

Comprehensive Plan

Durham Township



December 6, 2016

Durham Township Comprehensive Plan

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Introduction

A comprehensive plan is the keystone of a municipal land use-planning program. A comprehensive plan has been referred to as a master plan for the future of a community. Whether it is referred to as a master plan or a comprehensive plan, it provides a framework of a vision of how land use in the municipality should occur over the next ten to twenty years. It is a guide for zoning decisions, open space preservation programs, and planning for water supply and wastewater facilities.

While a comprehensive plan does not necessarily provide answers to all of the questions or issues that Township officials may be faced with, it does provide a means to arrive at those answers. By developing a vision for the future that includes goals and objectives for various key topics, a framework is established by the comprehensive plan to guide the decision making process.

If a comprehensive plan is to remain a viable document for the Township officials in making land use related decisions, it must be reviewed periodically. The importance of reviewing and updating a municipal comprehensive plan is acknowledged by the Pennsylvania Municipalities Planning Code, which requires that a municipal comprehensive plan be reviewed every ten years (Act 68 of 2000). This review of the Durham Township Comprehensive Plan 2016 was conducted in conjunction with the most recent Durham Township Survey. The Survey questions and responses can be found on the Durham Township website: durhamtownship.org

In preparing this Comprehensive Plan the guidelines of Article III of the Municipalities Planning Code were followed. The Comprehensive Plan that was adopted in 1977/2006 was used as a starting point and base for this Plan. By following the Municipalities Planning Code, the scope of this Plan was expanded to provide a more thorough analysis of the Township. The goals and objectives provide a guide for making decisions regarding land use matters that involve development, protecting and managing the vast natural resources in the Township, and community facilities.

Durham Township has a high concentration of natural resources. Prime agricultural land and the rolling, wooded terrain are the two predominant characteristics of the Township. The Cooks Creek Watershed encompasses approximately two thirds of the Township. The watershed is an important area of the Township because of the natural resources and the Creek itself, which is classified an *Exceptional Value (EV) cold-water fishes (CWF)* water. Fortunately, the Durham Township Environmental Advisory Council prepared the *Cooks Creek Watershed Conservation Plan*. The Plan is invaluable as a tool for identifying the important features and significance of the watershed. It also establishes a framework for developing a program for the protection and proper management of the watershed. Because of its significance for Durham Township, the *Cooks Creek Watershed Conservation Plan* is incorporated into this Comprehensive Plan by reference and as such becomes a companion document that should guide land use decisions in the Township.

The overall goal of this Comprehensive Plan is to maintain the high quality of life in the Township by protecting the natural resources – including the Cooks Creek Watershed, prime agricultural land, the floodplain of the Delaware River and its tributary streams, the limestone geology and the wooded slopes and maintain the rural, scenic and aesthetic character of Durham Township-regarding air quality, noise level and light emissions. In addition, a Development Area has been provided that will be able to accommodate the Township's fair share of the forecasted growth in population and the accompanying zoning will provide the opportunity for variety of housing types to be built.

Chapter One

Goals and Policies

This comprehensive plan was prepared by making an examination of the state of the community and to identify issues that are and will be facing the Township. From that examination, this important chapter was prepared. The Statement and the Goals and Policies provide an overview of the Township and a framework and guide for making land use related decisions that will face the officials. In addition, the Comprehensive Plan will serve as a policy guide for the review of the Township's zoning ordinance that will follow. A municipal comprehensive plan should be a dynamic document. The Board of Supervisors and Planning Commission should refer to the Plan often as a guide in making decision and for instituting measures that are needed to implement the recommendations contained herein. In addition, it is important that the Plan remain a viable planning tool for the Township, and it should be reviewed periodically. To that end the Pennsylvania Municipalities Planning Code directs municipal officials to conduct a review of the comprehensive plan every ten years.

Statement of Goals and Policies

Goals are defined as long-term objectives. Together these goals are a community statement, which direct change and development and generally describe the desired nature of the Township in the future. Policies are shorter-term targets whose accomplishment will aid in achieving the longer-term goals of the community. These goals and policies are to serve as guidelines in drafting ordinances and establishing related programs. The goals and policies should also guide private decisions so that individual development plans are consistent with the community's stated objectives.

Although the following statements are listed under specific categories, it must be remembered they are inter-related and policies from more than one goal should be used in the decision making process when applicable.

TOWNSHIP CHARACTER

Goal: To insure the continued rural and scenic nature of the Township.

Policy: Employ the comprehensive plan and implementing ordinances to guide development and changing land uses in order to achieve the desired Township character.

NATURAL RESOURCES

Goal: To protect natural systems, natural resources, and critical features so that the natural environment will contribute to the physical and mental well-being of the Township residents.

Policies:

- Identify critical natural and scenic resources, such as floodplains, wetlands, and riparian buffers, bodies of water, ridgelines and steep slopes and protect these by the establishment of natural resource protection zones and districts and the development of natural resource standards.
- Natural resource standards shall be the primary factor in determining the type and intensity of land uses in all districts.
- Appropriate provisions to protect both the new homeowner and the community shall be incorporated into the Township's ordinances. These provisions shall prevent destruction of the natural environment during and after development, by regulating among other things, the rerouting of watercourses, the removal of topsoil, and forest management.
- Use private and public means to protect open space, forests, and other scenic and ecologically valuable resources.
- Surface and groundwater should be protected from point and nonpoint sources of pollutants.
- To counter the environmental impact of development, require a meaningful level of reforestation and afforestation in new building projects, require Best Management Practices be employed when managing new and existing forest systems and promote sound stewardship practices at the landowner level.
- To take the necessary measures to implement the recommendations of the *Durham Township Open Space Plan*.
- The Cooks Creek Watershed shall have top priority for protection and preservation. Cooks Creek, in March 2003, was identified as a source that flows into the Lower Delaware River as an "Exceptional Value Water" Stream.

"Exceptional Value Water" is defined as High Quality Water which satisfies PA Code Chapter 93 Water Quality Standards. Exceptional Value Waters are to be protected at their existing water quality, and no lowering of water quality is to be allowed.

- To incorporate the *Cooks Creek Watershed Management Plan* in this Comprehensive Plan by reference and use it as a guide in making land use decisions.
- Identify EAC Member/Representative for Cooks Creek Watershed Association monthly meetings.
- To support the implementation of the *Gallows Run Watershed Restoration and Protection Plan* and enact applicable recommendations.

SCENIC RESOURCES

Goal: To preserve and protect those features and views of the landscape such as treed slopes, stream valleys, rolling topography, hills, and other physical and natural features which are picturesque and unique examples of natural beauty.

Policies:

- Identify those areas in the Township that are scenic because of land forms and natural features and protect them through appropriate methods.
- Establish design standards that would address the limiting of the visual impact of development or despoilment of the scenic areas and encourage the use of clustering, open space, construction materials and physical design which would not be visually apparent or obstruct views.
- River Road (PA Route 611) has been designated a Scenic Highway. The land use regulations for the land along River Road should address access management, appropriate setbacks, buffer yard provisions and landscaping requirements.

AGRICULTURE

Goal: To encourage agriculture as a viable economic pursuit in the Township.

Policies:

- Identify productive agricultural soils and incorporate these into agricultural districts.
- Encourage the preservation of agricultural land by permitting alternate forms of development and appropriate zoning standards which will not depreciate farmers' or landowners' property values in the process of protecting the land.
- Work with the farmers and farm groups to investigate the many related factors pertinent to the continuation of this industry.
- To permit a wide range of appropriate agricultural-based businesses in the Township.
- To keep the farmer in mind when developing land use and nuisance ordinances so that the regulations will not hinder normal farm operations.
- To support the Bucks County Agricultural Land Preservation Board in its efforts to purchase the conservation easements of farms.
- To encourage the continued implementation and expansion of the Agricultural Security District.
- Promote private initiatives to work in conjunction with public agencies and programs to preserve agricultural land.
- Encourage the use of open space easements and purchase of development rights to preserve agricultural land and promote the continuation of agricultural as a land use.
- To encourage community participation to preserve prime agricultural land.
- To consider the use of Transfer of Development Rights (TDR) to preserve prime agricultural land.

PLANNING

Goal: To control the rate, magnitude, and location of growth within the Township, recognizing that very rapid, uncontrolled and intense development would irreversibly alter the character of the community and seriously deplete the aquifer water supply system.

Policies:

- Insure that development proposals are in concert with the goals and guidelines established in this plan.
- Develop and use innovative planning tools such as performance standard zoning to guide growth within the Township and to deal with surrounding development pressures.
- Encourage the coordination of all units and agencies of government and private interests for a more comprehensive approach to achieving community goals.
- The size of the Development District will be based on the forecasted population and housing growth for 2020 and 2025.
- Limit the intensity of development and prevent the extension of public infrastructure and services into agricultural and natural resource areas.

HISTORIC IDENTITY

Goal: To protect the historical character of the community and preserve our historic landmarks.

Policies:

- Identify and document those areas and structures that are indicative of the historic character of the area.
- Encourage the organization of a panel of interested citizens to investigate areas and structures, which may be historically and architecturally significant, and to research private and public programs, which provide funds to restore and preserve these areas and buildings. Priority should be given to the protection of the Durham Grist Mill and the remnants of the Durham Furnace.
- Encourage the use of these structures in a manner, which will not detract from the character of the building or surrounding structures, and preserve around these buildings an appropriate landscape setting characteristic of the period in which they were constructed.
- Support the efforts of the State and the Delaware and Lehigh Canal Heritage Corridor Commission's effort to preserve and maintain the Delaware Canal, and enact appropriate zoning for properties adjacent to the Canal.
- Develop and use specific ordinances, which will facilitate the achievement of this goal.
- To encourage the preservation, maintenance and adaptive reuse of historic buildings.

- To recognize the importance of retaining the landscape in which a historic structure is set.

TRAFFIC AND TRANSPORTATION

Goal: To develop systems for the unimpaired movement within and through the region and to insure that development plans and transportation plans are consistent.

Policies:

- Identify areas of future intense development both within and surrounding the Township, and use this information in a re-evaluation of the roadway system.
- Work with State, County and other local agencies and governments, as well as soliciting the aid of state legislators, to insure that desired transportation improvements are implemented.
- The type and intensity of land use along all roads will be regulated with particular attention given to arterial and collector roads. The regulations for arterial and collector roads will include limiting the number and location of access points, marginal access streets, shared driveways and reverse frontage streets.
- The Township ordinances should include a requirement that a traffic impact study will be required for all major development proposals. The analysis will include an examination of existing levels of service, turning movements, safety improvements, and impacts on nearby intersections.
- Access management shall be given priority in controlling the number and location of new driveways on Arterial Roads in the Township. In particular, flag lots shall be discouraged on Arterial Roads.
- Encourage the use of through streets in all residential developments.

HOUSING

Goal: To promote a balanced mix of housing types and costs that accommodate the needs of the present and future residents of the community and insure that the existing housing remains safe and sanitary.

Policies:

- Establish regulations which will provide the opportunity for alternate types of housing (e.g., performance standard development and single-family cluster development) which will provide for open space, resource protection and aesthetic surroundings as well as needed housing for all socio-economic groups.
- Encourage the maintenance and enhancement of those dwellings which are of sound construction and good design.
- Maintain up-to-date building codes that are consistent with State codes.

- Provide a Development Area within the Township that will have appropriate zoning to accommodate the forecasted population increase and will provide the opportunity for a variety of housing types.

PARK AND RECREATION

Goal: Promote the establishment and limited development of park and recreation areas within the Township to aid in increasing land within the county devoted to these activities.

Policies:

- To periodically monitor the need for active recreational facilities in the Township.
- Require developments within the Development District to provide appropriate recreational facilities for the residents of that community.
- To cause developers to include in their planning process appropriate park and recreation areas in accordance with the size of the development.

COMMUNITY FACILITIES AND PUBLIC SERVICES

Goal: To maintain a sufficient level of community facilities and public services that will satisfy the needs of the residents and to provide these services where they may be necessary.

Policies:

- Provide the opportunity for adequate wastewater disposal within the Development District so that water supplies will be protected from contamination or depletion. Water that eventually becomes effluent should be used, when feasible, to recharge the Township ground water. Any waste-disposal system that transports water from the Township shall be dependent prior to adoption and implementation on a full study of long- and short-term costs associated with assuring adequate water supplies.
- Prepare policies and plans for the provision of public water supply and wastewater facilities in the Development District. Said policies and plans shall be directed at the developer who shall bear full cost of such plans.
- Water supply and wastewater facilities in the Agricultural / Resource Protection areas will continue to be provided on an individual on-lot basis.
- The Township will coordinate all water supply and wastewater facilities planning with land use planning policies.
- Promote the proper maintenance of individual on-lot wastewater disposal systems.

- Wellhead protection should be required for any proposed community well.
- A water resources impact study should be required of all major subdivisions and land development applications proposed in the Township. The study should specifically address the impact of the proposed well on the base flow of the Cooks Creek and its tributaries.

