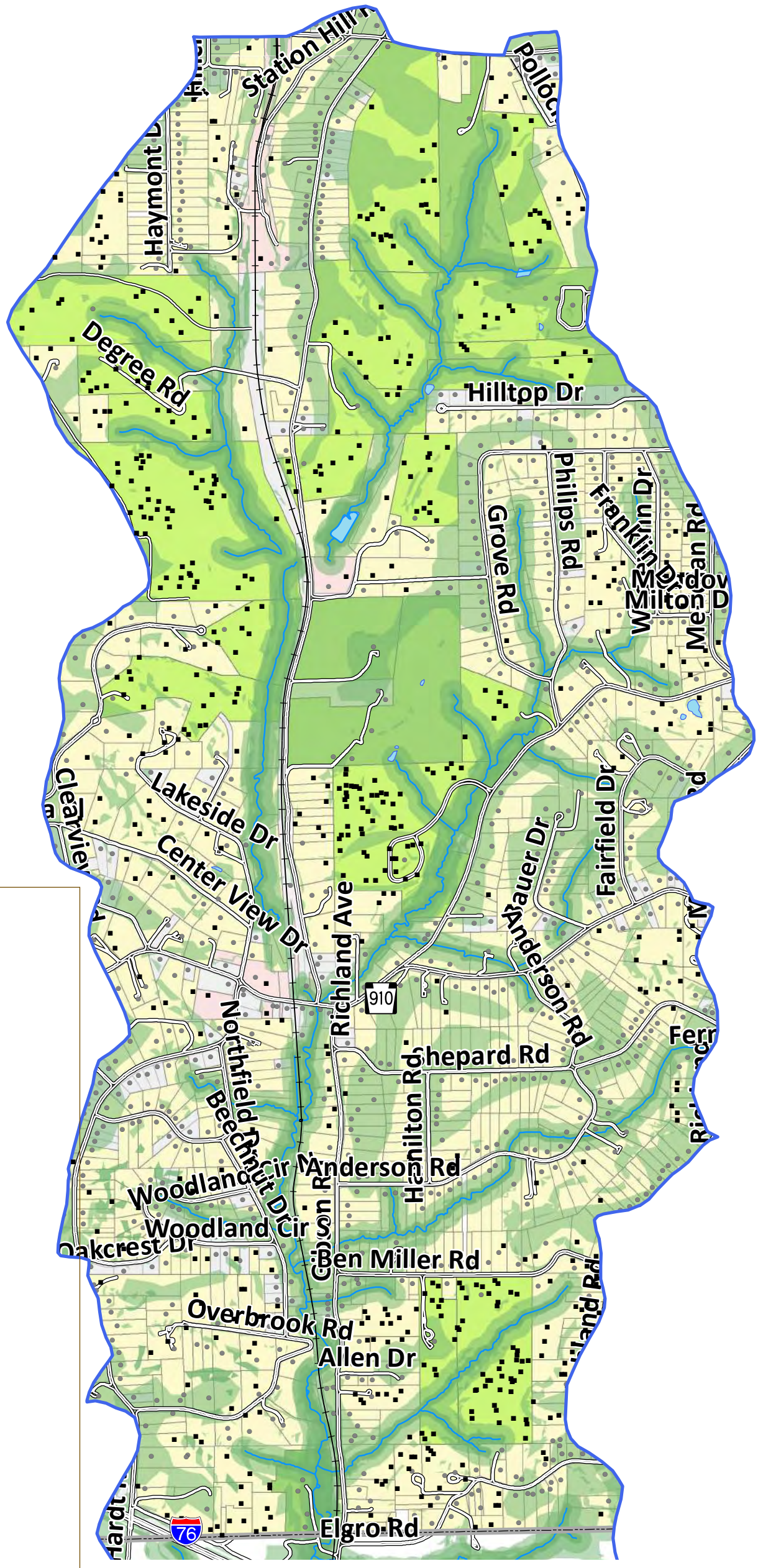
Richland Township



Legend

- Municipal Boundary
- Watershed Boundary
- Water Body
- Stream
- Street
- Railroad
- Built-Out Parcel
- Existing Building

Development Constraints

- Public Park/Protected Open Space
- Slopes > 25%
- Lake/Pond Buffer
- Wetland Buffer
- ALT Greenprint (unprotected lands)
- Agricultural Security Areas (ASA)
- Prime Agricultural Soils
- Red Bed Soils
- 150' Stream Buffer

Development Scenario Results

- Buildable Commercial Parcel
- Parcel <10 Acres as Traditional Development
- Parcel 10+ Acres as Conservation Subdivision
- New Residential Structure

Development Scenario 1—Maximum Build-Out Results
(existing zoning regulations)

	Residential						Non-Residential					
	Total Land Area (acres)	Nonbuilt (acres)	Existing Homes	Buildable Area (acres)	New Homes	Undevelopable (acres)	Total Land Area (acres)	Nonbuilt (acres)	Existing Structures	Buildable Area (acres)	New Structures	Undevelopable (acres)
North Fork Pine Creek Watershed	**4,025.08**	**3,129.53**	**1,343**	**2,028.50**	**1,362**	**1,101.03**	**310.04**	**287.68**	**48**	**239.29**	**187**	**48.39**
Montour Run Watershed	**2,277.16**	**1,942.09**	**610**	**1,450.53**	**1,270**	**491.57**	**435.73**	**311.72**	**36**	**213.96**	**41**	**97.77**
Willow Run Watershed	**2,038.61**	**1,888.23**	**925**	**1,604.94**	**1,020**	**283.29**	**35.24**	**27.95**	**25**	**21.72**	**5**	**6.23**
TOTAL (acres)	**8,340.85**	**6,959.85**	**1,140**	**5,083.97**	**3,652**	**1,875.89**	**781.01**	**627.35**	**55**	**474.97**	**233**	**152.39**
%	**—**	**83%**	**—**	**73%**	**—**	**27%**	**—**	**80%**	**—**	**76%**	**—**	**24%**

Total Land Area (acres) is the total land area zoned residential and nonresidential in the watershed.

Nonbuilt (acres) is the total amount of land available for development after the "built-out" parcels have been removed.

Existing Homes/Structures is the total number of principal structures in existence in the watershed.

Buildable Area (acres) is the total amount of land that is able to be developed after the built-out parcels and constraints have been removed.

New Homes/Structures is the total number of new principal structures that could be built according to the development scenario.

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, 50' stream buffers, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), and public parks/protected open space lands (per ALT Greenprint).

Development Scenario 2—Maximum Build-Out Results
(existing zoning regulations with Greenprint (unprotected lands))

	Residential						Non-Residential					
	Total Land Area (acres)	Nonbuilt (acres)	Existing Homes	Buildable Area (acres)	New Homes	Undevelopable (acres)	Total Land Area (acres)	Nonbuilt (acres)	Existing Structures	Buildable Area (acres)	New Structures	Undevelopable (acres)
North Fork Pine Creek Watershed	**4,025.08**	**3,129.53**	**1,343**	**1,658.96**	**1,120**	**1,470.57**	**310.04**	**287.68**	**48**	**206.31**	**185**	**81.38**
Montour Run Watershed	**2,277.16**	**1,942.09**	**610**	**881.78**	**730**	**1,060.32**	**435.73**	**311.72**	**36**	**90.74**	**35**	**220.98**
Willow Run Watershed	**2,038.61**	**1,888.23**	**925**	**1,558.62**	**972**	**329.61**	**35.24**	**27.95**	**25**	**21.61**	**5**	**6.33**
TOTAL (acres)	**8,340.85**	**6,959.85**	**1,140**	**4,099.36**	**2,822**	**2,860.50**	**781.01**	**627.35**	**55**	**318.66**	**225**	**308.69**
%	**—**	**83%**	**—**	**59%**	**—**	**41%**	**—**	**80%**	**—**	**51%**	**—**	**49%**

Total Land Area (acres) is the total land area zoned residential and nonresidential in the watershed.

Nonbuilt (acres) is the total amount of land available for development after the "built-out" parcels have been removed.

Existing Homes/Structures is the total number of principal structures in existence in the watershed.

Buildable Area (acres) is the total amount of land that is able to be developed after the built-out parcels and constraints have been removed.

New Homes/Structures is the total number of new principal structures that could be built according to the development scenario.

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, 50' stream buffers, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), public parks/protected open space lands (per ALT Greenprint) and ALT Greenprint (unprotected lands).

Development Scenario 3A—Maximum Build-Out Results
Traditional Residential Development

	Parcels < 10 acres					Parcels 10+ acres				
	Nonbuilt (acres)	Existing Homes	Buildable Area (acres)	New Homes	Undevelopable (acres)	Nonbuilt (acres)	Existing Homes	Buildable Area (acres)	New Homes	Undevelopable (acres)
North Fork Pine Creek Watershed	**1,207.88**	**1,283**	**219.84**	**607**	**988.04**	**1,921.65**	**60**	**1,808.66**	**755**	**112.99**
Montour Run Watershed	**470.79**	**563**	**376.44**	**236**	**94.35**	**1,471.30**	**47**	**1,074.09**	**1,034**	**397.22**
Willow Run Watershed	**1,279.13**	**899**	**1,097.23**	**537**	**181.91**	**609.10**	**26**	**507.71**	**483**	**101.38**
TOTAL (acres)	**2,957.80**	**2,745**	**1,693.51**	**1,380**	**1,264.30**	**4,002.05**	**133**	**3,390.46**	**2,272**	**611.59**
%	**—**	**—**	**57%**	**—**	**43%**	**—**	**—**	**85%**	**—**	**15%**

Nonbuilt (acres) is the total amount of land available for development for parcels 10 acres or larger after the "built-out" parcels have been removed.