LAND USE

Goal: To provide for a balanced variety of development forms, based on sound land use planning and ecological principals that reflect the local limiting conditions.

Policies:

- Use the goals and guidelines incorporated in this plan to give direction to growth and change in the Township and to evaluate development proposals as they arise.
- Consider in all land use decisions the need and appropriate location for agricultural, open space, resource protection, and recreation uses as well as the need for developed land uses. In this fashion, the conflicts among land uses and between land uses and natural features will be avoided.
- When filing a petition for a change in zoning classification, the property owner shall provide the following:
 - An analysis of the impacts of the proposed change on all applicable aspects of the Comprehensive Plan.
 - The impacts of the proposal on the natural features on the site.
 - An analysis of the impacts on the road network.
 - A detailed description of the proposed wastewater facilities and the consistency with the Township’s wastewater facilities plan.
- Provide the opportunity for growth by implementing the Development District Concept in the Zoning Ordinance.
- Maintain and enforce current regulations and standards for the protection of natural resources in all zoning districts.
- Maintain regulations in the zoning ordinance that promote the preservation of prime agricultural lands.
- Planned Commercial – Industrial District
 - Prepare use regulations and dimensional standards for the Planned Commercial – Industrial District that protects the health, safety and welfare of the residents of Durham Township.
 - Establish policies and regulations, as necessary, for water supply and wastewater facilities in the District with priority given to groundwater recharge.

- Institute access management techniques for new development to protect the integrity of road network.
- Promote and encourage the retention of the character of Durham Village.
 - Prepare land use regulations and dimensional standards for the village that permits appropriate residential and commercial uses.
 - The permitted uses and dimensional standards for the land adjacent to the village must be carefully developed to maintain the character of the village.
 - Protect the historic resources in the village.

SUMMARY

It is the overall objective of this planning process to establish a mechanism, which will prevent the Township from slipping into an unbalanced mix of inappropriate land uses. Through this planning process, it is intended that the character of the Township will be preserved. To accomplish this it will be the responsibility of the residents and elected officials to ensure that the goals stated herein are achieved. This plan will be an initial step in establishing an increased consciousness of community identity and public involvement in determining the future of the Township.

Chapter Two

Regional Setting

The Palisades School District is in the northeastern corner of Bucks County with the Delaware River establishing its eastern boundary and the Bucks County Northampton County line is its northern boundary. With the exception of Riegelsville Borough and some villages, the area is rural with significant agricultural areas in Durham and Springfield townships. There are also significant areas of natural resources in the region that include floodplains, wetlands, steep slopes (including the palisades along the Delaware River), important geologic features and vast areas of woodland. The chapter on Natural Resources contains a comprehensive assessment of the natural and environmental features in Durham Township.

Easton Road (US Route 611) and Pennsylvania Route 212 are the two major roads that connect Durham Township with the region and beyond. These two roads intersect with two other regional roads, Pennsylvania routes 32 and 412, within the Palisades region. Both US Route 611 and PA 412 provide direct access to Interstate Route 78, a major east-west expressway, to the north in Northampton County. Interstate 78 serves the corridor from Harrisburg and beyond in the west to the New York City metropolitan area to the east.

During the preparation of a comprehensive plan Article III, Section 301 of the Pennsylvania Municipalities Planning Code directs municipalities to examine the relationship of the planning and zoning in adjacent communities.

Springfield Township Comprehensive Plan of 2002

The Board of Supervisors adopted the Springfield Township Comprehensive Plan in 2002. The boundary line between Durham and Springfield is an arbitrary straight line that follows no natural or manmade features. The comprehensive plan designates the area along the border a Special Attention Area on the Future Land Use map (Figure 10). The Plan describes the Special Attention Area as follows.

“The SAA comprises the majority of the township and contains lands that require special resource protection including: the Cooks Creek Watershed, significant agricultural lands (including prime agricultural soils, soils of statewide importance, active farmland, and agricultural security district properties), carbonate areas, Natural Areas Inventory sites, and significant concentrations of woodlands and steep slopes. The purpose is to provide maximum protection of these resources through a variety of regulatory measures at the disposal of the township. The AD – Agricultural District and the RP – Resource Protection District corresponds to the SAA.”

As the titles of the districts imply, the Agricultural District and the Resource Protection District are intended to protect the significant agricultural area and the areas of natural resources in the Township. The natural resources include forests, steep slopes, scenic areas, wetlands, streams, floodplains and ponds. These natural features were identified in the *Bucks County Natural Resources Plan*, the *Natural Areas Inventory* and the *Cooks Creek Watershed Conservation Plan*.

There is a third planning area and zoning district in the Special Attention Area along the boundary of Durham and Springfield townships. It is the Water Supply District which

encompasses a portion of the Cooks Creek Watershed, north of the village of Springtown. “The purpose of this district is to protect these extraordinary natural and scenic resources while protecting the aquifer that supplies the public wells in Springtown.” In 2005 the Board of Supervisors appointed a committee to evaluate the water system serving Springtown to determine the feasibility of retaining ownership of the system. The Springtown Water Authority was formed.

From a land use compatibility standpoint the land use pattern that is designated by the Springfield Township Comprehensive Plan is compatible with the adjacent land in Durham Township.

A Springtown Source Water Protection Plan for the community water distribution system in the village was adopted. The Plan was prepared under the guidelines established by the Pennsylvania Department of Environmental Protection. A source water protection plan presents a program to prevent drinking water from becoming polluted by managing possible sources of contamination in the area.

Nockamixon Township Comprehensive Plan of 2005

Nockamixon Township is the adjoining municipality along the southeastern border from Springfield Township in the west to the Delaware River in the east. The area along the common boundary is designated R – Residential with the exception of the village of Kintnersville, which is classified Village Center; RA – Residential Agricultural; OSM – Open Space Management along the Delaware River. Single-Family Residential consists of properties with single-family detached, or attached, one- or two-unit dwellings on lots less than 5 acres.

Riegelsville Borough

The Borough of Riegelsville is the municipality along the northern boundary of Durham Township. *The Riegelsville Borough Commercial District Plan (2002)* and a Statement of Community Development Objectives in the Borough’s Zoning Ordinance serve as the comprehensive plan for the Borough. The goal of the Commercial District Plan is to improve the appearance and condition of the borough’s commercial district. There are three different zoning districts in Riegelsville along the common boundary: RP, Resource Protection; R-2, Residential; and I, Industrial. The Resource Protection District is intended to protect areas containing sensitive natural resources and has a minimum lot area of three acres for a single-family detached house. All types of residential structures are permitted in the R-2 Residential District and the minimum lot area varies with the different uses. The Industrial District is designed to provide the opportunity for industrial, commercial and office uses. The minimum lot area in the I District is one acre.

Riegelsville Borough adopted a *Source Water Protection Plan – Riegelsville Borough Water Company*. The purpose of the plan is stated as follows. “The Riegelsville Borough Water Company recognizes the possibility of potential threats to its water supply. In an effort to address the potential problems that could affect the source, the Riegelsville Borough Council established the Riegelsville Source Water Protection Steering Committee to make recommendations to Riegelsville Borough, Williams and Durham Township.” Source Water Protection plans are necessary for the protection of the Company’s source from contaminants that are difficult and costly to treat through normal means. The plan clearly identifies actual and potential sources of contamination to the source. Secondly, it allows communities to effectively educate the public on the importance of their drinking water source.

Third, the plan serves as the first step for long-term sustainable planning for the future of the community. Finally, it provides a comprehensive action plan in case of emergency. In 1993 the Borough Council undertook a study to identify the wellhead protection zones for well number 2, which is located in the western area of the Borough. A portion of Zone III extends into Durham Township. Zone III is the outer most zone and is the area that contributes surface and groundwater to the wellhead. It is a groundwater recharge area.

Williams Township Comprehensive Plan

The adjacent municipality along the northwestern border of the Township is Williams Township. The municipal line is also the line of Bucks and Northampton counties. Williams Township has designated the land along the boundary line as A – Agricultural in the comprehensive plan. The same nomenclature is used for the zoning district. A one-acre minimum lot size is set for single-family detached houses in the district.

Bucks County

Section 306 of the Pennsylvania Municipalities Planning Code directs municipal officials who are in the process of preparing a comprehensive plan to give consideration to the county's comprehensive plan. This coordination gives the municipal officials the benefit of the recommendations and land use strategies that have been formulated by the county planning agency. In 2011 the Commissioners adopted the current edition of the *Bucks County Comprehensive Plan*. The Plan establishes the county's goals, objectives and policies on various land use planning topics. The Plan "presents a common vision for the future of Bucks County and seeks to coordinate and assist the county's municipalities, agencies, and the general public in the planning, development, and management of Bucks County's natural and built environment." In addition, the County Planning Commission has published several functional plans that provide more in depth analysis and recommendations on various land use planning topics. The functional plans include: *The Natural Areas Inventory of Bucks County 2011*, the *Park and Recreation Plan (1986)*, and the *Implementation Document (1995)*.

Bucks County Comprehensive Plan

The County Comprehensive Plan advocates a strategy for managing growth and innovative approaches to land use planning. To that end, the stated goal of the Plan is to "foster land use planning and controls which allow for orderly growth." Recommended programs and courses of action for a well-conceived land use program are outlined for municipalities in Bucks County. Conditions, which are favorable for growth in population, are and have been present in Bucks County for decades. However, Durham Township and its neighboring municipalities in Bucks County have not experienced population and housing growth that municipalities in other parts of the County have over the past 30 years. It is nevertheless important for Durham to maintain a comprehensive plan that establishes a framework and strategy for managing the growth that may occur in the years to come.

In its assessment of the Upper Bucks area, the County Comprehensive Plan acknowledges that the carbonate and diabase geology and other environmental constraints in the Palisades Area will make development more difficult. The Plan identifies ten factors that provide a general indication of potential for growth in the various Planning Areas in the County. Only three of the ten factors are present in the Palisades Planning Area. They are, adequate recreation facilities, environmental constraints, and available land.

The growth factors that are not present in the Area are: 1) adequate infrastructure and services; 2) adequate transportation access; 3) traffic congestion; 4) concentrate development; 5) adequate employment opportunities; 6) adequate shopping facilities; and 7) good, centralized location. As a result of this assessment, the County Comprehensive Plan forecasted that population growth rate for Durham Township between 2000 and 2020 would be less than one percent.

The Development District Concept is the planning tool the County Plan recommends municipalities use for preparing future land use plans. This is the concept the Durham Township Comprehensive Plan of 1977/2006 followed, and is used in this update. Urban Areas, Development Areas, Rural Areas and Resource Protection Areas are the four types of planning areas involved with the Development District Concept. Durham Township is an excellent example of Rural and Resource Protection Areas.

The two primary characteristics of a Rural Planning Area are the lack of and no plans for the extension of public water and sewer service, and the predominance of vacant land and agricultural land. These characteristics certainly describe the conditions in Durham Township.

Land use planning strategies recommended by the County Plan for Rural areas include protect natural resources on development sites with the low density residential development occurring on the buildable portion of the site. Enacting zoning regulations that will protect the character of villages is another strategy. And, non-residential development should be limited to neighborhood stores and infill of existing business areas. Commercial development should be limited to providing essential goods and services for the residents of the community.

The County Comprehensive Plan describes Resource Protection Areas as “land in which development will jeopardize natural, recreational, and historic resources.” Prime agricultural land is included on the list of natural resources. Limiting the amount and degree of intrusion of the important natural resources is the primary strategy for protecting them and to maintain the quality of life.

Bucks County Natural Resources Plan

The heart of the land use-planning program advocated by the various editions of the *Bucks County Comprehensive Plan* over the last three decades has been the protection of natural resources. As early as 1972, the Bucks County Planning Commission published the first plan advocating the protection of natural resources in the Commonwealth. Since that time the County Planning Commission has made the protection of natural resources the primary factor in the preparation of municipal comprehensive plans and in determining the development potential of land. Natural resources include floodplains, wetlands, steep slopes (15 percent and greater), prime agricultural soils and woodlands. More specific to Durham Township is the carbonate geologic formation in the Durham Valley that extends from Springfield Township to Riegelsville Borough. This geologic formation requires careful investigation and care for any type of development activity. Sinkhole collapse and groundwater contamination are the two important concerns with carbonate geology.

Protecting natural resources is an important consideration for the *Comprehensive Plan* and *Zoning Ordinance of Durham Township*. The natural resources on land in the Township should be protected. Protecting natural resources is not only directly related to the protection of the health, safety and welfare of the residents of Durham, they also contribute to the quality of life in a community.

Bucks County Open Space and Greenways Plan (2011)

The *County's Open Space and Greenways Plan of 2011* includes references to four greenways in the township including:

- Unami-Beaver-Tohickon-Kimples-Cooks Creeks Greenway
- Gallows Run-Rapp-Tinicum Creeks Greenway
- Delaware & Lehigh National Heritage Corridor Greenway
- Delaware River Water Trail

Pennsylvania Highlands Trail Network Trail Feasibility Study

- The feasibility study identified a conceptual PA Highlands Trail Network (PHTN) trunk route, focused on making connections between existing trails found throughout the PA Highlands region with the intent of bringing greater interconnectedness and linkages among the outstanding natural and cultural features in the region, including several state parks, national historic sites and landmarks, numerous water trails, scenic vistas and revitalized downtowns. The PHTN Southern Route will be located in portions of the following municipalities in Bucks County: Riegelsville Borough, Durham Township, Nockamixon Township, Bridgeton Township, Haycock Township and Richland Township.

Bucks County Park and Recreation Plan

The *County's Park and Recreation Plan of 1986* was used to identify the location of State and County parks in the vicinity of Durham.

- Lake Towhee – Lake Towhee Park is located to the southwest in Haycock Township. The 500 plus acre park has a 28-acre lake that is a popular fishing location. There are picnic tables and pavilions, playground equipment and campsites in the park.
- Nockamixon State Park – the State Park is also to the southwest of Durham. The main attraction in the 5,065 acres park is a 1,450-acre lake that is 6.8 miles long and has a shoreline of 24 miles. In addition to the lake there is a large swimming pool, hundreds of picnic tables, a bike trail, an equestrian trail, four boat launching areas, a marina and a dry storage boat area.

Lower Delaware River Management Plan

Planning efforts by the National Park Service have created a comprehensive regional framework for protecting the scenic Delaware River corridor. A portion of the Lower Delaware River and its Cooks Creek are eligible for designation as a National Wild and Scenic River. This Lower Delaware River Wild and Scenic program identifies selected rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The *Lower Delaware River Management Plan (1997)* describes means of protecting areas within the proposed Wild and Scenic River designation area. Durham Township has the ability to adopt the Management Plan. The Cooks Creek Watershed Association and the Durham Historical Society adopted the Plan in May 2016. Springfield Township Board of Supervisors unanimously passed a resolution in support of joining the Wild and Scenic Rivers designation.

Delaware & Lehigh National Heritage Corridor

The Delaware & Lehigh National Heritage Corridor in Bucks County, extending along the Delaware River and Canal from Riegelsville Borough to Bristol Borough, are part of the larger 165-mile long Delaware & Lehigh National Heritage Corridor extending from Wilkes-Barre to Bristol, PA.

Established by the United States Congress in 1988, the Corridor follows the route that anthracite coal took from the mines in the northeastern part of the state, along the Delaware Canal to Bristol, where the tidewaters of the Delaware Bay made the Delaware River deep enough to be navigable year-round to the markets in the Delaware Valley region including Philadelphia. The 60-mile portion of the Corridor from Bristol to Easton forms the Delaware Canal State Park. The upper portion of the Delaware & Lehigh National Heritage Corridor passing through Durham is identified as a cultural greenway and is rich in natural, historical and recreational resources.

Chapter Three

Population and Housing

A municipal comprehensive plan provides a framework the elected officials will use to help them make decisions regarding the future of the community. The starting point in the preparation of a comprehensive plan is to gather information and data on the current status of the municipality. The plan for the future is based on the results of the information gathering combined with a vision of what the community will be in ten to fifteen years. A key component of preparing a plan for the future is an estimation or forecast of the increase in the population and in turn the increase in the number of houses that may occur in the time frame of the Plan. In order to have a thorough understanding of the population and housing characteristics of a municipality; information is needed on the past as well as forecasts for the future. Information is obtained from two sources. The Federal Census provides a broad range of population and housing data for municipalities every ten years, with the most recent census occurring in 2010.

The Delaware Valley Regional Planning Commission publishes forecasts of the change in population and housing units for ten-year intervals for municipalities in the region. The regional planning commission's forecasts will be used as a reference for the update of the comprehensive plan. Those forecasts will be referred to because they were prepared on a countywide basis and take into account factors from adjacent municipalities that may influence the growth in other municipalities in the area.

It is very important to understand that the forecasts of change in population and housing are not, nor should they be viewed, as a goal or target to achieve. Rather, they are estimates of what can be anticipated that are based on information and assumptions at the time they were prepared. They are based on trends, reasonable indicators on growth issues and assumptions based on existing conditions.

POPULATION TRENDS

An examination of the population of the Township at the ten-year intervals of the Federal Census will provide an indication of what has occurred in the past and from that data a suggestion of what is likely in the future.

Table 1 – Population Changes 1930 – 2010

Year	Population	Numerical Change	Percent Change
1930	619	-	-
1940	636	17	2.7
1950	668	32	5.0
1960	735	67	10.0
1970	781	46	6.2
1980	915	134	17.1
1990	1,209	294	32.1
2000	1,313	104	8.6
2010	1,144	-169	-12.9

SOURCE: 1930 – 2010 U.S. Census Bureau

Since 1930 the population of Durham Township has increased at a slow pace both in absolute numbers and percentage increase, with the exception of the decade of the 1980s. From 1981 to the end of the decade, the population grew by 294 persons, a 32.1 percent increase. The decade of the 90s saw a return to a more normal rate of growth with an 8.6 percent increase – 104 persons. The decade of 2000-2010 experienced a decline in growth as the population decreased by 169 persons, a 12.9 percent decline.

POPULATION CHARACTERISTICS

The population of Durham Township is distributed as follows: In 2010/2014, 96.3 percent of the population was white, 0 percent black, 2.0 percent Asian, 0.6 percent American Indian, 0.9 percent Hispanic and 0.2 percent Other.

The number of persons per household in the Township decreased between 2000 and 2010/14. Census data indicated there were 485 households in the Township in 2000. In 2010/14 the number of households decreased to 452. That is a decrease of 33 households or a 6.8 percent decline. In 2000 the average household was 2.71 persons, and in 2010/14 it decreased to 2.50 persons. The average household size for Bucks County was 2.70 in 2010.

Table 2 - Demographic Characteristics

Characteristic	1990	2000	2010/14
Median Age	36.60	40.80	50.80
Households*	430	485	452
Family Households**	356	382	316
Married Couple Families	327	342	282
Non-family Households***	74	103	136
Householders Living Alone	51	84	27
Average Household Size	2.81	2.71	2.50
Average Family Size	3.12	3.07	2.94

SOURCE: 2010/14 American Community Survey Demographic

* A Household is an occupied housing unit

** A Family Household is a household with two or more individuals related by marriage, birth, or adoption.

*** A Non-family Household is a household with a group of unrelated individuals or a person living alone.

In 2000 the majority of the population (1,017 persons or 77.5 percent) of Durham Township was between 0 and 55 years old. However, by 2010/14, 659 persons or 57.5 percent, of the individuals living in Durham were under 55 years of age and 42.5 percent were 55 years of age or greater. For the county as an entirety, 72 percent of the population in 2010 was under the age of 55 and 28 percent was 55 years of age or greater. The table below presents a breakdown of the ages of the residents of the Township.

Table 3 – Age Cohorts of Population

Age Cohorts	1990 Population	Percent of Total	2000 Population	Percent of Total	2010/14 Population	Percent of Total
0 - 9	179	14.81	157	11.96	83	7.24
10 - 19	166	13.73	188	14.32	145	12.63
20 - 34	224	18.53	166	12.64	108	9.42
35 - 44	243	20.10	261	19.88	110	9.59
45 - 54	142	11.75	245	18.66	213	18.56
55 - 59	64	5.29	77	5.86	133	11.60
60 - 64	72	5.96	63	4.80	106	9.24
65 - 74	81	6.70	107	8.15	154	13.43
75 - 84	37	3.06	41	3.12	76	6.63
85+	1	0.07	8	0.61	19	1.66
TOTAL	1,209	100.00	1,313	100.00	1,147	100.00

SOURCE: 1990 – 2000 U.S. Census Bureau and 2010/14 ACS

POPULATION FORECASTS

As noted elsewhere in this document, the primary purpose of a municipal comprehensive plan is to develop a vision of the future for the community, a conceptual idea of how and where development will occur. A forecast of the increase in population over a period of time provides a tool for planning municipal services and in determining the size of a development district.

Population forecasts have been prepared by the Delaware Valley Regional Planning Commission for the four suburban counties in southeastern Pennsylvania. Forecasts are provided for each municipality in the counties for 2020, 2025, 2030, 2035, and 2040.

Table 4 – Population Forecasts

	2010* Census	2015**	2020**	2025**	2030**	2035**
	1,144	1,149	1,160	1,180	1,200	1,242
Increase		5	11	20	20	42
Percent Increase		0.44%	0.96%	1.72%	1.69%	3.50%

SOURCE: *Federal Census Bureau

**Delaware Valley Regional Planning Commission

The population of Durham Township decreased 169 persons or -12.9 percent between 2000 and 2010. The Regional Planning Commission projects that the population will increase by 98 persons through 2035, resulting in a 0.34 percent annual growth rate.

Adjacent Municipalities

For purposes of comparison and to give some perspective on the region in which Durham Township is located, the following table presents the population data for the municipalities in the Palisades Planning Area. The municipalities in Palisades Region are the townships of Bridgeton, Nockamixon, Springfield and Tinicum and the Borough of Riegelsville. There is one adjacent municipality in Northampton County, Williams Township.

Table 5 – Population and Housing Palisades Region

Municipality	Population				Housing Units			
	2000	2010	Increase / (Decrease)	Percent	2000	2010	Increase / (Decrease)	Percent
Durham	1,313	1,144	- 169	-12.87%	525	518	- 7	-1.33%
Bridgeton	1,408	1,277	- 131	-9.30%	612	622	10	1.63%
Nockamixon	3,517	3,441	- 76	-2.16%	1,411	1,493	82	5.81%
Springfield	4,963	5,035	72	1.45%	1,972	2,142	170	8.62%
Tinicum	4,206	3,995	- 211	-5.02%	1,834	1,907	73	3.98%
Riegelsville Borough	863	868	5	0.58%	403	412	9	2.23%
Williams	4,470	5,884	1,414	31.63%	1,738	2,537	799	45.97%

SOURCE: 1990 – 2010 U.S. Census Bureau

During the decade of the 2000s the population in two of the six municipalities within the Palisades Planning Area increased by 77 persons. However, the population in the other three municipalities decreased by 587 persons resulting in an overall net decline of 510 persons in the Palisades Planning Area. Neighboring Williams Township, located in Northampton County, experienced a population increase of 1,414 persons which exceeded the aggregate population growth of the municipalities within the Palisades Planning Area. The net increase of the seven municipalities with the study was 904 persons.

Overall housing growth of the six municipalities within the Palisades Planning Area shared an inverse relationship when compared to that of the change in population as 267 housing units were constructed. Williams Township is an anomaly as its growth in population and housing has increased significantly when compared to that of the Palisades Region.

HOUSING TRENDS AND CHARACTERISTICS

During the decade of the 2000s the number of housing units in the Township decreased from 525 to 521 units (-0.8 percent). In terms of ownership, the Census reports that 78.3 percent of the dwelling units were owner occupied, 9.6 percent renter occupied and 12.1 percent vacant. Median home value has increased by 92.3 percent from 2000 to 2014. Median monthly rent has increased by 92.0 percent from \$716 per month to \$1,375 per month.

Table 6 – Housing Unit Characteristics

Characteristics	1990	2000	2010/2014
Total housing units	485	525	521
Single-family detached	429	473	482
Single-family attached	18	14	8
2 unit structures	18	17	28
3 or 4 units	6	7	0
5 to 9 units	0	0	0
10 to 19 units	0	0	0
20 or more units	0	0	0
Mobile home	13	14	3
Renter-occupied	41	54	22
Owner-occupied	441	431	430
Median home value	\$173,200	\$205,300	\$394,700
Median rent/month	\$433	\$716	\$1,375

SOURCE: 1990 – 2000 U.S. Census Bureau and 2010/14 ACS

SUMMARY

The population and number of housing units in Durham Township decreased between 2000 and 2010 by 12.9 percent and 0.8 percent, respectively. It is the conclusion of this Comprehensive Plan, consistent with population forecasts performed by the Delaware Valley Regional Planning Commission, that the rate of growth in population and housing will in all likelihood remain relatively stable through 2035.

Chapter Four

Community Facilities/Services

In its specifications for the contents of a municipal comprehensive plan, Article III of the Pennsylvania Municipalities Planning Code calls for an examination of the community facilities. Community facilities in Durham Township are surveyed and discussed in this chapter. However, it is not within the scope of this comprehensive plan to formulate strategies for expanding and/or maintaining any of the facilities. Planning for the various facilities is either accomplished in a specific plan for the facility or service, or another agency is responsible for providing the service. In either case the planning for all community services and facilities should be coordinated with the goals and objectives of the Township's Comprehensive Plan.