Existing Homes is the total number of existing homes on the 10+ acre parcels.

Buildable Area (acres) is the total amount of land that is able to be developed after the constraints have been removed.

New Homes is the total number of new homes that could be built according to the development scenario using traditional development principles.

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, 50' stream buffers, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), and public parks/protected open space lands (per ALT Greenprint).

Development Scenario 3B—Maximum Build-Out Results
(conservation development principles applied to 30% of all 10+ Acre Parcels)

	Traditional Residential Development				Conservation Subdivision					
	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Additional Open Space Preserved	Additional Homes*
North Fork Pine Creek Watershed	**1,177.00**	**734.63**	**458**	**442.36**	**744.65**	**427.47**	**356**	**317.17**	**55.15**	**59**
Montour Run Watershed	**917.62**	**647.02**	**604**	**270.60**	**553.68**	**427.06**	**522**	**126.62**	**150.22**	**92**
Willow Run Watershed	**404.58**	**334.25**	**326**	**70.34**	**204.51**	**173.46**	**193**	**31.05**	**71.21**	**36**
TOTAL (acres)	**2,499.20**	**1,715.90**	**1,388**	**783.30**	**1,502.84**	**1,027.99**	**1,071**	**474.84**	**276.58**	**187**
%	**—**	**69%**	**—**	**31%**	**—**	**68%**	**—**	**32%**	**—**	**—**

Nonbuilt (acres) is the total amount of land available for development for parcels 10 acres or larger after the "built-out" parcels have been removed.

Buildable Area (acres) is the total amount of land that is able to be developed after the constraints have been removed.

New Homes is the total number of new homes that could be built according to the development scenario using either traditional development principles or conservation subdivision principles.

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, 50' stream buffers, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), and public parks/protected open space lands (per ALT Greenprint).

Additional Open Space Preserved is the total amount of land that would be preserved as a result of applying conservation subdivision principles (must preserve 50% of total acreage—includes constraints—and a 20% dwelling unit density increase).

***Additional Homes is the increase in single family homes that would be developed as a result of applying conservation subdivision principles rather than traditional development principles to the 10+ acres parcels.*

Development Scenario 3C—Maximum Build-Out Results
(conservation development principles applied to 60% of all 10+ Acre Parcels)

	Traditional Residential Development				Conservation Subdivision					
	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Additional Open Space Preserved	Additional Homes*
North Fork Pine Creek Watershed	**875.46**	**541.62**	**376**	**333.84**	**1,046.18**	**620.49**	**456**	**425.70**	**97.40**	**77**
Montour Run Watershed	**546.07**	**358.17**	**332**	**187.90**	**925.23**	**715.92**	**848**	**209.31**	**253.30**	**146**
Willow Run Watershed	**207.61**	**157.95**	**178**	**49.66**	**401.48**	**349.76**	**373**	**51.72**	**149.02**	**68**
TOTAL (acres)	**1,629.14**	**1,057.74**	**886**	**571.40**	**2,372.89**	**1,686.17**	**1,677**	**686.73**	**499.72**	**291**
%	**—**	**65%**	**—**	**35%**	**—**	**71%**	**—**	**29%**	**—**	**—**

Nonbuilt (acres) is the total amount of land available for development for parcels 10 acres or larger after the "built-out" parcels have been removed.

Buildable Area (acres) is the total amount of land that is able to be developed after the constraints have been removed.

New Homes is the total number of new homes that could be built according to the development scenario using either traditional development principles or conservation subdivision principles.

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, 50' stream buffers, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), and public parks/protected open space lands (per ALT Greenprint).

Additional Open Space Preserved is the total amount of land that would be preserved as a result of applying conservation subdivision principles (must preserve 50% of total acreage—includes constraints—and a 20% dwelling unit density increase).

** Additional Homes is the increase in single family homes that would be developed as a result of applying conservation subdivision principles rather than traditional development principles to the 10+ acres parcels.*

Development Scenario 3D—Maximum Build-Out Results
(conservation development principles applied to 90% of all 10+ Acre Parcels)

	Traditional Residential Development				Conservation Subdivision					
	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Additional Open Space Preserved	Additional Homes*
North Fork Pine Creek Watershed	**364.23**	**250.12**	**152**	**114.12**	**1,557.41**	**911.99**	**728**	**645.42**	**133.28**	**125**
Montour Run Watershed	**172.43**	**147.97**	**140**	**24.46**	**1,298.87**	**926.12**	**1,081**	**372.75**	**276.68**	**187**
Willow Run Watershed	**25.66**	**16.31**	**24**	**9.35**	**583.43**	**491.40**	**561**	**92.03**	**199.68**	**102**
TOTAL (acres)	**562.32**	**414.4**	**316**	**147.93**	**3,439.71**	**2,329.51**	**2,370**	**1,110.2**	**609.64**	**414**
%	**—**	**74%**	**—**	**26%**	**—**	**68%**	**—**	**32%**	**—**	**—**

Nonbuilt (acres) is the total amount of land available for development for parcels 10 acres or larger after the "built-out" parcels have been removed.

Buildable Area (acres) is the total amount of land that is able to be developed after the constraints have been removed.

New Homes is the total number of new homes that could be built according to the development scenario using either traditional development principles or conservation subdivision principles.

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, 50' stream buffers, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), and public parks/protected open space lands (per ALT Greenprint).

Additional Open Space Preserved is the total amount of land that would be preserved as a result of applying conservation subdivision principles (must preserve 50% of total acreage—includes constraints—and a 20% dwelling unit density increase).

** Additional Homes is the increase in single family homes that would be developed as a result of applying conservation subdivision principles rather than traditional development principles to the 10+ acres parcels.*

Development Scenario 4A—Maximum Build-Out Results
(existing zoning regulations with maximum preservation)

	Residential						Non-Residential					
	Total Land Area (acres)	Nonbuilt (acres)	Existing Homes	Buildable Area (acres)	New Homes	Undevelopable (acres)	Total Land Area (acres)	Nonbuilt (acres)	Existing Structures	Buildable Area (acres)	New Structures	Undevelopable (acres)
North Fork Pine Creek Watershed	**4,025.08**	**3,129.53**	**1,343**	**958.69**	**698**	**2,170.84**	**310.04**	**287.68**	**48**	**151.21**	**153**	**136.47**
Montour Run Watershed	**2,277.16**	**1,942.09**	**610**	**451.75**	**350**	**1,490.35**	**435.73**	**311.72**	**36**	**39.43**	**20**	**272.30**
Willow Run Watershed	**2,038.61**	**1,888.23**	**925**	**985.00**	**587**	**903.22**	**35.24**	**27.95**	**25**	**19.70**	**5**	**8.25**
TOTAL (acres)	**8,340.85**	**6,959.85**	**2,878**	**2,395.44**	**1,635**	**4,564.41**	**781.01**	**627.35**	**109**	**210.34**	**178**	**417.02**
%	**—**	**83%**	**—**	**34%**	**—**	**66%**	**—**	**80%**	**—**	**34%**	**—**	**66%**

Total Land Area (acres) is the total land area zoned residential and nonresidential in the watershed.

Nonbuilt (acres) is the total amount of land available for development after the "built-out" parcels have been removed.

Existing Homes/Structures is the total number of principal structures in existence in the watershed.

Buildable Area (acres) is the total amount of land that is able to be developed after the built-out parcels and constraints have been removed.

New Homes/Structures is the total number of new principal structures that could be built according to the development scenario.

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), public parks/protected open space lands (per ALT Greenprint), ALT Greenprint (unprotected lands), agricultural security areas (ASA), prime agricultural farmland, red bed soils, and 150' stream buffers (from centerline).

Development Scenario 4B—Maximum Build-Out Results
(traditional development applied to all parcels <10 acres and conservation development principles applied to all 10+ Acre Parcels with maximum preservation)

	Traditional Residential Development				Conservation Subdivision					
	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Nonbuilt (acres)	Buildable Area (acres)	New Homes	Undevelopable (acres)	Additional Open Space Preserved (acres)*	Additional Homes**
North Fork Pine Creek Watershed	**1,207.88**	**457.71**	**359**	**750.17**	**1,921.65**	**500.98**	**415**	**1,420.67**	**459.85**	**76**
Montour Run Watershed	**470.79**	**143.73**	**78**	**327.06**	**1,471.30**	**308.02**	**335**	**1,163.29**	**427.64**	**63**
Willow Run Watershed	**1,279.13**	**711.50**	**331**	**567.62**	**609.10**	**273.50**	**313**	**335.60**	**31.05**	**57**
TOTAL (acres)	**2,957.80**	**1,312.94**	**768**	**1,644.85**	**4,002.05**	**1,082.50**	**1,063**	**2,919.56**	**918.54**	**196**
%	**—**	**44%**	**—**	**56%**	**—**	**27%**	**—**	**73%**	**—**	**—**

Nonbuilt (acres) is the total amount of land available for development for parcels 10 acres or larger after the "built-out" parcels have been removed.

Buildable Area (acres) is the total amount of land that is able to be developed after the constraints have been removed.

New Homes is the total number of new homes that could be built according to the development scenario using conservation subdivision principles. (20% density increase)

Undevelopable Area (acres) is the total amount of land that is unable to be developed due to the constraints, which include steep slopes 25% or greater, lakes/ponds buffers (50' in Pine Township & 25' in Richland Township), NWI wetland buffers (50' in Pine Township & 25' in Richland Township), public parks/protected open space lands (per ALT Greenprint), ALT Greenprint (unprotected lands), agricultural security areas (ASA), prime agricultural farmland, red bed soils, and 150' stream buffers (from centerline).