WASTEWATER FACILITIES

The residents of Durham Township are served by individual on-lot wastewater treatment and disposal systems. At this time there are no municipal or community wastewater facilities in the Township. Under State enabling legislation a wastewater facilities plan was prepared for the Township. Durham is one of the eight municipalities that is part of the *Palisades Area Wastewater Facilities Plan* that was prepared in 1980. That document continues to be the official wastewater facilities plan for the Township. The following are issues related to the planning for wastewater facilities that are important considerations.

- Since the Wastewater Facilities Plan was prepared many years ago, consideration should be given to developing a revision to it that addresses current conditions and establishes policies and procedures for the Township.
- In order to maintain the public health of the community, it is important to have the existing on-lot systems to continue to function properly. Some townships in Bucks County have established a management program for on-lot systems to educate the residents on the importance of maintaining their system. The Board of Supervisors should consider instituting such a program in the Township.
- The carbonate geology and the Cooks Creek watershed are two very important environmental features in the Township that warrant special consideration in terms of wastewater treatment and disposal facilities.
- Even though there are no community systems in the Township, it is reasonable to expect that at some time a development application will be filed that includes a community system of some type. When and if that occurs it will be essential that the applicant has conducted a thorough evaluation of all alternatives means of collection, treatment and disposal of the wastewater that will be generated by the development.
- From an environmental standpoint, the disposal of effluent from a community or municipal treatment facilities should be via land application in order to recharge the groundwater supply.
- All proposed wastewater facilities, other than individual on-lot systems, should include a water resources impact study as part of the investigations and planning for the system.

The Cooks Creek watershed, the area of limestone geology and the other aquifers and watersheds in the Township must be key components of the design of wastewater facilities.

WATER SUPPLY

All of the residents and businesses in Durham Township are served by individual on-site wells. There are no municipal or community water supply systems in the Township at this time.

It is noted that two of the wells that supply the Riegelsville Borough system are located close to the Borough Township boundary line. Wellhead protection zones were established for the two wells. There are three zones on the landscape. The purpose of the three zones is to protect the wells from potential sources of contamination. Zone One, the area immediately around the wellhead is smallest in land area and is the most restrictive in terms of the uses that may be located in the zone. In most cases Zone One is owned by the water supply agency or has easements placed upon it. Zone Two and Three involve larger areas of land around the wellhead and the level of land use restriction decreases with each zone. For the two wells in Riegelsville, parts of Zones Two and Three are in Durham Township.

In 2005 the Bucks County Department of Health instituted a new program whereby the Department must certify new private wells. The regulations apply to only new wells. The permit certifies that the new well has a proper sanitary seal to safeguard against contamination of the water supply. All Township residents should have the water from their well tested periodically to ensure it is safe.

Any planning for a municipal water supply system and/or a system to supply a residential subdivision or non-residential land development must carefully study the conditions in the area of the system. In particular, if the proposed system is within or near the limestone geology the potential impacts must be assessed. A proposed system within the Cooks Creek watershed must carefully analyze the potential impact on the base flow of the stream. The planning for any water supply system must include a water budget to address recharge and to ensure the forecast withdrawal will not exceed the capacity of the aquifer.

FIRE PROTECTION

While there are no volunteer fire companies in Durham Township, the community is served by companies in nearby municipalities. The Springtown Fire Company is located on Route 212 on the west end of the village, and the Riegelsville Fire Company also serves the Township. Three other fire companies that are located at a greater distance to the Township provide backup support; they are, Upper Black Eddy, Uhlerstown, and Haycock.

AMBULANCE SERVICES

The Upper Bucks Regional EMS, located at 8716 Easton Road (Route 611) in Revere, provides basic and advanced life support services to the residents of Durham Township. The organization also has stations in Nockamixon and Springfield townships.

POLICE

Police service for the Township residents is provided by the Pennsylvania State Police from its barracks at 3218 Rickert Road, Perkasie, PA 18944. At this time the Township has no plans to establish a police force to serve the community.

SCHOOLS

Durham Township is one of the five municipalities in the Palisades School District. The local schools for our Township are Durham Nockamixon Elementary School, Palisades Middle School and Palisades High School; all three are located in Nockamixon Township. In the vicinity there is also the River Valley Waldorf School located in Bridgeton Township.

HOSPITALS

There are no hospitals in the Palisades School District. Three St. Luke's Hospitals are the closest, one in Quakertown located on Park Avenue; another in Bethlehem on Ostrum Street, which has a trauma center, and the new St Luke's Anderson Campus in Easton located at Freemansburg Road and Route 33. There are also the Easton Hospital and Doylestown Hospital a reasonable distance away.

LIBRARIES

The Riegelsville Public Library, a community public library, is located in Riegelsville Borough. The James A. Michener Branch of the Bucks County Free Library is located on Mill Street in Quakertown. A Little Free Library was just installed outside the Durham Post Office.

POST OFFICE

The Township has a post office, located at 955 Durham Road, which serves the community half days Monday through Saturday. Durham residents who wish to have USPS home delivery are served by the Riegelsville Post Office on the northern end of the Township and Kintnersville Post Office on the southern end of the Township. Outside the Post Office, there is a Durham Historical Society Community Bulletin Board for notices and community events.

TOWNSHIP ADMINISTRATION BUILDING AND MEETING ROOM

The Township has offices and a meeting room, located at 215 Old Furnace Road, which are used for official Township business and meetings. Outside, there is a bulletin board for notices and community events.

MAINTENANCE & RECYCLING

There are outdoor facilities adjoining the Township building for the road maintenance equipment and vehicles, as well as the Emergency Vehicle. There is also a recycling center which is open once a month.

PARKS

There are five parks in the Township including the Ball Field with a concession stand/equipment room and dugouts used and maintained by the Durham Athletic Association. This field is located on Dogwood Lane, just off of Durham Road. A small triangle adjoining the Township building, Post Office and Mill (all owned by the Township), where the Durham Boat Replica is displayed along with the Carl B. Robbins Bandstand and Durham Historical Society Community Bulletin Board, is where the Township Community Day program is held. There is a 90 acre parcel, some owned by the Township and some leased by the Township from Bucks

County, off Stouts Valley Road and along Cooks Creek that is part of Open Space but unused for any public activity. And finally, the Delaware Canal State Park along the Delaware River at Route 611 & 212 exists for the pleasure of jogging, hiking, fishing and biking.

DURHAM GRIST MILL

The Mill is located next to the Township offices at Durham and Old Furnace Roads. It is owned and maintained by the Township. It is open for tours on Community Day and the Durham Historical Society hosts programs in the Mill.

CHURCHES AND CEMETERIES

Durham Township has one church within its borders, Evangelical Lutheran Church of Durham, 821 Durham Road, Durham, PA 18039.

Durham Township has one cemetery; Durham Cemetery, also known as Evangelical Lutheran Church Cemetery, Durham Reformed Cemetery and Durham Union Cemetery. Earliest burials date back to the 1830's.

UTILITIES

Electric transmission lines that run through the Township along with distribution lines belong to Met-Ed-FirstEnergy Corp. Currently, the local cable provider and internet service in our area is provided by Service Electric and Verizon. There are currently two cell towers in the Township that are on private land and serviced by Sprint and Verizon. A defunct oil transmission line owned by Sunoco Logistics and managed by Reliant Energy Group crosses our Township. At the present time it is "inactive" with nitrogen being pumped occasionally to maintain integrity.

As of the updating of this plan, there is a proposal to run a 36 inch natural gas transmission line (named PennEast Pipeline) through our Rural Residential District, across the preserved properties and under the Delaware River and Canal in Durham Township. The goal of the company is to have the pipe installed and operating by end of year 2017. There will be no gas provided by the line to the Township.

WASTE MANAGEMENT

The area is served by private trash collection services. Established businesses who serve the area currently include, Waste Management Services, Peterson's, DelGuericos, and Allied Waste.

SENIOR CENTER

The Eastern Upper Bucks Senior Center located at 8040 Easton Rd Route 611 (PO Box 545) in Ottsville, Pa. The center is open Monday through Thursday from 10-3 and offers a wide variety of services to seniors over the age of 55 living in the Upper Bucks Area.

Chapter Five

Natural Resources

The rolling farmland, wooded steep slopes, meandering streams and the Delaware River create a very distinct and beautiful natural setting for Durham Township. Natural resources were the corner stone of the 1977/2006 Comprehensive Plan with the following excerpt from the Preamble that is still very much applicable to character of the Township and this Plan.

“The identity of Durham Township has evolved over time in a slow, consistent manner: consistent with natural resource constraints which have allowed a farming industry to prosper on fertile, prime, agricultural soils as the more delicate and vulnerable natural features have been protected. The best soils are farmed while slopes, alluvial soils, wetlands, and forests have for the most part been preserved.

This development of the landscape emanates from a recognition by the Township residents of the limitations and benefits that can be expected if natural resources are respected and used appropriately.

Prudent use and protection of natural resources has created a beautiful, open landscape to which the residents of Durham Township respond. The rolling hills and open farm fields afford magnificent views of the entire Township where wooded slopes and hedgerows still support abundant wildlife and streams are clear and pure. It is these large open vistas and abundant, untouched natural areas to which the people respond with satisfaction and appreciation.

The development of Durham Township has, therefore, remained consistent. Consistent with the physical limitations and potential of the land and with the attitudes and opinions of the people toward the land. Durham Township wishes to remain consistent in the future. It is the purpose of this plan to recognize the need to plan for the future development which is safe, healthy, non-discriminatory, economically sound and establish criteria that will protect vital resources as development takes place. In this way Durham Township can grow in the future without losing nor compromising those attributes that make it an attractive and desirable living environment today.”

The Township’s policy on the protection of prime agricultural land and natural resources is supported by Article I, Section 27 of the Constitution of Pennsylvania:

“The people have a right to clear air, pure water, and to the preservation of the natural, scenic, historic and aesthetic values of the environment, Pennsylvania’s public natural resources are the common property of all people including generations yet to come.”

The Pennsylvania Municipalities Planning Code, the enabling legislation for all land use planning in the Commonwealth, also supports a municipality’s effort to protection prime agricultural land and natural resources. Subsection (6) of Section 301 stipulates that a municipal comprehensive plan include a plan for the protection of prime agricultural land and natural resources. In addition, Article VI authorizes a municipality to include provisions in the zoning ordinance for protection and preservation of natural resources and agricultural land and activities. It is important to note that a municipal zoning ordinance may include measures to protect agricultural activities in addition to protecting agricultural land.

The areas that are particularly important to the Township from a natural resource standpoint include the prime agricultural land, the Cooks Creek Watershed, the Delaware River,

Durham Mine, Mine Hill, Rattlesnake Hill, the Gallows Run Watershed and all tributary streams, and the Carbonate (limestone) geology. The Cooks Creek watershed, a 30 square mile area that is located within Springfield and Durham townships, has been designated an Exceptional Value stream by the Pennsylvania Department of Environmental Protection. The Cooks Creek is the only stream in Bucks County that supports a population of trout. Wild, naturally reproducing brown trout and native brook trout are part of the trout population in the Cooks Creek and its tributaries. The native brook trout population in the Cooks Creek and its tributaries is unique to Southeastern Pennsylvania. Productive farm fields on the prime agricultural soils are very much in evidence throughout the Township. While the carbonate (limestone) geology cannot be seen, it is nevertheless a very important natural resource. The soils associated with limestone are productive agricultural soils, and the geology is generally a good source of groundwater. However, caution must be used when development is proposed in limestone areas because of the possibility of subsidence and ground water pollution.

AGRICULTURAL SOILS

The preservation of agricultural land was an important component and recommendation of the 1977/2006 Comprehensive Plan, and continues to be equally important with this update. Several years ago the Natural Resource Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, issued a new soil classification for Bucks County. Soil classifications that have characteristics that are favorable to good agricultural production have been placed in two categories – Prime Farmland Soils and Soils of Statewide Importance.

Prime Farmland Soils is land best suited for producing food, feed, forage, fiber and oilseed crops, and also available for these uses (the land could be cropland, pastureland, rangeland, forestland, or other land but not developed land or water. It has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops economically when treated and managed, including water management, according to modern farming methods.

Soils of Statewide Importance are, in addition to Prime Farmland, of statewide importance for the production of food, fiber, forage and oilseed crops. The Natural Resource Conservation Service has designated Capability Class II land and Capability Class III land does not qualify as Prime Farmland as additional Farmland of Statewide Importance in Pennsylvania.

Prime Farmland Soils and Soils of Statewide Importance are located throughout the Township and generally coincide with the land that is under cultivation. All of the soil categories that are considered Prime have a slope of eight percent or less, while some of the soils with the statewide classification have a slope of between 8 and 15 percent.

NATURAL RESOURCES

Durham Township is fortunate to have a number of reports and studies that address various aspects of the natural resources in the Township. The list of these studies includes:

- *Cooks Creek Watershed Conservation Plan*
- *Durham Resource Inventory Plan*
- *Natural Areas Inventory of Bucks County, Pennsylvania*

- *Bucks County Natural Resources Plan*
- *Conservation & Management Practices for Buckingham & Durham Carbonate Valleys*

- *Wetland Protection Plan* – This plan was prepared by the Durham Environmental Advisory Council through a grant from the Environmental Protection Agency. The Plan outlines a series of recommendations and tasks for the protection of wetlands in the Township.
- *The Gallows Run Watershed Restoration and Protection Plan*

Each of these reports is summarized below to present a basic understanding of the report and its significance to the land use-planning program of Durham Township. As appropriate, each document should be referred to for more detail information and data.

Cooks Creek Watershed Conservation Plan

Over a period of several years the Durham Township Environmental Advisory Council spent a considerable amount of time compiling information and data on the Cooks Creek Watershed. That material was analyzed from which the *Watershed Conservation Plan* was prepared. Even though the Plan covers only the portion of the municipality that is within the Cooks Creek Watershed, it is an invaluable resource for land use planning programs in the Township.

The *Cooks Creek Watershed Conservation Plan* is adopted by reference with this Comprehensive Plan. It is a companion document of extreme value and importance for the future of Durham Township.

The Environmental Advisory Council identified two goals for the *Conservation Plan*.

1. To formulate a management program that truly sustains water resources through utilization of Best Management Practices (BMPs).
2. To highlight those characteristics or critical issues in the watershed that require further study.

Using those goals as a guide and the vast amount of data collected and mapped, the Council prepared management options and recommendations for protecting and preserving the Cooks Creek Watershed.

1. Develop a Water Management Plan – Using data developed from ongoing and future studies, develop a Sustainable Watershed Management Plan that provides for wellhead and base flow protection in the Cooks Creek Watershed.
2. Monitoring Cooks Creek Flow – The critical base flow condition Q7-10 values are used in the Water Balance Model. The Q7-10 has not been collected from the Cooks Creek Watershed using data from a ten-year period. Less than four years of data have been collected for this calculation. This equation requires the collection and use of 10 years of data, therefore, continued monitoring of the “Red Bridge Road” bridge location gauging station should be conducted to obtain the additional data required.
3. Monitoring Aquifer Levels – Water levels should be measured monthly at 4 to 6 residential wells. This data is used in groundwater storage and water budget calculations in WAMOS computer interface.

4. Generate an Upgraded Water Table Map – In this study approximately 75 residential wells were utilized to establish the water table map. An additional 30 residential wells are suggested to measure for depth of water to upgrade the water table map.
5. Expand the GIS Database – As more watershed related data becomes available, expand and incorporate all data into GIS and computer applications. Train municipal officials in the use and maintenance of GIS databases. Develop and maintain current land use maps.
6. Continue to Develop the Hydrologic Database managed using the computer interface WAMOS.
7. Develop a Nutrient Management Plan – Low level, chronic nutrient pollution has been observed in the watershed and has been shown to impact water and habitat quality. Perform a comprehensive nutrient balance to determine the sources and causes of nutrient enrichment in the Cooks Creek Watershed. Use this information to pinpoint appropriate management actions.
8. Develop a Township Level Storm Water Management Plan – Extremely local erosion problems have been observed contributing to siltation in the streambeds. Given the sensitivity of the wildlife and fisheries of the watershed these problems should be carefully examined and controlled, if possible. Although a countywide storm water management plan exists a specific township level plan should be developed to determine the locations and magnitude of storm water runoff in the watershed. Monitor erosion throughout the watershed and determine its causes. Develop a plan to manage both storm water and erosion and determine appropriate management actions.
9. Develop a Comprehensive Biological Inventory – Considerable biological resources exist in the watershed. In order to monitor the success of this plan and to alert officials to any future problems, work with local watershed groups to establish and monitor the health of the biological resources of the watershed.
10. Expand and Maintain a Water Quality Monitoring Program – In order to expand water quality monitoring information and track improvement.
11. Educational Activities – Educational programs are necessary to change misconceptions regarding watershed resources and to encourage future protection and enhancement of Cooks Creek Watershed. The following educational programs or forums should be considered: a) Water quality seminars for local government officials; and b) Public workshops.
12. Riparian Buffer Improvements – A complete assessment of current stream bank conditions should be conducted to determine priority sites within the watershed requiring riparian buffer enhancements. Riparian buffer improvements and management programs should be employed.
13. Ordinances and Planning Documents – Update the Comprehensive Plans for both Durham and Springfield Townships. Include the data in this plan, and referenced studies. Work to ensure that water quality and quantity are sufficient to support local vision for the future of the watershed.

The following critical areas should be considered for zoning ordinance and Comprehensive Plan preparation:

- Storm water management and erosion control;
- Wetlands protection;
- Base flow protection;
- Conservation easements and open space;
- Endangered and/or threatened species habitat protection;
- Karst and sinkhole land development standards;
- Overlay districts of critical areas (first order sub-basins; wetland buffers; riparian (flood plain); and, lakes and ponds);
- Septic systems types based on soil districts;
- Steep slopes;
- Stream or riparian buffers; and
- Wellhead protection

Natural Areas Inventory of Bucks County Pennsylvania

In 2011 the Bucks County Commissioners published the *Natural Areas Inventory of Bucks County Pennsylvania*; first published in 1999. The report contains an inventory of the most significant natural features throughout the County. Of the sites that were studied 115 are presented in the report.

Through the evaluation of the sites they were placed in priority order in terms of importance for protection. Priority One sites were placed in that class due to their uniqueness or exceptional high quality and have statewide or countywide significance. Priority Two sites have countywide importance and a few have statewide significance. The sites in this class have an overall high quality and significance. There are no priority two sites in Durham Township. Priority Three sites are ones with county and local significance. A few sites that are small or have a degraded population of a state listed species were placed in this category. Lastly, Priority Four sites are primarily important on the local level because of the nature of the resource.

Bucks County and certainly Durham Township, is known for the beauty of the scenic rural countryside. The scenic qualities are a result of the natural resources that make up the landscape. The report emphasizes the importance of the diversity of natural features that include plants, animals and natural communities that are not found in any other place in Pennsylvania. Identifying the important natural resources is only the first step. Protecting and preserving the natural resources is the ultimate goal of both the County and the Township.

Priority One Sites In Durham Township

- Cooks Creek - This watercourse which is located in Durham and Springfield townships is described as follows. "Cooks Creek (also known as Durham Creek) originates in the Triassic diabase and quartzite hills of western Springfield Township and flows in a northeasterly direction through Brunswick Formation shale into a limestone valley at Springtown. From there it follows a course through the Cambrian limestone of

Springfield and Durham Townships to its confluence with the Delaware River below Riegelsville. The main stem of Cooks Creek is approximately 15 miles in length, the tributaries total an additional 37 miles. The creek has been designated an Exceptional Value (EV) stream by the Pennsylvania Department of Environmental Protection. It supports a native brown trout population. Headwater of the main channel of Cooks Creek is on the lower slopes of The Lookout. Most of the land along the creek is agricultural, although extensive sedge meadows are present in several locations. Industry borders the creek near its mouth in the vicinity of Durham Furnace, the site of an early iron forge. Cooks Creek is an outstanding aquatic resource. Protection efforts should extend from the mouth to the headwaters.”

Notable features:

- Tussock sedge marsh
 - Red maple – scrub/shrub palustrine woodland
 - Sugar maple – basswood forest
 - Red oak – mixed hardwood forest
 - Tulip tree – beech – maple forest
 - Silver maple floodplain forest
- Durham Mine, Mine Hill, and Rattlesnake Hill – “This site consists of extensive north-facing forested slopes extending for about two miles along Route 212 from Mine Hill Road to the intersection with Route 32 south of Riegelsville. The ridge represents a spur of the Reading Prong and is composed of Hardyston quartzite and Byram gneiss separated from the main mass of the Reading Prong by the limestone valley containing Cooks Creek. Iron ore from Mine Hill supplied the early forge at Durham. In 1851 a larger mine was opened to the east in Rattlesnake Hill, which supplied the nearby Durham Iron Works with ore.”

“The abandoned mine has become an important bat hibernaculum, the second largest in Pennsylvania with 8,000 – 10,000 bats recorded in a 1997 survey. Six species of bats have been identified at the mine, including two species of special concern in the state. Because of the importance of the hibernaculum, in 1994 the Pennsylvania Game Commission and Heritage Conservancy collaborated to install specially designed gates to exclude humans but allow bats to enter and leave freely. Problems involving vandalism of the gates have occurred, requiring continual monitoring and repairs. A rare fresh water invertebrate, Price’s cave isopod also has been found in the mine.” A check of the bats at Durham Mine on April 5, 2010 found that white nose syndrome, a fungal disease that has devastated bat populations throughout the northeast, was present.

“The 150-175 acre forest that covers the northern and eastern slopes of Mine Hill and Rattlesnake Hill provides a link between the mine and the Cooks Creek and Delaware River corridors which is of significance for the bats and also provides habitat for 62 birds species including 10 rare breeders. Increased monitoring of the gates is urgently needed to protect the bats which are very vulnerable to disturbance when they are hibernating.”

Notable features:

- Bat hibernaculum housing 8,000 – 10,000 bats
- Red oak – mixed hardwood forest
- Eastern small-footed myotis *Myotis leibii*
- Northern myotis *Myotis septentrionalis*
- Price’s cave isopod *Caecidotea pricei*
- 62 bird species, including 10 rare breeders.

Priority Three Sites In Durham Township

- Buckwampum Hill – “This site includes approximately 320 acres of forested slopes and hilltop, it straddles the boundary between Durham and Springfield Townships. Headwaters streams of Gallows Run and Cooks Creek originate in seeps and wetlands on the slopes of Buckwampum Hill. Fifty-eight species of birds have been recorded including 7 rare breeders. The county owns several parcels on the hill including a communications tower site at the top. Residences are scattered along the lower slopes and on a dirt road which goes to the top on the south side. Deer browse is moderate to severe throughout. Geology is Triassic shale and quartzite, the site lies immediately adjacent to the Monroe Border Fault. A description of the forest composition approximately 100 years ago is provided by the journals of two local botanists, John and Harvey Ruth (White and Rhoads 1996).”

Notable features:

- Headwaters of tributaries of Gallows Run and Cooks Creek
 - Red oak – mixed hardwood forest
 - Red maple – blackgum palustrine forest
 - 59 bird species including 10 rare breeders
- Chestnut Hill – “This site consists of extensive wooded slopes with scattered houses tucked into the woods. The entire area is heavily browsed by deer and consequently lacks shrub and understory layers. Herbaceous species are also sparse. Chestnut Hill is composed of Triassic shale and quartzite and is adjacent to the Monroe Border Fault. Surveys by the Bucks County Audubon Society have identified 63 bird species on Chestnut Hill including 10 rare breeders.”

Notable Features:

- Immediately adjacent to the Monroe Border Fault
 - Red oak – mixed hardwood forest
 - 63 bird species including 10 rare breeders
- Lynn Island – Durham and Nockamixon Townships – “This 11 acre island in the Delaware River was added to the Delaware Canal State Park and designated along with several other islands, as part of a State Park Natural Area. It includes alluvial sand and cobble deposits and mature riparian forest. The upper end of the island is flood-scoured. Observations of the flora of the island from the 1890s provide an interesting reference point for evaluating changes over the years (White and Rhoads 1996).”

Notable features:

- Part of the Delaware River corridor
- River birch – sycamore floodplain scrub
- Tulip tree – beech – maple forest
- Sycamore – river birch – box-elder floodplain forest
- River beach bar community
- Abbreviated clubtail dragonfly – *Gomphus abbreviatus*
- Ohio spiderwort – *Tradescantia ohioensis*

- Monroe Border Fault – “This significant geological feature has been designated as a National Natural Landmark, a plaque is present in the exposed rocks along Route 32 just south of Lehnenberg Road. Also known as the Triassic Border Fault, this geologic boundary runs from the Delaware River at Monroe west to where Route 212 crosses the county line. The fault formed about 250 million years ago when the block to the south dropped to form a deep valley. Subsequent deposition of sediments has formed the Triassic shales, sandstones, and conglomerates of the Piedmont physiographic province. To the north are much older rocks, some as much as one billion years, including the Precambrian gneiss and granite and Cambrian limestones and quartzite’s which make up the Reading Prong (Geyer and Bolles 1979).”

Notable Features:

- National Natural Geologic Landmark
- Part of the Delaware River corridor
- Red oak – mixed hardwood forest

Priority Four Site In Durham Township

- Kintnersville – Gallows Run floodplain – “The lower section of the Gallows Run Creek corridor, between Route 611 and the Delaware Canal, contains extensive floodplain wetlands and backwaters.”