**Additional Open Space Preserved is the total amount of land that would be preserved over the required 50% as a result of applying conservation subdivision principles.*

*** Additional Homes is the increase in single family homes that would be developed as a result of applying conservation subdivision principles rather than traditional development principles to the 10+ acres parcels.*

SECTION IV

CONSERVATION SUBDIVISION EXAMPLES

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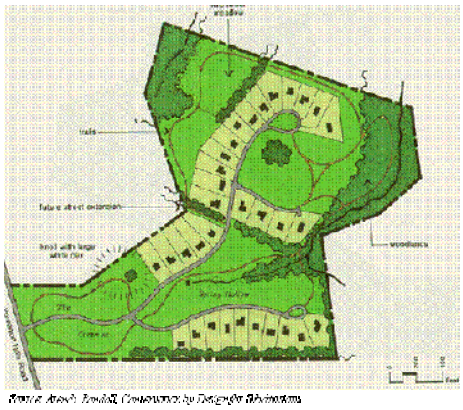
What are Conservation Subdivisions?

In conventional residential subdivisions land is developed into lots and streets and the only open space is wetlands, steep slopes, floodplains, and stormwater management areas. In conventional subdivisions, there usually are no sidewalks, trails or places for children to play. An alternative to conventional subdivisions that many municipalities are encouraging is conservation by design subdivisions. Conservation by design subdivisions or conservation subdivisions do not restrict development, but allow for smaller minimum lot sizes if certain percentages of common open space are designated. Conservation subdivisions do not limit or hinder new residential development but rather act as a tool to ensure residential development meets higher standards.



In conservation subdivision design half or more of the developable land is designated as permanent open space. Therefore, residential neighborhoods are more compact with smaller lots for homes. However, as all the lots are developed with open space behind them, the lots don't actually feel smaller. The open space that is preserved by this type of residential development can be either wooded, open meadow, or a recreational area.

There are many economic, environmental, and recreational benefits to conservation subdivisions. Economic benefits include lower costs, marketing and sales advantages, and market value appreciation. Environmental benefits include protection of wetlands, floodplains, and habitat, as well as less stormwater as larger areas of vegetation act as buffers. A recreational benefit is that trails and playgrounds can be built in the open space to serve residents of the community.

Conservation subdivisions are developed by creating primary and secondary conservation elements. Examples of primary conservation areas include water, easements, floodplains, steep slopes, soils, waterways, wetlands, and wooded areas. Examples of secondary conservation areas include buffers, historic resources, landmarks, and viewsheds. Every effort should be made to conserve all primary conservation areas, as well as secondary conservation areas during development. After these areas are designated the lots and roads can then be delineated around the primary and secondary conservation areas.

In order for a municipality to require or encourage conservation subdivisions, the municipal zoning ordinance must include provisions for open space protection and density requirements. For example under traditional zoning an applicant who wanted to subdivide his or her property would have to meet the minimum lot size in the corresponding zoning district, which could be 1 acre with a density maximum of 1 unit per acre. This would mean the subdivision could contain a maximum of 100 units on 1-acre lots. The subdivision would most likely contain slightly less than 100 units due to roads and utility Right of Ways. However, using Conservation Subdivision the applicant would be given a density

bonus. The density requirement could be a total of 2.25 units per acre if 60 percent of the total development is set aside as open space. This would give the applicant approximately 209 units, compared to 100 units under conventional zoning. The 209 units would have to be placed on 40 acres, as 60 acres would be permanent open space. This would create an average lot size of 0.20 acres. The ordinance can also require that all units abut the permanent open space; therefore the units would be clustered around the open space.

Conservation subdivisions are more common in eastern Pennsylvania as municipalities require this type of development in their ordinances. In Western Pennsylvania a lot of municipalities don't include this type of language in their ordinances, or if they do it is only an option, not a requirement.

Conservation by Design Subdivision Examples

To gain a better understanding of what conservation by design subdivisions involve and how they are regulated, examples from the western and the eastern part of the state were examined in detail. The examples include Rolling Ridge in Murrysville (Westmoreland County), Garnet Oaks in Bethel Township (Delaware County), and Farmview in Lower Makefield Township (Bucks County).

Western Pennsylvania - Murrysville

The Rolling Ridge development in Murrysville is an example of conservation by design and includes 46 dwelling units on 100 acres. The development has 40 acres of preserved green space with two miles of nature trails and a park with gazebo.

Murrysville's zoning ordinance allows for Planned Residential Developments (PRD), which permit creative residential development, such as conservation by design subdivisions. This type of development is allowed in the Rural Residential (R-R), Low Density Residential (R-1), and Medium Density Residential (R-2) zoning districts if the development consists of at least 25 contiguous acres. PRD's are also allowed in the High Density Residential (R-3) Zoning District if the site is 10 contiguous acres.

Single family, two family, triplex, fourplex, and townhouses are permitted within the R-R, R-1, R-2, and R-3 districts. The R-3 district also allows garden apartments and apartments.

In order to achieve a higher density within a PRD, at least 30 percent of the total area must be common open space. Of that open space, 0.033 acres of ground per dwelling unit must be active recreation land. The density permitted is calculated by using a formula that consists of gross acreage, acreage of environmentally sensitive area and mminimum acres per dwelling unit permitted in the underlying residential district. Environmental Sensitive Areas include steep slopes, floodplains, and wetlands.

Western Pennsylvania - Peters Township

Peters Township in Washington County, Pennsylvania includes conservation by design techniques in their zoning ordinance. Within their ordinance is the Woodland Protection Zoning District, which is intended to provide different options to residential developers to preserve the environment and rural landscape. There are three options within this district; the Estate Lot Design, Open Space Design, and Half-Acre Design. The Estate Lot Design is

permitted by right and the Open Space Design and Half Acre Design are permitted as Conditional Uses.

- Estate Lot Design-minimum lot size of 2 acres with a maximum density of 1 dwelling unit per lot. House sites and streets shall be laid out to avoid specific areas which are environmentally sensitive, scenic or possess significant attributes.

- Open Space Design- lot sizes may vary but the minimum is 0.25 acres with a maximum density of 1.2 lots per acre. A total of 40 percent of open space must be preserved within the development.

Half-Acre Design- minimum lot size of 0.5 acres with a maximum density of 1.2 lots per acre. House sites and streets shall be laid out to avoid specific areas which are environmentally sensitive, scenic or possess significant attributes.

An example of a residential subdivision that was developed in the Woodland Protection Zoning District in Peters Township is the Willamar development. Willamar is a total of 55 acres with 65 lots. The average lot size is approximately 17,000 square feet or 0.39 acres. A total of 23 acres of open space was preserved or 42 percent of the total development. The open space consists of steep slopes, a stream, woodlands, wetlands, and a 100 year flood plain.

Willamar Subdivision

Eastern Pennsylvania - Bethel Township and Lower Makefield Township

The Garnet Oaks subdivision in Bethel Township consists of a total of 58 acres, of which 24 acres is open space. The 80 homes within the development are located on quarter acre lots, with most of the homes directly abutting open space. The open space within the development consists of a wildlife preserve, walking trails, playground, and picnic grove. This development was developed under the guidance of the Pennsylvania Department of Conservation and Natural Resources (DCNR), National Lands Trust, and the Growing Greener Program

(http://www.dep.state.pa.us/earthdaycentral/99/learn_about/model.htm).

Bethel Township's Zoning Ordinance allows for the conservation by design technique in the Planned Residential Development District (R-3). In order to qualify as a Planned Residential Development (PRD), the development has to consist of at least fifty (50) acres of land and be served by public water and sewer. Single family detached homes, single family semi-detached homes, and single family attached homes are permitted in this district. A minimum of fifty percent of land has to be set aside as open space. Open space can consist of boating and fishing, golf courses, hiking and horseback riding, parks, playfields, playgrounds, picnic areas,

ice skating rinks, swimming pools, tennis courts, ponds and lakes, woodlands, ski and toboggan runs, and athletic fields. Density requirements vary depending on the type of dwelling unit; from a minimum lot size of four thousand square feet (4,000 Square Feet) to ten thousand square feet (10,000 Square Feet).

Another example of conservation by design in eastern Pennsylvania is the Farmview subdivision located in Lower Makefield Township. The development is a total of 418 acres, with 322 lots that are less than half an acre and 213 acres of open space, which includes cropland and woods. The cropland is donated to a local land trust, and the farmland is leased to local farmers. There are a total of 322 lots, with homes placed on less than a half acre.

The Residential Resource Protection (R-RP), Residential Low Density (R-1), Residential Medium Density (R-2), Residential Single Family High Density (R-3) Zoning Districts in Lower Makefield's Zoning Ordinance allow for open space cluster development (i.e. conservation by design). In all the districts, a minimum of 51 percent of the development has to be classified as resource protection land. Resource protection lands are areas or land with natural resources which are required to be protected. Farmland preservation development is permitted in the R-1 district if the development is at least 25 acres.

Density requirements differ for each district and are shown on **Table 1**.

Table 1: Open Space Cluster Development Requirements

Zoning District	Average Net Lot Size (units per acre)	Minimum Net Lot Area (acres)	Minimum Average Net Lot Area (acres)
R-RP	0.66	1	1.5
R-1*	2	16,500	22,000
R-2	3.5	10,000	12,500
R-3	4	10,000	12,500

**Permits farmland preservation as well as open space preservation*

Source: Lower Makefield Zoning Ordinance, 1994

SECTION V

LOCAL CONSERVATION FINANCE OVERVIEW

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THE TRUST for PUBLIC LAND

CONSERVING LAND FOR PEOPLE

Local Conservation Finance Overview

Report for the Allegheny Land Trust

Local Land Conservation Funding Options in Pennsylvania
December 2010

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Introduction

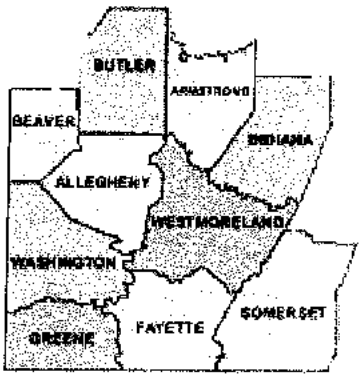
The Trust for Public Land (TPL) is a national nonprofit organization dedicated to conserving land for people to enjoy as parks, gardens, and natural areas. Since 1972, TPL has conserved more than 2.5 million acres of land nationwide. In Pennsylvania, TPL has helped protect almost 3,000 acres.