Notable Features:

- Stream
- Isolated ponds and backwaters associated with the creek
- Bluejoint – reed canary grass emergent wetland
- Tussock sedge marsh
- Sycamore – river birch – box-elder floodplain forest

Prioritizing and ranking natural resources was an important component of the original 1999 report of *Natural Areas Inventory of Bucks County Pennsylvania*; the more recent 2011 version of the study incorporates the concept of Landscape Conservation Areas, including two in Durham Township:

- Cooks Creek Landscape Conservation Area
This conservation landscape includes the Bucks County portion of the watershed of Cooks Creek. Occupying an area of 17,107 acres, it extends across northern Bucks County from the mouth of Cooks Creek at Durham west to The Lookout. The Cooks Creek Landscape connects with the Delaware River Conservation Landscape.
- Delaware River Conservation Area.
The Delaware River Conservation Landscape is located along the eastern border of Bucks County from the Northampton County line to the Fall Line which marks the boundary with the Atlantic Coastal Plain. It is designed to focus attention on the ecological and scenic resources of the 26 mile-long river corridor which includes islands, the floodplain along the river, and the cliffs and forested slopes that are part of the viewshed.

Bucks County Natural Resources Plan

The heart of the land use-planning program advocated by the various editions of the *Bucks County Comprehensive Plan* over the last three decades has been the protection of natural resources. As early as 1972, the Bucks County Planning Commission published the first plan advocating the protection of natural resources in the Commonwealth. Since that time the County Planning Commission has made the protection of natural resources the primary factor in the preparation of municipal comprehensive plans and in determining the development potential of land. Natural resources include floodplains, wetlands, steep slopes (15 percent and greater), prime agricultural soils and woodlands. More specific to Durham Township is the carbonate geologic formation in the Durham Valley that extends from Springfield Township to Riegelsville Borough. This geologic formation requires careful investigation and care for any type of development activity. Sinkhole collapse and groundwater contamination are the two important concerns with carbonate geology.

Protecting natural resources is an important consideration for the Comprehensive Plan and Zoning Ordinance of Durham Township. The natural resources on land in the Township should be protected. Protecting natural resources is not only directly related to the protection of the health, safety and welfare of the residents of Durham, they also contribute to the quality of life in a community.

Durham Resource Inventory Plan – 1995

In 1995 the Durham Township Environmental Advisory Council prepared the Resource Inventory that includes maps and text on three natural resources – soils, geology and hydrology. The stated purpose of the Inventory was “to raise the awareness of environmentally sensitive areas and aid in identifying areas for preservation.”

Geology Map – The discussion of the geology is focused on the carbonate geology that is in much of the Township. While the potential yield of groundwater in this geologic formation is generally good, there are environmental hazards associated with limestone. The two most serious hazards are the formation of sinkholes and groundwater pollution. The report also stresses the importance of managing the flow and quality of stormwater in carbonate areas. Concentrated stormwater can erode the soil and increase the risk of sinkholes. Improperly managed stormwater can also lead to pollution of the groundwater.

Soils Map – In its study, the EAC, examined agricultural, hydric, and floodplain soils, the predominant types of soil in the Township. Agricultural soils are productive and contribute to the local economy. In addition, they are important contributors to groundwater recharge and provide scenic open space. Hydric and floodplain soils, because of the characteristics and location, are important natural features that must be protected.

Hydrology Map – This map identifies the four watersheds in the Township – the Delaware, Rogers Run, Gallows Run and Cooks Creek. The report emphasizes the importance of the connection between groundwater and surface water. Because of the high water quality of the streams, it is important that measures be taken to protect them. In particular, Cooks Creek has been designated an Exceptional Value stream. In addition to promoting the protection of the streams, the report also stresses the importance of preserving the stream corridor and the forested buffer.

Conservation & Management Practices for Buckingham & Durham Carbonate Valleys

Even though this report was prepared in 1985, it is still considered the authoritative source for the two carbonate valleys in Bucks County. “This report provides an overview of the potential water quality problems and geologic hazards encountered in the environmentally sensitive carbonate rock areas of Bucks County, Pennsylvania. Recommended conservation and management practices to prevent environmental degradation are presented. Study Goals:

1. Call attention to the environmental sensitivity of the carbonate valleys of Bucks County.
2. Identify the environmentally sensitive and critical areas within the carbonate Valleys.
3. Recommend strategies to protect both the ground and surface waters within these carbonate valleys.
4. Recommend appropriate standards for development within the carbonate valleys.
5. Recommend strategies for coordinated planning within the carbonate valleys.”¹

¹ Conservation and Management Practices for Buckingham & Durham Carbonate Valleys, Bucks County Planning Commission, 1985

The boundaries of the carbonate geology are presented on a property base map of the Durham Valley that extends through the northern area of Durham and Springfield townships and into Riegelsville Borough. The report contains management strategies for stormwater management, wastewater disposal (on-lot systems and wastewater treatment facilities), storage of materials and development hazards. With the potential for subsidence of the ground surface and pollution of the groundwater, this area is of particular concern for the land use plan and supporting land use regulations.

The *Cooks Creek Watershed Conservation Plan* contains mapping of the geology in the watershed and provides a delineation of the carbonate geology. The delineation of the carbonate geology was based on a geologic survey of the watershed, and thus provides a more recent examination of this geologic formation in the Township than the report that was prepared by the County. In any regulations that the Township adopts relative to carbonate geology should refer to both studies and the mapping with the greatest delineation of the formation should be used. It must be recognized that the delineation is limited in its precision due to the circumstances.

Gallows Run Watershed Restoration and Protection Plan

The 8.87 square mile watershed is located in Nockamixon, Springfield and Durham townships and the Pennsylvania Department of Environmental Protection classifies the waterway as a Cold Water Fishery. Under a Growing Greener grant, Gallows Run Watershed Association prepared the Plan to create a list of restoration and protection measures to maintain and improve water quality in the watershed. The goals of the Plan are:

1. Water quality and water quantity protection – Enhance, protect, and maintain existing water quality and quantity in the Gallows Run, its tributaries and hydro-geologically connected groundwater resources.
2. Restoration and Protection Plan Implementation – Take a proactive approach to preserve, protect and restore the quality of water in the Gallows Run watershed, and implement Tier 1 – Tier 3 prioritized projects listed in the Gallows Run Watershed Plan.
3. Watershed Amenity Protection – Enhance, protect, preserve and manage natural land

resources in the Gallows Run Watershed since they are directly associated with clean and plentiful surface and groundwater resources.

4. Education and Stewardship – Create and maintain an informed and pro-active citizenry knowledgeable of stewardship throughout the Gallows Run watershed.
5. Environmental Partnership – Maintain and enhance partnerships with adjoining and regional watershed groups and government and non-government organizations.
6. Environmental Planning and Protection – Enforce existing environmental protection tools and provide additional protection as needed.
7. Capital Improvement – Obtain reliable and consistent funding to preserve, restore and manage water resources and natural, cultural, and recreational amenities within the Gallows Run Watershed.

Chapter Six

Protected Land

The preservation of land in Durham Township has become an active endeavor that is very successful. Land has been permanently preserved through the following three different means. The properties and the acreage for this summary are current as of 2016.

BUCKS COUNTY AGRICULTURAL PRESERVATION PROGRAM

The Bucks County Commissioners have an active agricultural land preservation program that is administered by the Agricultural Preservation Board. The Bucks County Agricultural Land Easement Program was established in 1990 as part of the Pennsylvania Farmland Protection Program. The joint state/county easement purchase program provides funds for agricultural conservation easement purchase. These easements limit use of the land to agricultural operations in perpetuity. The following properties have been preserved through this program.

Tax map parcel	
11-002-024 & 11-002-034	167.94
11-2-56 & 11-2-55-1	94.86
11-13-11, 11-13-12, 11-13-13, 11-13-19, 11-13-21, 11-13-22	53.00
11-2-54-1	63.06
11-2-19, 11-2-20, 11-2-21, 11-2-23	130.52
11-002-033	49.91
11-001-003	62.86
11-004-003	93.36
11-005-110, 11-005-009	151.78
11-005-052, 11-005-057	195.89
11-4-49-1, 11-4-45	65.81
11-005-051, 11-005-063	71.04
11-002-016, 11-002-035, 11-002-042	105.73
	1,305.76 acres total

TOWNSHIP/COUNTY PARTNERSHIP

Under the Bucks County Open Space Preservation Program, 90.2 acres (two parcels), was preserved along Stouts Valley Road, Rattlesnake Road and Route 212 as permanent open space.

HERITAGE CONSERVANCY

The Heritage Conservancy is a land conservation organization in Doylestown, PA that has a mission of protecting the natural and historic resources in the region. At this time the Conservancy has conservation easements on twenty-four properties in Durham Township.

Tax map parcel	
11-1-1-1, 11-1-1-2, 11-1-2	69.7
11-2-31	65.7
11-2-51	23.6
11-2-51-1	16.4
11-2-51-2	16.4
11-5-21, 11-5-22, 11-5-54	37
11-5-24	42.7
11-5-26, 27, 28-1, 35	89
11-5-89, 91, 11-13-32	84.3
11-13-29	18.9
11-5-85	119
11-2-5	33
11-2-6, 6-4, 6-5	44
	659.7 acres total

Under the three land preservation programs, a total of 2,055.66 acres has been preserved. The preserved area represents approximately 32.1 percent of the area of the Township.

AGRICULTURAL SECURITY AREA

The Agricultural Security Area Law (Act 43 of 1981) established a program to protect agricultural land from development pressure. It is a voluntary program that is established by Township governing body at the request of a group of landowners. The program is intended to promote more permanent and viable farming operations by the strengthening the farmer's sense of security of a right to farm. Farmers enrolled in the program realize the following benefits:

- Protection from municipal nuisance ordinances restricting normal farming operations.
- Protection from acquisitions by governments through condemnation or eminent domain. The Agricultural Lands Condemnation Approval Board must approve Land proposed for acquisition.
- Enrollment into the county's easement purchase program requires being part of an Agricultural Security Area.

There are twenty-five properties in the Durham Township Agricultural Security Area that have a total area of approximately 1,842.7 acres.

PENNSYLVANIA STATE PARKS & NATIONAL HERITAGE CORRIDOR DELAWARE CANAL

The Delaware Canal tow path has a park, open space, recreational area and Lynn Island totaling 34.2 acres in Durham Township.

TOWNSHIP LAND

In addition to the 90 acre Open Space Preserved land, Durham Township owns 3.6 acres where the Municipal building -1920 Mill Maintenance Building, recycling center, Public Works Shop, pole barn, chicken/turkey house, Durham Grist Mill and Township Green are located. The Baseball field is 1.7 acres, also owned by the Township.

Chapter Seven

Transportation

Article III of the Pennsylvania Municipalities Planning Code states that a municipal comprehensive plan must address the movement of people and goods within the community. This chapter of the comprehensive plan will provide an overview of road network in the Township and pedestrian circulation. Existing data and observations were used to prepare this chapter.

Transportation in Durham Township is limited to the highway network that provides circulation within the Township and with links beyond. From a historical perspective, the Delaware Division of the Pennsylvania Canal provided another, albeit limited mode of transportation for residents of the Township.

Two Pennsylvania State Routes, 611 and 212, are the through roads that connect Durham with the region. Route 611, Easton Road, is the contemporary version of the Colonial road that linked Philadelphia and Easton. In the village of Kintnersville, just south of the boundary line of Durham and Nockamixon townships, Pennsylvania Route 32 (River Road) intersects with Route 611. Route 32 follows the River and provides links to New Jersey at several locations. As Route 611 continues in a northerly direction through Riegelsville, it provides a connection with Interstate 78 where it crosses the Delaware River just south of Easton. Interstate 78 is a major limited access arterial highway that extends west to Harrisburg and beyond, and east to northern New Jersey and New York City. Access to I-78 is also available by traveling in a westerly direction on Route 212 to Route 412 and travel north to the Hellertown interchange.

From a local perspective, Route 611 provides a connection with New Jersey via the Riegelsville Bridge and the city of Easton. To the south, Route 611 is the link with Doylestown and to Route 32 (River Road) and the communities along the Delaware River, connections with New Jersey and New Hope. Route 212 provides a link with Quakertown where it joins with Route 313 and the connections it provides. To the west of Springtown Route 412 intersects with Route 212. Route 412 gives the residents of Durham a convenient route to Bethlehem.

STREET CLASSIFICATION

Roads in Durham Township are classified according to the function they serve in terms of the overall network within the Township and the links the roads provide to adjacent municipalities and beyond.

ARTERIAL HIGHWAYS

Arterial highways are major roads with limited access points that carry regional and inter-municipal traffic. They carry large volumes of traffic to major business and employment centers in the region beyond the municipality. It is important to control the number and location of access points on arterial roads in order to maintain the function of the road which is to move people and goods through the area.

The Arterial highways in Durham Township are: Route 611 and Pennsylvania Route 212.

COLLECTOR ROADS

A Collector Road carries traffic to Arterial Highways, or moves people between neighborhoods and local shopping areas. While this classification of road is not designed as a major throughway, they must be maintained to allow a free flow of traffic. The function of a Collector Road is to carry traffic to and from arterial highways to local primary and secondary roads. The following policies are established for Collector Roads.