To help state agencies and local governments acquire land, TPL assists communities in identifying and securing public financing. TPL's Conservation Finance program offers technical assistance to elected officials, public agencies and community groups to design, pass and implement public funding measures that reflect popular priorities.

Since 1996, TPL has supported almost 450 state and local ballot measures that have generated nearly $31 billion for natural area protection around the country. In Pennsylvania, TPL recently assisted in the passage of a $10 million bond in Adams County. The funds will be used for open space, farmland and other natural area preservation. The measure passed with 75 percent support in November 2008. TPL also assisted Buckingham Township (Bucks County) in the passage of a $20 million bond for open space in April 2008. The measure passed with 82 percent support.

Statewide, TPL was involved in the passage of the Growing Greener II bond, authorizing $625 million for the maintenance and protection of the environment, open space and farmland preservation, watershed protection, abandoned mine reclamation, acid mine drainage remediation and other environmental initiatives. The bond passed in May 2005.

The objective for this study is to provide the Allegheny Land Trust (ALT) with some information about the viable options for local governments in Pennsylvania to create long-term funding sources for the conservation of open space, parks, farmland, forests, watersheds and wildlife habitat.



The study provides an overview of conservation finance options at the local level in Pennsylvania, and examples of successful programs. This research is part of a larger study on conservation programs that might be considered by communities in the Pine Creek watershed in Southwestern Pennsylvania.

The Trust for Public Land would be pleased to provide further research and technical assistance to the Allegheny Land Trust and other local public and private partners in the Pine Creek watershed to evaluate the feasibility of conservation finance measures in individual communities.

Executive Summary

Since 1996, more than 100 local ballot measures were passed in Pennsylvania that support the acquisition of land for open space, farmland and recreational purposes. The overall passage rate for ballot measures in Pennsylvania is 80 percent. Pennsylvania voters have approved 89 percent of all bond measures, 74 percent of all earned income tax measures, and 85 percent of all property tax measures. Over the past two years, voters approved three of three (100 percent) local conservation finance ballot measures in Pennsylvania.

Historically in Pennsylvania, general obligation bonding has been the only financing mechanism utilized by counties for land conservation. A bond issue provides up front funds that will allow for the immediate purchase of land while it is still available and distributes the cost of acquisition over time so that future beneficiaries also share in the burden. In addition, bond issues are a familiar form of public financing for local capital improvements in Pennsylvania.

At the municipal level, pay as you go taxes such as the property tax, earned income tax, or real estate transfer tax have been used, in addition to bonds, to finance land conservation in Pennsylvania townships, mostly in the southeastern portion of the state. [1]

There are several local finance options—from taxes to bonds—that could be considered as tools for financing parks and land conservation by local governments throughout Pennsylvania.

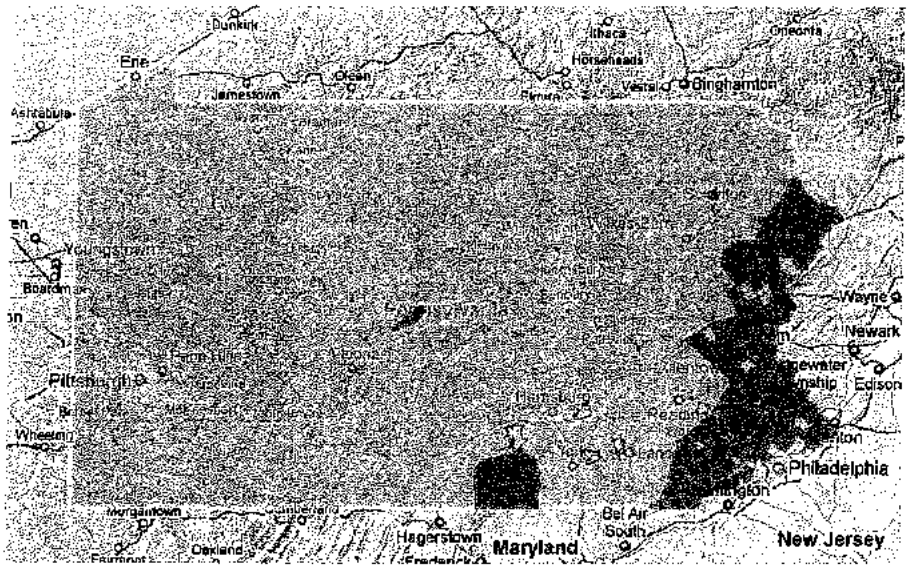
This feasibility report is meant to inform the Allegheny Land Trust of funding options for land conservation by identifying the potential funding mechanisms available to local governments in Pennsylvania.

This Study does not address county or municipal fiscal status or legal requirements for implementing a funding mechanism in depth. Rather, The Trust for Public Land anticipates that an examination of fiscal status, political climate, and legal requirements will be an integral part of any decision-making process concerning conservation funding for the individual jurisdictions in the study area.

[1] http://www.heritage conservancy.org/news/publications/pdf/pub-fin.pdf

Support for Preservation Funding Efforts

Conservation finance election results can often be helpful in gauging voter tolerance for public spending on land conservation. Across the country, dozens of state and local governments each year vote to raise public funds in support of land conservation. The Trust for Public Land's LandVote® Database is the premier source of information about these measures. The database brings together the most comprehensive history available for conservation finance measures that have been placed on the ballot.



Since 1987 there have been 143 total measures proposed in Pennsylvania. Of these 143, 28 failed (20 percent) and 115 passed (80 percent). Of the 115 measures to pass, 50 were bond measures (43 percent), 11 were property tax measures (10 percent), and 54 were earned income tax measures (47 percent). All together these voter-approved conservation measures have generated approximately $878,600,000 for open space.[2]

As the above LandVote snapshot illustrates, the vast majority of conservation finance ballot activity has occurred in townships in southeastern Pennsylvania. Almost no measures have been proposed elsewhere in the state. For a closer look at successful conservation finance measures in Pennsylvania since 2000, see the Appendix.

[2] TPL's LandVote database: www.landvote.org

Growing Greener II

In May 2005, Pennsylvania voters supported the passage of the statewide Growing Greener II Bond question, authorizing $625 million of which almost $300 million was to preserve open space, farmland and watersheds. It passed overall with 61 percent support.[3] The language read:

"Do you favor authorizing the Commonwealth to borrow up to $625,000,000, for the maintenance and protection of the environment, open space and farmland preservation, watershed protection, abandoned mine reclamation, acid mine drainage remediation and other environmental initiatives?"

SW PA Counties and Growing Greener Election Results

County	Votes Yes	Votes No	Approved
Allegheny	61%	39%	Yes
Washington	56%	44%	Yes
Beaver	55%	45%	Yes
Greene	54%	46%	Yes
Fayette	54%	46%	Yes
Somerset	53%	47%	Yes
Indiana	51%	49%	Yes
Butler	51%	49%	Yes
Westmoreland	47%	53%	No
Armstrong	39%	61%	No

Counties in Southwestern Pennsylvania voted favorably for the Growing Greener II bond. Of the ten counties sampled above, only Armstrong and Westmoreland counties voted against the measure. Sixty-one percent of Allegheny County voters approved the bond, a percentage greater than any other county in Southwestern Pennsylvania. The state passed the measure with the same approval rating, showing that in 2005 Allegheny County voters valued their open space equally as other voters across Pennsylvania.

The chart to the right highlights the 14 Allegheny County municipalities in the Pine Creek watershed and how each of them voted on the Growing Greener II bond measure. Only McCandless rejected the measure, although Richland barely passed with a 50-50 vote and several other municipalities were close decisions.

Pine Creek Watershed Municipalities: Growing Greener Election Results

Municipality	Yes	No	Result
Sharpsburg	69%	31%	Approved
Fox Chapel	65%	35%	Approved
Etna	62%	38%	Approved
O'Hara	62%	38%	Approved
Indiana	60%	40%	Approved
Bradford Woods	60%	40%	Approved
Franklin Park	55%	45%	Approved
Shaler	55%	45%	Approved
Ross	55%	45%	Approved
Hampton	53%	47%	Approved
Marshall	52%	48%	Approved
Pine	52%	48%	Approved
Richland	50%	50%	Approved
McCandless	46%	54%	Failed

[3] Pennsylvania Department of State - Elections Information.

Local Conservation Financing Options:

Generally, there are five primary types of revenue sources available to counties and municipalities in Pennsylvania to pay for land conservation. Counties and municipalities can use discretionary annual spending; and electoral and non-electoral debt financing, while municipalities may additionally use a voter-approved property tax [4] or earned income tax. This report will look at general obligation bonds at the county and municipal levels, and at the earned-income and property taxes for municipalities. The financing options utilized by a community will depend on a variety of factors, such as taxing capacity, budgetary resources, voter preferences and political will. The ability of local governments to establish dedicated funding sources depends upon state enabling authority.

General Obligation Bonds

Non-electoral debt

Counties and municipalities may issue bonds directly, without voter approval. This is called non-electoral debt and is limited by law. The Local Government Unit Debt Act establishes the limits for non-electoral debt by type of local unit.