- a. Properties adjacent to a Collector Road should be prohibited from taking direct access. Reverse-frontage, marginal-access roads or clustered developments around cul-de-sacs should be used to limit curb cuts.
- b. When a property adjacent to a Collector Road is being developed, builders are required to make improvements to the road frontage. Such improvements may include repaving, realignment of the road and/or intersection, and grading to provide adequate shoulders and drainage facilities. In making these improvements, the rural qualities of Durham Township should be considered.
- c. Parking is prohibited on Collector Roads. Because development will occur primarily within the Development District, little improvement to Collector Roads will be required outside the District.

The Collector Roads in Durham Township are Durham Road, Lehnenberg Road, Spring Hill Road, Stouts Valley Road, Delaware Road and Gallows Hill Road.

LOCAL ROADS

These roads serve the adjacent land uses and carry local traffic, not through-traffic. They will be built as part of developments within the Development District and other parts of the Township, and will be offered to the Township for dedication. Consequently, new Local Roads must be built to Township road specifications and provide adequate access for the development they serve.

TRANSPORTATION IMPROVEMENT PROGRAM PROJECTS

Proposed improvement projects for State roads and County bridges are included on the Bucks County Transportation Improvement Program (TIP). Requests to have projects included on the list, which will receive state or federal funding, are made by primarily municipal officials. The first level of the review process for inclusion on the list is the staff of the Bucks County Planning Commission. After review, the county's list is forwarded to the Delaware Valley Regional Planning Commission for consideration for the regional program. Every two years the regional list is updated and coordinated with the Pennsylvania Department of Transportation's Twelve Year Plan. The Regional Planning Commission ranks and selects projects from the lists submitted by the counties for inclusion on the regional TIP.

Durham Township has one project on the Delaware Valley Regional Valley Planning Commission's Fiscal Year 2015 – 2018 Transportation Improvement Program for Pennsylvania. The project is for the replacement/rehabilitation of the PA 611 Bridge. In the nearby municipalities of Riegelsville Borough, Bridgeton and Nockamixon township's there are three projects on the TIP, all involving the replacement/rehabilitation of bridges.

Chapter Eight

Land Use Plan & Implementation

Based on a review and update of the Goals and Objectives and the Land Use Plan in the 1977/2006 Comprehensive Plan, this Comprehensive Plan will recommend the continuance of the land use scheme in the 1977/2006 Plan. The Land Use Plan is based on the Development District Concept, a growth management tool that has been used by many municipalities in Bucks County for approximately forty years.

A municipal comprehensive plan is a policy document outlining the desired physical development of the community with a time horizon of ten to twenty years. The governing body and planning commission prepare the plan using an involved public participation process. It will establish a desired land use pattern for the municipality. With the Development District concept, the future land use pattern will include four basic categories of land use. The first of two objectives of the concept is to direct the anticipated growth into compact areas where infrastructure and services either are available or can be provided in a logical and cost efficient manner. Protection of prime agricultural land and natural resources constitutes the second objective. With this approach to land use planning, the opportunity is provided for higher density residential development to occur. A full range of housing types is permitted in the zoning ordinance as provided for in the Pennsylvania Municipalities Planning Code. The more intense growth is directed away from the sensitive natural resources and prime farmland.

The four fundamental categories of land use in the Development District concept are:

- **Urban Area** – This is the area of existing development. It may be a borough, village or a developed area of the municipality. In most cases it will be served by public water and sewer service. For Durham Township, the Urban Area is Riegelsville Borough. Since Riegelsville is a separate municipality, the Urban Area is not applicable to Durham Township and will not be addressed by this Plan.
- **Development Area** – This area has been determined through the preparation of the comprehensive plan to be the best and most logical place for more intensive growth to occur. Using population forecasts for a ten to twenty year period, the size of the area is set to accommodate the anticipated growth. Public water and sewer facilities will be in the area, or the plans for those facilities designate the Development Area for extension of these services in the near future.
- **Rural Areas** – As the name implies, Rural Areas are mostly vacant land outside the Development District that are not prime farmland or natural resource areas. There are no plans for serving the area with public water and sewer facilities.
- **Resource Protection Areas** – The characteristics of this category in the Development District Concept is a preponderance of natural resources that will be jeopardized by development. For the Durham Township Comprehensive Plan, the resource protection category will be referred to as the Agricultural Protection Area. In addition, other important natural resources such as floodplains, wetlands and steep slopes will be given a high priority for protection.

DURHAM TOWNSHIP LAND USE PLAN

This section provides a plan of the Township's vision of the future land use pattern for Durham Township. The protection of natural resources, the preservation of open space and sound growth management are the three priorities that guided the land use plan. The two relevant planning areas (Resource Protection Area and Development Area) of the Development District Concept are presented here. For this comprehensive plan the Resource Protection Area of the Development District concept will be the Agricultural Protection Area. Each classification is presented in terms of the issues relevant to Durham Township by pointing out particular features and/or characteristics of the Township. The descriptions of the planning areas will provide a guide for reviewing and revising the land use ordinances, provide a guide for other land use related plans such as a wastewater facilities plan and open space plan. This section should also be consulted during the review of development proposals.

AGRICULTURAL PROTECTION AREA

Agriculture is the primary land use in Durham Township and has been for many generations. Active farm fields are part of the landscape throughout the Township. As of the updating of this Comprehensive Plan 1,305.76 acres of farmland have been preserved through the Bucks County Agricultural Land Easement Program. An additional 537 acres of farmland is enrolled in the Township's Agricultural Security Area program. The predominance of agriculture in the Township has not occurred by chance. The early settlers realized what the Natural Resources and Conservation Service (NRCS) has documented. The soils are very good for raising crops. The NRCS has mapped the soil types in Bucks County and has identified Prime Agricultural Soils and soils that are considered Statewide Important Farmland. A review of the soil classification map for Durham Township reveals that virtually all of the areas in the Township that have a slope of eight percent or less has one of those two classifications.

The zoning district, Agricultural Preservation that is written protects sixty percent of the Prime Farmland Soils and the Soils of Statewide Importance as defined by the Natural Resources and Conservation Service. Article VI of the Pennsylvania Municipalities Planning Code provides the authorization for zoning regulations that have the intent of preserving farmland soils and agriculture as an industry. Farmland must be considered as developed land and is being used to produce a product. It must be clearly established that agricultural activities will be protected from interference caused by incompatible uses.

The Agricultural Preservation Area also contains extensive and significant concentrations of natural resource features such as forest, steep slopes, streams, wetlands and floodplains. A band of limestone geology crosses the Township from the Delaware River and into Springfield Township. Productive agricultural soils are associated with limestone. Limestone also has characteristics that can present a safety risk such as subsidence and the potential for groundwater contamination is a concern that must be addressed. The Cooks Creek Watershed and the Natural Areas Inventory sites are important natural features in the Township. And, last but certainly not the least, are the significant concentrations of woodland and steep slopes and the floodplain of the Delaware River and the tributary streams. The Agricultural Preservation zoning district also includes provisions for tracts that have considerable areas of natural resources. The development standards and use regulations must ensure the protection of these sensitive and important natural resources, while providing the opportunity for reasonable residential and accessory uses.

Large areas of Durham Township are Prime Agricultural Soils and Soils of Statewide Importance as identified by the Natural Resource Conservation Service. Much of this prime agricultural land is in active farming use, and many of the farms have been placed in the Township's Agricultural Security District. More importantly in terms of preserving agricultural land for continued protection is that farms be permanently preserved by the Bucks County Agricultural Preservation Program, acquired by the Township, by the Heritage Conservancy, or a combination of the aforementioned. All of these programs are continuing and will presumably preserve additional properties in the Township. The Commonwealth Court determined in a decision that agricultural land is considered developed land and a legitimate use, rather than vacant land that is a holding zone for development in the future.

Actions

1. Continue to support and encourage property owners to place their land in the Township's Agricultural Security Program.
2. Maintain the Agricultural Preservation zoning district and accompanying development standards that place the emphasis on the protection of the Prime Farmland Soils and Soils of Statewide Importance, while providing the opportunity for some reasonable residential development to occur.
3. Continue to include in the Zoning Ordinance as permitted uses that support the farming community, such as roadside stands, pick-your-own harvesting and other secondary or accessory activities to promote the economic vitality of the farms.
4. Continue to support the preservation of agricultural land through the Bucks County Agricultural Land Preservation Program and other land preservation programs.

NATURAL RESOURCE PROTECTION

What distinguishes Durham Township from most municipalities are the studies that document the significance and extent of the natural resources. Two were prepared by the Township – *Durham Resource Inventory Plan* and *Cooks Creek Watershed Conservation Plan* (the *Conservation Plan* also includes Springfield Township). Two of the plans were prepared by the County and have specific applicability to Durham Township – *Natural Areas Inventory of Bucks County, Pennsylvania* and *Conservation and Management & Management Practices for Buckingham & Durham Carbonate Valleys*. The *Bucks County Natural Resources Plan* is another important reference document that supports and promotes the protection of natural resources. Those documents are summarized in Chapter Five, and are made part of this Comprehensive Plan by reference.

The protection and preservation of natural resources occurs through a series of actions that involve the government (Township, county and State), conservation organizations and the individual property owners. The following recommendations for actions to protect natural resources are either taken verbatim from the above referenced studies or developed as a result of the findings in Chapter Five, Natural Resources.

ACTIONS:

- A. Cooks Creek Watershed Conservation Plan
 1. Expand the GIS Database – As more watershed related data becomes available, expand and incorporate all data into GIS and computer applications. Train

municipal officials in the use and maintenance of GIS databases. Develop and maintain current land use maps.

2. Develop a Township Level Storm Water Management Plan – Extremely local erosion problems have been observed contributing to siltation in the streambeds. Given the sensitivity of the wildlife and fisheries of the watershed these problems should be carefully examined and controlled, if possible. Although a county-wide storm water management plan exists; a specific township level plan should be developed to determine the locations and magnitude of storm water runoff in the watershed. Monitor erosion throughout the watershed and determine its causes. Develop a plan to manage both storm water and erosion and determine appropriate management actions.
3. Riparian Buffer Improvements – A complete assessment of current stream bank conditions should be conducted to determine priority sites within the watershed requiring riparian buffer enhancements. Riparian buffer improvements and management programs should be employed.
4. Ordinances and Planning Documents – Update the Comprehensive Plans for both Durham and Springfield Townships. Include the data in this plan, and referenced studies. Work to ensure that water quality and quantity are sufficient to support local vision for the future of the watershed.

The following critical areas should be considered for Zoning Ordinance and Comprehensive Plan preparation:

- Storm water management and erosion control;
- Wetlands protection;
- Base flow protection;
- Conservation easements and open space;
- Endangered and/or threatened species habitat protection;
- Karst and sinkhole land development standards;
- Overlay districts of critical areas (first order sub-basins; wetland buffers; riparian (flood plain); and, lakes and ponds);
- Septic systems types based on soil districts;
- Steep slopes;
- Stream or riparian buffers; and
- Wellhead protection.

B. Natural Areas Inventory of Bucks County, Pennsylvania

Take actions that are appropriate for inclusion in the Zoning Ordinance and Subdivision and Land Development Ordinance and are authorized by the Pennsylvania Municipalities Planning Code to protect the priority sites in the Plan.

C. Durham Township Comprehensive Plan

1. Review and revise, as necessary, the natural resource protection standards in the Zoning Ordinance.

2. Review and revise, as necessary, the sections of the Subdivision and Land Development Ordinance that pertain to the protection of natural resources, such as, plan requirements, grading regulations, erosion and sediment controls, and best management practices for stormwater.
3. Maintain and record the carbonate geology informational studies. Proposed developments within the delineated carbonate area and within 200 to 500 feet of the boundary are required to conduct a Carbonate Geology Study to thoroughly examine and evaluate the presence of carbonate geology on the site.
4. Review and revise, as necessary, the Zoning and Subdivision and Land Development Ordinances to conserve existing woodland, address reforestation and afforestation and promote proper forest management practices. Measures to incorporate into the ordinances include:
 - a. Retain and expand woodland for benefits such as water quality, forest production, recreation and wildlife habitat. Forest banking should be promoted for the restoration, creation and preservation to compensate for the loss or disturbance of woodland. A priority for reforestation and afforestation is the expanding wooded riparian corridors.
 - b. Promote timber harvesting as an agricultural pursuit. Proper management is essential for the long-term health of woodland. Best management practices provided by the Pennsylvania State University School of Forestry and/or the Department of Conservation and Natural Resource's Bureau of Forestry.

D. Gallows Run Watershed Restoration and Protection Plan

The Durham Township Comprehensive Plan supports the goals and recommendations of the plan for the Gallows Run and the Township will take steps to implement them where appropriate.