All local government units in Pennsylvania may issue non-voted debt if they are within the statutory debt limits permitted under the Local Government Unit Debt Act. [5] The amount of non-voted debt that can be issued by a county is limited to 300 percent of its borrowing base; for other local governments, the limit is 250 percent of its borrowing base. The Act defines the borrowing base as the average annual revenue taken over the last three years. [6] However, if a bond issue would exceed the debt limit or hamper the jurisdiction's financial flexibility by using too much of its non-voted debt issuing capacity, a voter-approved (electoral) bond measure can be sought.

[4] Voter approved, only if municipality would like to go above their legally limited property tax rate
[5] Section 8102 and 8103
[6] Act 177 of 1996. Part VI. Subpart B. Chapter 80. Section 8022.

Before a county or municipality can borrow funds, the governing body must enact an ordinance or a resolution in the case of small borrowings. The ordinance is both an information tool for the citizens and a means to officially begin the process of incurring debt. Notice of the ordinance must be published both before and after its enactment. The law requires that the ordinance contain certain items, which include the following:

- an indication of the type of debt to be incurred (electoral, non-electoral, or lease rental debt);
- an indication of the form of debt (general obligation, revenue or guaranteed revenue);
- a repayment schedule and interest rates;
- a covenant;
- a notice whether the bonds will be sold at public or private sale;
- authorization for an officer of the municipality [7] to prepare a debt statement (which must be submitted to the Department of Community and Economic Development), to execute and deliver the bonds or notes, and to take other official action as may be needed;
- an identification of the project/purpose for which the debt is being issued and its useful life.

[7] Counties are also considered municipalities in Pennsylvania.

As shown in the chart to the right, a number of counties have opted to raise open space funds without a referendum. [8]

Recent Non-Electoral Debt and Appropriations for Open Space		
County	Total Amount Raised	Year Approved
Adams County	$2 million	2003
Berks County	$30 million	1999
Berks County	$36 million	2005
Chester County	$50 million	1997
Chester County	$75 million	1999
Chester County	$60 million	2004-2007
Cumberland County	$3 million	2004
Lancaster County	$9 million	1992-2006
Monroe County	$7 million	2009
Montgomery County	$100 million	1993
Schuylkill County	$.65 million	2000

Voter-approved (Electoral) debt

Voter-approved general obligation bonds have enjoyed widespread support in communities throughout Pennsylvania and the rest of the country. The passage rate for local land conservation measures in the Commonwealth is 80 percent, which is above the national passage rate of 76 percent.

As shown in the chart to the right, since 1989, nine counties have passed land conservation funding measures, most with overwhelming support. In total these measures have generated over $400 million for land conservation.

Successful County Conservation Bond Measures					
Jurisdiction Name	Date	Finance Mechanism	Total Funds Approved	Status	% Yes
Chester County	11/7/1989	Bond	$50,000,000	Pass	80%
Bucks County	11/8/1994	Bond	$3,500,000	Pass	67%
Monroe County	5/19/1998	Bond	$25,000,000	Pass	52%
Lehigh County	5/21/2002	Bond	$30,000,000	Pass	71%
Northampton County	11/5/2002	Bond	$37,000,000	Pass	65%
Montgomery County	11/4/2003	Bond	$150,000,000	Pass	78%
Pike County	11/8/2005	Bond	$10,000,000	Pass	67%
Bucks County	11/6/2007	Bond	$87,000,000	Pass	74%
Adams County	11/4/2008	Bond	$10,000,000	Pass	75%
			$402,500,000		

[8] Opportunity Knocks, Open Space is a Community Investment; The Heritage Conservancy 2008

Legal requirements for bond measures

Authority [9]

For all local government units, except Philadelphia, the Local Government Unit Debt Act provides the authority and procedure for issuing local government debt. There are no statutory debt limits on the amount of voter-approved (electoral) debt. Bond measures can go on the ballot for either the general or primary election. To pass, the measure needs a simple majority of voters.

Procedure [10]

To obtain voter approval, the governing body of the county or municipality must first adopt a resolution signifying its intent to issue electoral debt. A copy of the resolution and the form of the question must be certified to the county board of elections at least 45 days before the election. [11]

The question must be phrased substantially as follows:

Shall debt in the sum of [amount] dollars for the purpose of financing [insert brief description of project] be authorized to be incurred as debt approved by the electors?

While the description of purposes should be brief, it should also be clear to the voters and it should authorize all of the intended activities.

Notice of the referendum must be published in one or two newspapers of general circulation beginning no earlier than 21 days before the election and no later than 14 days before the election. The county board of elections shall prepare a statement in plain English, which indicates the purpose, limitations and effects of the ballot question to be included in the notice along with the date of the election and the question to be submitted to the voters.

[9] PA Local Government Unit Debt Act Section 8022
[10] Local Government Unit Debt Act, sections 8041 through 8049 and Center for Local Government Services "Referendum Handbook"
[11] Section 8043 Personal Conversation with Bernadette Barattini, Deputy Chief Counsel, PA Dept of Economic and Community Development 6/16/2008

Example of Electoral Debt: Buckingham Township, 2008

Buckingham Township is a semi-rural community in Bucks County that encompasses the wooded slopes of Buckingham Mountain, the headwaters of several important streams, crossroads villages, and exceptional fertile farmland.

Strategies for preservation continue to be of compelling concern to the township's residents, who have repeatedly embraced preservation in the face of increasing rates of development.

In 1989, the Commonwealth of Pennsylvania established an agricultural land preservation program with funds contributed by the state and participating county governments. At first alone, and then in partnership with the township, the county program continues to be a major player in the township's efforts to preserve its farms.

In 1995, Buckingham residents went to the polls and approved a referendum that permitted the Board of Supervisors to borrow $4 million to establish a township land preservation program—making Buckingham the first municipality in Bucks County to do so. In 1999, residents approved a second referendum in the amount of $9.5 million to continue the program. In 2008, voters overwhelmingly approved a third referendum which allows the township to borrow up to an additional $20 million to fund the next great push to preserve Buckingham's farmland and historic character.

As of July 2009, 4250 acres of land have been permanently protected from development in Buckingham using a variety of preservation options including the bond measures of 1995, 1999, and 2008.

According the Buckingham Township Agriculture and Open Space Preservation Committee, preserving land through the bond measures will cost citizens annually, but it provides priceless advantages:

- By protecting Buckingham's scenic and historic resources, land preservation enhances the value of all township properties.
- Land preservation conserves the township's natural environment, water resources, air quality and wildlife.
- Land preservation supports a robust farm economy which contributes to the financial wellbeing of the local community, the county and state.
- Land preservation saves taxpayers the cost of schools and other services that typically result when open lands are converted to residential development.

Voter-approved Property Tax

The property tax is a familiar revenue source for local governments. Property taxes are usually measured in "mills," where 1 mill equals $1 of tax for every $1,000 of assessed property value. Property taxes provide a relatively steady annual source of revenue regardless of changes in the economy.

They are relatively easy to administer at the local level, and the burden is broadly distributed. Local property tax rates have limits, requiring voter approval if these limits are exceeded. Nevertheless, the following communities have approved a property tax increase when revenues are specifically designated for parks and open space protection. [12]

Successful Property Tax Measures in Pennsylvania

Jurisdiction Name	County	Date	Conservation Funds Approved	% Yes	Mill per $100
Barrett Township	Monroe	11/8/2005	$ 600,000	57%	0.5
Chadds Ford Township	Delaware	5/17/2005	$ 2,500,000	72%	0.28
Concord Township	Delaware	11/2/2004	$ 6,000,000	71%	0.189
East Marlborough Township	Chester	11/2/1999	$ 1,900,000	69%	0.0002
Franklin Township	Chester	11/5/2002	$ 2,400,000	70%	0.5
Halfmoon Township	Centre	11/2/1999	$ 1,960,000	57%	0.02
London Britain Township	Chester	11/7/2000	$ 720,000	63%	0.0002
Milford Township	Bucks	11/4/1997	$ 1,027,500	59%	0.02
Pennsbury Township	Chester	11/3/2009	$ 5,000,000	62%	0.34
Pocopson Township	Chester	5/16/2006	$ 5,500,000	64%	0.01
West Vincent Township	Chester	5/21/2002	$ 2,900,000	63%	0.0005
		Total:	**$ 30,507,500**		

[12] Excerpted from the Heritage Conservancy's http://www.heritageconservancy.org/news/publications/pdf/pub-fin.pdf

Example of property tax measure – Milford, 1997

Milford Township in northwestern Bucks County has a population of approximately 9,000. The town is located in the Delaware River watershed and is drained primarily by the Unami Creek and Macoby Creek into the Perkiomen Creek and Schuylkill River.

In November of 1997 Milford citizens voted on a 2 mill property tax increase for watersheds, parks, wildlife and conservation areas, natural and scenic resources, farmland, and open space. The measure passed with 59 percent approval and generated over $1 million.

Milford's 1997 property tax measure is a relevant example to this study for the Pine Creek area because watershed protection was specifically included in the ballot language as a significant purpose of the ballot measure.

In 2007, Milford approved another measure for open space, park, forest, watershed, and farmland preservation that included both bonding and an additional EIT increase. The bond, set at $5 million, passed with 62 percent approval, and the accompanying .25 of 1% earned income tax increase for conservation passed with 55 percent of the vote.

The ballot language for each measure is below:

Property Tax 1997
Do you favor the imposition of an additional two (2) mills of real estate tax by the Township of Milford to be used to acquire interests in real estate to protect and conserve water resources and water sheds, existing or planned parks, wildlife and conservation areas, to preserve natural or scenic resources, to protect and preserve farmland and to promote cohesive land development by preserving open space between communities?

Bond Issue 2007
Shall debt be authorized to be incurred as debt approved by the electors in the sum of Five Million Dollars ($5,000,000) for the purpose of financing the acquisition of interests in real property to protect and preserve open space including farmland, water resources and watersheds, forests, park, recreation or conservation sites, natural or scenic resources, sites of historic, geologic or botanic interests, and open spaces between communities and for the purposes of reimbursing the Capital Improvement Fun of the Township for funds previously expended to acquire open space interests?

Earned Income Tax

The earned income tax (EIT) is an important source of revenue for local governments. The EIT may be more acceptable than the property tax in communities with a large population of retired seniors, since the tax is only applied to earned income, not to real estate assets or pensions.

Pennsylvania law caps the EIT at 1.0 percent, and in most jurisdictions the local school district lays claim to half of this amount. Act 153 of 1996 authorizes voters to approve the levy of an increased earned income tax beyond the 1.0 percent limit, exclusively for the purpose of financing purchases of open space. The amount of the additional tax is set by the voters in a referendum. [13]

Example of EIT – Charlestown Township 2008

Charlestown Township in Chester County is a small town with a population of around 5,000 people. This population is roughly double what it was in 1990, indicating rapid development. As of the 2000 Census the population density in Charlestown was 323.3 people per square mile.[14]

In 2003 the Board of Supervisors instituted the ½ percent Earned Income Tax (EIT), a tax many Charlestown residents were already paying to other municipalities where they worked. The EIT generated $900,000 to $1,000,000 annually and in 2005, the Board borrowed $9,000,000 via municipal bonds to finance the land preservation program. The current EIT is used to service this debt.

In 2007, Charlestown permanently preserved 287 acres using the Township's EIT funds, landowner donations, and both County and State matching grants.

With increased development pressures in 2008, and the risk of losing significant open space within the Township, Charlestown went back to the ballot to add an additional ½ percent to the EIT to be used for open space acquisition, farmland preservation, habitat and riparian protection, and the safeguarding of land suitable for recreation and scenic areas. This measure was approved overwhelmingly by Charlestown voters, 77-23.

This increase was primarily used to help save 374 acres of wooded hills from major development. The goal beyond that project was to preserve an additional 750 to 1,000 acres, or approximately 80 percent of all remaining large land parcels in the township.

[13] Excerpted from the Heritage Conservancy's http://www.heritageconservancy.org/news/publications/pdf/pub-fin.pdf
[14] United Census Bureau, 2000

Other Funding Mechanisms[15]

Besides the three primary funding mechanisms discussed above – bonds, property taxes, and earned income taxes – Pennsylvania's local governments have two other less common options to create funds for open space acquisition.[16]

The real estate transfer tax (RETT) is levied on property sales, increasing with the value of the property being sold. According to the Pennsylvania Association of Realtors, Pennsylvania currently assesses a 1% statewide transfer tax on the actual sales price of a property. In addition to the statewide tax, the Local Real Estate Transfer Tax Act allows local communities to assess up to an additional 1% tax. This additional 1% local tax is typically apportioned evenly between the local government and school district. Since the tax is limited by state law to 1 percent, if a community has already reached this level, it cannot be exceeded. Radnor Township in Delaware County increased its RETT from 0.75 percent to 1 percent and dedicated the additional revenues from the increase to open space.

Especially in rapidly developing communities the RETT can create significant funding for park and open space acquisition. However, fluctuations in the economy and the real estate markets can make revenues from a transfer tax difficult to predict. Opposition from real estate interests has arisen in some communities to proposed RETT increases.

As a non-tax method, the Pennsylvania Municipalities Planning Code also allows municipalities to require the reservation of land for park and recreation purposes, or to charge a developer fee-in the case of dedications, as part of the subdivision and land development process.

[15] The Heritage Conservancy. 2008. *Public Finance for Open Space: A Guide for Pennsylvania's Municipalities*
[16] TPL has not collected data on the extent of these mechanisms' implementation throughout the state

Appendices

Appendix A: Successful local measures: 1998-2008

93 Successful Local Ballot Measures in Pennsylvania from 1998-2008					
Jurisdiction Name	Jurisdiction Type	Date	Finance Mechanism	Conservation Funds Approved	% Yes
Monroe County	County	5/19/1998	Bond	$ 25,000,000	52%
Northampton Township	Municipal	5/19/1998	Bond	$ 4,300,000	66%
Lower Makefield Township	Municipal	11/3/1998	Bond	$ 7,500,000	71%
East Bradford Township	Municipal	11/3/1998	Income tax	$ 14,000,000	68%
East Rockhill Township	Municipal	5/18/1999	Income tax	$ 1,106,000	61%
Buckingham Township	Municipal	11/2/1999	Bond	$ 9,500,000	85%
Solebury Township	Municipal	11/2/1999	Bond	$ 10,000,000	90%
East Marlborough Township	Municipal	11/2/1999	Property tax	$ 1,900,000	69%
Halfmoon Township	Municipal	11/2/1999	Property tax	$ 1,960,000	57%
West Rockhill Township	Municipal	4/4/2000	Income tax	$ 2,159,124	59%
New Britain Township	Municipal	4/5/2000	Income tax	$ 6,900,000	67%
Upper Makefield Township	Municipal	11/7/2000	Bond	$ 15,000,000	68%
East Bradford Township	Municipal	11/7/2000	Income tax	$ 6,000,000	65%
Hilltown Township	Municipal	11/7/2000	Income tax	$ 12,000,000	69%
London Britain Township	Municipal	11/7/2000	Property tax	$ 720,000	63%
Patton Township	Municipal	11/6/2001	Bond	$ 2,500,000	63%
Plumstead Township	Municipal	11/6/2001	Bond	$ 6,000,000	76%
Franconia Township	Municipal	11/6/2001	Income tax	$ 8,500,000	68%
Skippack Township	Municipal	11/6/2001	Income tax	$ 8,955,208	57%
Stroud Township	Municipal	11/6/2001	Income tax	$ 3,600,000	53%
Lehigh County	County	5/21/2002	Bond	$ 30,000,000	71%
Upper Southampton Township	Municipal	5/21/2002	Bond	$ 2,000,000	69%
Wrightstown Township	Municipal	5/21/2002	Bond	$ 1,500,000	70%
East Vincent Township	Municipal	5/21/2002	Income tax	$ 13,600,000	80%
North Coventry Township	Municipal	5/21/2002	Income tax	$ 8,000,000	77%
Wrightstown Township	Municipal	5/21/2002	Income tax	$ 2,650,000	59%
West Vincent Township	Municipal	5/21/2002	Property tax	$ 2,900,000	63%
Bedminster Township	Municipal	11/5/2002	Bond	$ 2,500,000	77%
Northampton County	County	11/5/2002	Bond	$ 37,000,000	65%
Richland Township	Municipal	11/5/2002	Bond	$ 4,000,000	58%
Solebury Township	Municipal	11/5/2002	Bond	$ 12,000,000	87%
East Brandywine Township	Municipal	11/5/2002	Income tax	$ 3,500,000	74%
Richland Township	Municipal	11/5/2002	Income tax	$ 3,000,000	56%
Tinicum Township	Municipal	11/5/2002	Income tax	$ 5,000,000	65%
Franklin Township	Municipal	11/5/2002	Property tax	$ 2,400,000	70%
Upper Providence Township	Municipal	5/20/2003	Bond	$ 6,000,000	65%
Warwick Township	Municipal	5/20/2003	Income tax	$ 1,700,000	56%
Montgomery County	County	11/4/2003	Bond	$ 112,500,000	78%
South Abington Township	Municipal	11/4/2003	Bond	$ 1,250,000	55%
East Nantmeal Township	Municipal	11/4/2003	Income tax	$ 2,000,000	58%
Londonderry Township	Municipal	11/4/2003	Income tax	$ 1,340,000	63%
Lower Oxford Township	Municipal	11/4/2003	Income tax	$ 6,000,000	61%
Upper Oxford Township	Municipal	11/4/2003	Income tax	$ 3,423,020	54%
West Brandywine Township	Municipal	11/4/2003	Income tax	$ 4,000,000	54%
West Sadsbury	Municipal	11/4/2003	Income tax	$ 1,420,000	53%

99 Successful Local Ballot Measures in Pennsylvania from 1998-2008 (cont.)					
Jurisdiction Name	Jurisdiction Type	Date	Finance Mechanism	Conservation Funds Approved	% Yes
West Rockhill Township	Municipal	4/27/2004	Income tax	$ 5,000,000	55%
East Nottingham Township	Municipal	11/2/2004	Income tax	$ 8,800,000	50%
Highland Township	Municipal	11/2/2004	Income tax	$ 2,000,000	62%
Nockamixon Township	Municipal	11/2/2004	Income tax	$ 3,800,000	60%
Perkiomen Township	Municipal	11/2/2004	Income tax	$ 4,500,000	69%
Williams Township	Municipal	11/2/2004	Income tax	$ 4,500,000	70%
Concord Township	Municipal	11/2/2004	Property tax	$ 6,000,000	71%
Bedminster Township	Municipal	5/17/2005	Bond	$ 2,500,000	69%
Middletown Township	Municipal	5/17/2005	Bond	$ 8,500,000	79%
Kennett Township	Municipal	5/17/2005	Income tax	$ 14,000,000	76%
Moore Township	Municipal	5/17/2005	Income tax	$ 10,000,000	55%
Chadds Ford Township	Municipal	5/17/2005	Property tax	$ 2,500,000	72%
Mount Joy Township	Municipal	11/8/2005	Bond	$ 2,000,000	61%
Pike County	County	11/8/2005	Bond	$ 10,000,000	67%
Plumstead Township	Municipal	11/8/2005	Bond	$ 8,000,000	77%
Solebury Township	Municipal	11/8/2005	Bond	$ 18,000,000	88%
Upper Makefield Township	Municipal	11/8/2005	Bond	$ 10,000,000	80%
Bedminster Township	Municipal	11/8/2005	Income tax	$ 10,270,660	51%
Bushkill Township	Municipal	11/8/2005	Income tax	$ 3,140,000	66%
Honey Brook Township	Municipal	11/8/2005	Income tax	$ 10,000,000	51%
Barrett Township	Municipal	11/8/2005	Property tax	$ 600,000	57%
Upper Merion Township	Municipal	5/16/2006	Bond	$ 5,000,000	85%
East Rockhill Township	Municipal	5/16/2006	Income tax	$ 3,000,000	53%
East Vincent Township	Municipal	5/16/2006	Income tax	$ 4,000,000	55%
London Grove Township	Municipal	5/16/2006	Income tax	$ 5,500,000	51%
Lower Mount Bethel Township	Municipal	5/16/2006	Income tax	$ 3,000,000	76%
Paradise Township	Municipal	5/16/2006	Income tax	$ 2,000,000	72%
West Vincent Township	Municipal	5/16/2006	Income tax	$ 3,700,000	70%
Pocopson Township	Municipal	5/16/2006	Property tax	$ 5,500,000	64%
Radnor Township	Municipal	11/7/2006	Bond	$ 20,000,000	79%
Springfield Township	Municipal	11/7/2006	Bond	$ 5,000,000	74%
Warwick Township	Municipal	11/7/2006	Bond	$ 7,000,000	72%
Wrightstown Township	Municipal	11/7/2006	Bond	$ 1,500,000	78%
East Pikeland Township	Municipal	11/7/2006	Income tax	$ 5,000,000	65%
Elk Township	Municipal	11/7/2006	Income tax	$ 2,500,000	65%
Lower Saucon Township	Municipal	11/7/2006	Income tax	$ 3,500,000	60%
New Hanover Township	Municipal	11/7/2006	Income tax	$ 3,000,000	57%
Schuylkill Township	Municipal	11/7/2006	Income tax	$ 18,000,000	64%
Upper Pottsgrove Township	Municipal	11/7/2006	Income tax	$ 2,720,000	60%
Whitemarsh Township	Municipal	11/7/2006	Income tax	$ 20,000,000	62%
Milford Township	Municipal	5/15/2007	Bond	$ 5,000,000	62%
Jackson Township	Municipal	5/15/2007	Income tax	$ 8,000,000	74%
Upper Mount Bethel Township	Municipal	5/15/2007	Income tax	$ 5,650,000	68%
Bucks County	County	11/6/2007	Bond	$ 87,000,000	74%
Plainfield Township	Municipal	11/6/2007	Income tax	$ 6,000,000	60%
West Pikeland Township	Municipal	11/6/2007	Income tax	$ 11,000,000	61%
Buckingham Township	Municipal	4/22/2008	Bond	$ 20,000,000	82%
Charlestown Township	Municipal	4/22/2008	Income tax	$ 20,000,000	77%
Adams County	County	11/4/2008	Bond	$ 10,000,000	75%
Lower Makefield Township	Municipal	11/4/2008	Bond	$ 15,000,000	69%
Upper Dublin Township	Municipal	11/4/2008	Bond	$ 30,000,000	67%
Newtown Township	Municipal	11/4/2008	Income tax	$ 13,600,000	61%

Appendix B: Recent Successful Ballot Language

Adams County, November 4, 2008

Adams County Water and Land Protection Bond Referendum

Shall debt in a sum not to exceed 10 million dollars be authorized for the purposes of financing land conservation and preservation efforts, including protection of drinking water sources, stream water quality, wildlife habitat, farmland, open space and recreation lands, all for future generations, to be incurred as debt approved by the electors of Adams County, with lands preserved solely in cooperation with willing sellers, and ensuring that an annual independent audit evaluates program success?

Bond passed 75% to 25%

Upper Pottsgrove Township, November 7, 2006

Do you favor adopting an earned income tax of ¼ of 1% in order to finance the acquisition of open space from willing sellers in Upper Pottsgrove Township?

Measure passed 60% to 40%

Pennsbury Township, November 3, 2009

Pennsbury Township Open Space Lands Acquisition And Preservation Act

Do you favor the imposition of a tax on real estate of 0.79 mills to be used to acquire real property for the purpose of preserving open space and securing open space benefits under the Open Space Lands Acquisition and Preservation Act?

Measure passed 62% to 38%

For questions or more information please contact:

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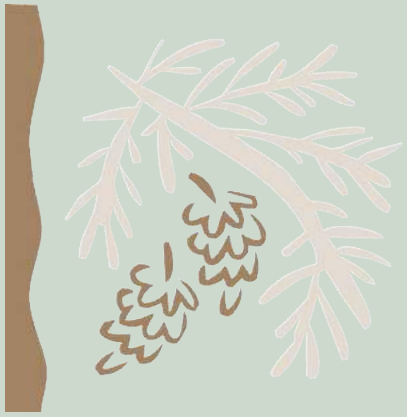

Pine Creek

An Alternative Vision

SECTION VI

PHASE II

SCOPE OF WORK

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This project will be completed in a two phase approach as a result of limited funding and time constraints. Phase I included reviews of background information, development of build out scenarios to prepare for a cost/benefit analysis, model municipal fund programs and ordinances, and the preparation of a Phase II scope. Phase II will commence upon receipt of additional project funding and will include a cost/benefit analysis of the restructuring of development scenarios and their impact on stream flows, stream elevations, flood area extents, infrastructure costs, downstream damage costs, and tax revenues and other municipal/school district costs.

Phase II Scope of Work

The Phase II Scope of Work is divided into three sections. Although each section will be developed individually, each one is interdependent on the results of the other and each are integral to the process to meet the end goal of determining the anticipated benefits of utilizing conservation design principles in the proposed developments within the three watersheds: North Fork Pine Creek, Willow Run, and Montour Run.

Part A—Determination of Impervious Cover

I. Task Identification:

The following tasks have been identified for the determining impervious coverage. Included are some preliminary tasks that will be required.

1. Existing Impervious Coverage

2. Future impervious coverage per Development Scenario

II. Task Description:

1. Existing impervious coverage layers have been provided from the Act 167 planning process that is underway in the North Hills COG area. The data will be reviewed and formatted to allow for use in the Community Viz software.

2. Determining future impervious coverage will be generated through a series of steps.

    a) The process by which the new amount of impervious cover would be calculated and best expressed will be by the establishment of ranges for parcel sizes classified by zoning district.

    b) Next an average building footprint per district will need to be determined; this will be accomplished by evaluating the area of the existing building footprints from the source data layers supplied. Additionally driveways will also need to be averaged using the aforementioned method and by the use of high resolution aerial imagery.

    c) Using the Phase I Development Scenarios, a building footprint will be assigned to each developable parcel. A series of sizes will be used depending on the area of the individual parcel. The footprint, including the building and associated driveway, will be used to assess the "new" impervious cover per parcel. This "new" impervious cover estimate can then be compared to the existing impervious cover acreages and a percent increase can be determined.

3. The University of Connecticut NEMO (Nonpoint Education for Municipal Officials) program has identified a methodology for determining impervious coverages based on build out scenarios. These

technical papers have been preliminarily reviewed and are accepted methodology for determining impervious coverages. In conjunction with the previously identified methodology, the NEMO approach will be incorporated and both will be utilized to determine impervious surface coverage.

Part B – Hydrologic and Hydraulic Studies

I. Task Identification:

The following tasks have been identified for the hydrology and hydraulic modeling work. Included are some preliminary tasks that will be required before assembling the models.

1. Survey available mapping and aerial photography.
2. Review Act 167 hydrology model and associated GIS data.
3. Conduct on-site field views.
4. Review Build-out scenarios for hypothetical future development
5. Establish limits of study (locations) for hydraulic analysis of the three subject stream tributaries.
6. Gather topographic data as required.
7. Conduct electronic field surveys at required locations.
8. Perform hydrology modeling tasks and evaluate results.
9. Perform hydraulics modeling tasks and evaluate results.
10. Prepare a streamlined report on the hydrologic and hydraulic studies.

II. Task Description:

1. Survey available mapping and aerial photography

   This task will include gathering and reviewing USGS topographic maps and Flood Insurance Rate Maps (FIRM's) published by FEMA. Identify FEMA flood hazard designations of floodplains encompassing the three tributaries from the FIRM's. Aerial photography will also be reviewed and pertinent information on existing conditions will be gleaned, including identification of existing stream crossings and floodplain encroachments.

2. Review Act 167 hydrology model and associated GIS data

   In this task, the HEC-HMS hydrology model used in the North Hills COG will be reviewed to ascertain what GIS data was utilized to develop the model. Determine additional GIS data required, and obtain what is needed.

3. Conduct on-site field views

   The hydraulic engineer will conduct on-site visits to the Montour Run, Willow Run, and North Fork Pine Creek tributaries, and perform cursory on-site evaluations of stream channel and floodplain characteristics. Information will be collected on stream characteristics at judicious

intervals, and at existing stream crossings (bridges, culverts, etc.), with photographs taken. The engineer will assess where field data is required for the hydraulic modeling to be performed for the study (e.g. bridge or culvert openings). Determine where electronic survey data needs to be collected to establish hydraulic openings of bridge and culvert structures, and select topographic data as required.

4. Review Build-out scenarios for hypothetical future development

   The future development build-out scenarios that were developed in Phase 1 of the watershed conservation study will be reviewed. A total of 7 build-out scenarios have been developed for each of the three Pine Creek sub-watersheds. Hydrologic and hydraulic models will need to be constructed for each scenario.

5. Establish limits of study (locations) for hydraulic analysis of the three subject stream tributaries.

   Based on mapping and aerial photography, establish rational location limits of study for hydraulic models for the three subject stream tributaries to minimize hydraulic model size and complexity. This would include assessing the relative flooding risks in specific locations along each stream reach based on approximate floodplain extents from the FEMA maps, compared with existing and/or build-out scenario development areas. Coordinate with the Townships in establishing these limits.

6. Gather topographic data as required.

   This task will involve gathering required topographic data in 3D electronic format as LIDAR data or as otherwise available. This data will be needed to construct hydraulic models along each of the three major stream tributaries.

7. Conduct electronic field surveys at required locations.

   A survey team will be sent to pre-determined sites to obtain survey data based on the previous field views conducted by the hydraulic engineer. The surveys will collect geometric information and elevation data related to hydraulic openings of bridge and culvert structures, and select topographic data as required.

8. Perform hydrology modeling tasks and evaluate results.

   This task will consist of developing hydrology models for the three Pine Creek sub-watersheds considered in the watershed conservation plan—Montour Run, Willow Run, and North Fork Pine Creek, in Pine and Richland Townships—for determination of peak storm discharges in these tributaries. The modeling will utilize existing data describing actual geographic and land use features in the form of GIS data, and the hypothetical land use scenarios for the build-out alternates that were developed in Phase I. Stream discharges from the North Hills COG's Act 167 Project will be utilized for existing conditions. To date, the Act 167 hydrology model is set up with existing conditions, but it will need to be run for each of the studied watersheds. Stream discharges that reflect the hypothetical developments associated with each build-out scenario will be generated based on modifications made to the Act 167 model. A list of anticipated modeling tasks follows.

a) Using the existing imperious/ground cover layer (GIS data), developed by the North Hills COG's Act 167 Project, determine the land cover percentages in each zoning district in the sub-watersheds being studied. Also use this layer to determine the existing impervious cover and ground cover statistics for the watersheds that were evaluated in Phase 1.

b) Estimate how much impervious cover will be created from each of the build-out scenarios generated in Phase 1. These build-outs include only residential development scenarios. This will require estimates of impervious cover as a percentage of parcel size. Assumptions will also need to be made concerning remaining impervious cover on each developed parcel—i.e. percentage of wooded area remaining, and percentage of wooded area converted to non-wooded permeable cover such as lawn areas. Estimate how much wooded cover has been preserved based on proposed conservation scenarios. This information will be converted into land cover statistics for each build-out scenario, which when superimposed upon soil group layers will be converted into Curve Numbers (CN's), used to calculate runoff properties. This process will be required for seven (7) build-out scenarios within each of the three Pine Creek sub-watersheds in the study, for a total of 21 scenarios.

c) The North Hills COG's Act 167 Project included the creation of a HEC-HMS hydrology model, used to generate discharges for particular storm events. The HEC-HMS model will be modified for each design (build-out) scenario, and then executed to estimate predicted flows for storms having statistical return periods of 2, 5, 10 and 100 years.

d) Flood discharges generated for each of the design scenarios will be tabulated and compared with the flood discharges for existing conditions.

9. Perform hydraulics modeling tasks and evaluate results.

Pine and Richland Township Tributaries

This task will consist of developing hydraulic models for the three Pine Creek tributaries considered in the watershed conservation plan—Montour Run, Willow Run, and North Fork Pine Creek, in Pine and Richland Townships. The models will be used to predict water surface elevations and floodplain extents based on peak storm discharges associated with specific storm events. Detailed FEMA hydraulic studies have not been prepared and published for these tributaries, therefore modeling will utilize 3D spatial topographic data sets obtained from the townships or from LIDAR data, which is readily available from the PASDA website. Initially, existing conditions will be modeled, and this will be done at a level of accuracy deemed appropriate for this type of watershed study. HEC-RAS hydraulics software will be used to model each of the aforementioned tributaries. A list of anticipated modeling tasks follows.

a) Begin assembling hydraulic models that reflect existing conditions. Using the electronic topographic mapping data obtained in Task 6 above, establish stream cross section locations along the reaches of each subject tributary that will be studied. Each cross section will extend sufficient distances on either side of the stream as to ensure that the entire floodplain is encompassed. Locate existing bridge and culvert crossings on the topographic map that need to be modeled, and also identify existing floodplain encroachments.

b) Using the survey data obtained in Task 7 above, model bridges and culverts, and model floodplain encroachments; apply assumptions; also apply channel and floodplain roughness coefficients, which will be estimated from the field views (Task 3), and aerial photography.

c) Incorporate flood discharges from the Act 167 study for the storm frequencies to be evaluated, and set boundary conditions for computation of water surface elevations at the boundaries.

d) Execute the existing conditions model, and check the results. Address warning messages generated by HEC-RAS, and otherwise debug the model.

e) Plot floodplain extents on the topographic mapping to establish baseline existing conditions. Note areas where the plotted floodplain extents indicated inundation of sensitive areas (e.g. property impacts). Compare these floodplain boundaries with approximate floodplain boundaries for Allegheny County that have been obtained from the PASDA website.

f) Begin assembling hydraulic models that reflect conditions for a build-out scenario. The process will essentially follow Steps a) thru e) above. However, establishing floodplain encroachments [Steps a) and b)] associated with hypothetical developments will need to approximated based on visual inspection by superimposing the topographic mapping upon a particular build-out scenario layer. This will need to be done, theoretically, for all seven build-out scenarios for all three subject tributaries; however, the process can be simplified where hypothetic development schemes between different scenarios are identical or similar.

g) Tabulate flood elevations and floodplain extents at all cross sections modeled for the existing conditions and build-out conditions. Compare each build-out scenario with existing conditions.

Main Stem of Pine Creek

This task will consist of developing hydraulic models for the main stem of Pine Creek downstream of the Montour Run, Willow Run, and North Fork Pine Creek, in Pine and Richland Townships tributaries. The stream reaches in questions extend through Hampton and Shaler Townships, and the Borough of Etna. The purpose of this project task is to analyze the impacts of additional flooding along Pine Creek due to stormwater runoff increases associated with the build-out scenarios. The models will be used to predict water surface elevations and floodplain extents based on peak storm discharges associated with specific storm events. Detailed FEMA hydraulic studies have been prepared and published for these tributaries, therefore the hydraulic models will be obtained (as cost) from FEMA. Typically FEMA hydraulic models for Allegheny County were created with the HEC-2 software program, and include flood discharges for the 10, 50, 100 and 500-year flood events. These models will be imported into HEC-RAS. The models will be run with the FEMA discharges, and then re-run utilizing discharges from the Act 167 study to establish the baseline existing conditions model (results using FEMA discharges will be used only for comparison purposes).

Stream cross section data from the FEMA analyses do not include spatial topographic data, therefore flood inundation mapping from the models created for this study will need to be based on 3D topographic data sets obtained from the townships or from LIDAR data. FEMA cross sections on published FIRM maps as TIF files will be underlain beneath the spatial mapping, and cross section lines will then be located on the mapping. The flood elevations generated at each cross section in the hydraulic models will then be used to generate floodplain extents on the spatial mapping. Floodplain extents will be plotted for existing conditions, and for the build-out scenarios.

10. Prepare a streamlined report that discusses the hydrologic and hydraulic modeling, and the results. Discuss the additional flooding impacts associated with each build-out scenario in relation to existing conditions within the subject sub-watersheds in Pine and Richland Townships, and along the main stem of Pine Creek downstream of the sub-watersheds.

Part C—Impact of Residential Development

I. Task Identification

The following tasks have been identified for the determining the impact of residential development.

1. Residential Tax Revenue

2. Other municipal impacts

   a) Number of new residents

   b) Number of new school aged residents

   c) Per Pupil School District Spending

   d) Per Capita Municipal Government Spending

   e) School Cost Increase

   f) Road Cost Increase

   g) Police Services Cost Increase

   h) Government Administration Increase

II. Task Description

1. The process by which the new amount of impervious cover would be calculated and best expressed will be by the establishment of ranges for parcel sizes classified by zoning district.

Next an average building footprint per district will need to be determined; this will be accomplished by evaluating the area of the existing building footprints from the source data layers supplied. Additionally driveways will also need to be averaged using the aforementioned method and by the use of high resolution aerial imagery.

Using the build-out scenarios from Phase 1 the new buildings created will be used to select the developable parcels. By the use of the established parcel ranges a new attribute will be added to each

dynamic parcel layer enable the summation of the individual ranges. The total of the new impervious cover will be removed from each range allowing for a relatively accurate representation of the increase in impervious cover can be expressed in acres, square feet, or percent.

2. Penn State College of Agricultural Sciences Cooperative Extension has published material relating to the impacts of residential development and the costs and revenues for municipalities. Using an accepted methodology, i.e., *Costs and Revenues of Residential Development: A Workbook for Local Officials and Citizens*, an economic analysis will be conducted to predict the potential impacts that may occur as a result of the anticipated increases in dwelling units on Pine and Richland Townships within North Fork Pine Creek, Willow Run, and Montour Run sub-watersheds.

Part D—Cost/Benefit Analysis

Utilizing the data generated in Parts A, B, and C of the identified scope, a matrix will be developed that compares the economic and environmental costs and benefits of traditional neighborhood development and conservation design principle development.

A steering committee should be developed that includes members of Allegheny County, NAEC, Pennsylvania Environmental Council, and other local key stakeholders to provide input regarding the details of the cost/benefit analysis.

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CHAPTER X—
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