DEVELOPMENT DISTRICT

The Development District includes three separate areas: 1) the Rural Residential area; 2) the Planned Commercial-Industrial area; and 3) the Village Center. These three areas or districts are intended to accommodate most of the development that will occur in the future.

RURAL RESIDENTIAL AREA

In part the Comprehensive Plan of 1977/2006 described the Rural Residential area as follows. "The purpose of this area is to preserve the rural character of the Township and to prevent haphazard, scattered development characterized by urban sprawl. It is intended that this area will provide a place for the residential growth of the Township. All types of residential uses are permitted at various densities according to the underlying geology of the site. Development will relate to the natural physical characteristics such as waterways, woodlands, topography and soils so as to protect and preserve these natural features and the open character of the countryside. Those areas overlaid (sic) with limestone must employ development practices and design that will not adversely affect the structural integrity of the underlying strata to support development."

That statement was appropriate in 1977/2006 and it is equally appropriate as a statement of the intent of the Rural Residential Area for this Comprehensive Plan. An analysis of the

Rural Residential Area was conducted in which it was determined the district is large enough to accommodate the growth in population forecast through the year 2035. See Chapter 9.

ACTIONS

1. Review and revise, as necessary, the provisions and standards of the Rural Residential District in the Zoning Ordinance. Particular attention should be given to maximum density and minimum open space standards, dimensional standards for the various housing types, and buffer yard provisions.
2. Review the natural resource protection standards for consistency with the current recommendations of the Bucks County Natural Resources Plan.
3. Review and update the natural resource protection standards for carbonate geology to bring the regulations into compliance with the current techniques for evaluating the conditions on a particular tract of land. The ordinance should also require best management practices for the location and construction of buildings, roads and stormwater management facilities.
4. This comprehensive plan establishes the policy that wastewater facilities in the District must take the carbonate geology into account. Emphasis is placed on land application of the treated effluent.
5. The subdivision and land development ordinance should be reviewed. Attention should be given to the plan requirements, review procedures and design standards. Design standards for streets, open space, recreational facilities and stormwater management should be revised to incorporate current techniques.
6. Policies and standards should be developed for community water supply systems that will be proposed to serve a development in the RR District. The regulations should include wellhead protection and the distribution system.
7. It is important that all major development proposals in this area conduct and submit to the Township a water impact study. At a minimum, the study must address the protection of existing wells, the potential impact on the limestone geology, and the base flow of Cooks Creek.

PLANNED COMMERCIAL - INDUSTRIAL

Once again the stated purpose for this area in the 1977/2006 Comprehensive Plan is still very much relevant today. “It is the purpose of this area to encourage planned industrial and commercial uses in an appropriate location with access to an arterial highway and public services that can serve these uses. Such development shall be planned as a whole with all uses fronting on an internal street. The intent is to encourage high quality industrial and commercial development which enhances the employment opportunities in the Township and is designed with adequate road access and public utilities to minimize adverse impacts on the natural systems and residential uses in the surrounding area.”

ACTIONS

1. Review and revise as necessary the provisions in the Zoning Ordinance to bring it into line with current techniques.
2. It is important that all major development proposals in this area conduct and submit to the Township a water impact study. At a minimum, the study must address the protection of existing wells, the potential impact on the limestone geology, and the base flow of Cooks Creek.

IMPLEMENTATION TOOLS AND TECHNIQUES

A comprehensive plan lays out a framework for making decision on land use and community facilities and it establishes goals and objectives for the future of the community. There are various means for achieving some of the goals. This section will present a summary of some of the tools that are available for shaping the new land uses that occur, while protecting the natural resources and character of Durham Township. The adopted Township ordinances contain a number of what are considered innovative planning tools. These tools include the Performance Zoning, natural resource protection standards, including carbonate geology, and site capacity calculations.

- **Development District Concept** – The foundation for the 1977/2006 Comprehensive Plans was the Development District Concept, and it is also the basis for this Plan. With the Development District concept, the future land use pattern will include four basic categories of land use Urban Area (Riegelsville Borough), Development Area, Rural Area and Resource Protection Area. The first objective of the concept is to direct the anticipated growth into compact areas where infrastructure and services can be provided in a logical and cost efficient manner. Preservation of agricultural land and/or the protection of natural resources are the second objective. Growth is directed away from the sensitive natural resources and to the area of the municipality that is most appropriate for it to occur.
- **Performance Zoning** - Performance Zoning was developed by the Bucks County Planning Commission in the mid-1970s and is used by most of the rural and developing townships in Bucks County. Its primary purpose is to ensure the protection of natural resource features. A secondary objective is to allow flexibility for the designer of a residential development.

Protection standards are established for natural resources. For example, no development may occur in floodplains and wetlands. The entire area of those resources must remain as open space. For slopes of 25 percent and greater, 85 percent of the slope must remain as open space and 15 percent may be developed. The number of residential lots permitted on a site is based on the amount of buildable land, i.e., land that is not constrained from development by natural resources. In other words, the characteristics of the land determine the amount of development that is permitted.

Standards are set for a maximum density, maximum impervious surface and minimum open space. The Performance Zoning technique has been incorporated into the Durham Township Zoning Ordinance for the Rural Residential District.

- **Traditional Neighborhood Development** – The objective of the Traditional Neighborhood Development is a residential development technique to simulate the development pattern of older towns and villages. TND promotes a pedestrian-oriented pattern of development that is

characterized by village greens, a grid street pattern, sidewalks and trails, shallow front yards, narrow streets and alleys. A TND may also include mixed-use development that integrates retail commercial, offices and services to mimic towns and villages. Article VII A of the Pennsylvania Municipalities Planning Code authorizes the use of the technique and guidelines for implementing the concept. TND would be appropriate for the Rural Residential District.

- **Transfer of Development Rights** – The transfer of development rights is a land preservation technique that is applicable for agricultural and natural resource protection areas of a municipality. With this technique the owner of a property in an agricultural area sells the rights for development of his/her land to a developer who will use them in the development district of the municipality. After the development rights of a tract of land are sold, that property may not be developed in perpetuity. There is no expenditure of municipal funds with this land preservation technique. TND is an appropriate tool for the Resource Protection District.

- **Riparian Corridor Management** - Riparian buffers are natural boundaries between a watercourse and the adjacent land use. They filter pollutants, provide flood control, minimize stream bank erosion, mitigate stream warming and provide for lateral movement of the stream channel. Riparian buffers are “low tech” and one of the most effective tools to protect stream quality. Studies have proven that they can be very effective in protecting both water quality and quantity. The following features are important for an effective municipal ordinance:
 - The establishment of a minimum width for the riparian buffer. The minimum width must be adequate to realize all of the benefits of a buffer.
 - The use of a two-zone system with the functions, widths, vegetative targets and management schemes for each zone presented in detail.
 - A provision that creates the ability to expand the buffer to include the 100-year floodplain, steep slopes, and adjacent delineated wetlands.
 - Promote reforestation and/or afforestation in riparian buffers where tree cover does not exist or is sparse.
 - A thorough explanation of the limits on any use of the riparian buffer and the requirements for any development plan.
 - A system to permanently mark the buffer, both physically on-site and in the land records.
 - A designated management system for the buffer, detailing permitted and restricted uses within the buffer, and an educational program that ensures that future residents know about the buffer. Maintenance guidelines and enforcement procedures for buffer violations should be included.
 - A monitoring system must be established to ensure compliance and maintenance.

- **Agricultural Zoning** – With the active agricultural community in Durham Township, Agricultural Preservation zoning ordinances should be appropriately maintained. Sixty percent of Prime Agricultural Soils and Soils of Statewide importance are preserved. These tools can promote the continuation of farming while giving the owner the opportunity for the reasonable use of the land. There is a forty percent level of development potential on the remaining land. Accessory farm business in the agricultural areas is permissible. The retail sale of produce, pick- your-own sales and farm entertainment activities are examples of accessory farm business uses.

- **Wastewater Facilities Planning** - A well thought out plan for wastewater facilities that is coordinated with the municipal comprehensive plan is essential for protecting the environment. The following are some of the issues the plan should address:
 - Promote groundwater recharge of effluent rather than stream discharge
 - The operation and maintenance of community systems should be managed by the municipality to ensure satisfactory performance of the system.
 - Management and maintenance plans and programs for on-lot systems to avoid contamination of the ground and surface water.

- **Water Supply Planning** - Having a well thought out plan for the supply of water is an important component of the planning program for Durham Township. The water resources plan should address both wells that supply individual properties and a well or wells that supply a distribution system that serves a number of houses and/or businesses. A key factor in preparing a water plan is base the future supply on the estimated sustainable yield of the aquifer. Aggressive analysis and protection of the Cooks Creek and its watershed shall be given high priority by the Township.

Any planning for a municipal water supply system and/or a system to supply a residential subdivision or non-residential land development must carefully study the conditions in the area of the system. In particular, if the proposed system is within or near the limestone geology the potential impacts must be assessed. A proposed system within the Cooks Creek watershed must carefully analyze the potential impact on the base flow of the stream. The planning for any water supply system must include a water budget to address recharge and to ensure the forecast withdrawal will not exceed the capacity of the aquifer.

- **Design Standards for New Streets** - Streets constitute a significant portion of the total impervious surface in a new development. Thus, from an environmental standpoint it is important that new streets be no wider than is necessary to safely accommodate the volume of traffic that it will carry. The fundamental principle is the width of a street should be consistent with the function and volume of traffic it will serve.

The recommended approach is to develop a hierarchy of street types that is included in the municipal subdivision and land development ordinance. The design of the street standards should follow these guidelines:

 - The width of the residential street should be determined by the number of cars expected to use it, whether on-street parking is needed and whether curbing or shoulders are desirable;
 - The engineering standards (sight distance, horizontal curves, etc.) safely control traffic;
 - The arrangement of the streets encourages short, quiet residential streets and blocks that create recognizable neighborhoods and discourage through traffic.

- **Forest Management** - The forestry stewardship ethic implies that we who own or work in our forest lands have a moral obligation to leave them in better condition than we found them (*Best Management Practices for Pennsylvania Forests*).

The vast extent of the forest cover is probably the single most important natural feature in the Township. Soils in a forest typically have a rather high capacity for absorbing rainwater. The litter layer on the forest floor aids in the absorption of water and protects the soil from erosion. Thus, forest cover in a watershed contributes greatly to the quality and quantity of the groundwater and in turn the stream.

Cutting of timber occurs for generally one of two reasons. Timber harvesting is done to remove trees for processing into lumber or for making paper. Trees can be selectively removed from a forest, or the forest can be clear-cut (remove all of the trees). Clear cutting obviously has the greatest impact on the forest and both the quality and quantity of water. With timber harvesting, the forest regenerates and eventually, it returns to a mature state. The other reason for cutting trees is to clear the land for development. When that occurs the forest is lost forever.

The purpose of this tool is to stress the importance of maintaining the forest cover in the watershed and to encourage property owners to use good forestry management practices. The College of Agriculture at the Pennsylvania State University established a Forest Stewardship Program to assist owners of wooded property to prepare forestry management plans using best management practices.

The following statement summarizes very well the importance of protecting and managing the forest resource in the watershed. A forest can be retained and allowed to continue to provide the numerous environmental benefits and the property can realize economic benefit through a managed timber-harvesting program.

“Private forest landowners, who control most of the woodland resource, seldom seek the help of resource management professionals despite increased interest in timber harvesting. Good forestry is so much more than cutting big trees. Good forestry requires concern for and understanding of the effects of our decisions and actions on the well-being of the entire forest ecosystem. We can avoid serious degradation of the forest when knowledgeable landowners and natural resource professionals plan and work together. To meet the ever-increasing demand on Pennsylvania’s forest resources, we must manage our forests to keep them healthy and productive for the long term – an idea known as forest sustainability. Our past exploitation now necessitates our benevolent management. We cannot again treat our woodlands with disregard and count on Mother Nature to restore one of the world’s richest forests for a second time.” Forest Stewardship – Our Link to the Past-Our Legacy for the Future, Pennsylvania State University’s College of Agricultural Sciences, 2002.

- **Low-Impact Grading** - It is fairly common with large scale developments for the entire property to be stripped and regraded. This technique has the potential for erosion which impacts the water quality of streams, it destroys habitat and drastically alters the character of the landscape. Low-impact grading limits the area of disturbance to areas of structures, roads, stormwater management facilities, other improvements and utilities.

Chapter Nine

Development Area Analysis

The Durham Township Comprehensive Plans of 1977/2006 used the Development Area Concept to formulate the Future Land Use. This approach to land use planning is described in more detail in Chapter Eight. Briefly, the Development Area Concept promotes the preservation of open space, sensitive natural features and farmland, while providing the opportunity for higher density development to occur in the Township. Through the concept, most development should occur in areas where services exist or can be reasonably provided. Higher intensity development is encouraged to locate near existing centers of development because services are needed or already exist. Thus, these services can be more economically and more efficiently expanded or provided.

In the 1977/2006 Plans, the Development Area is divided into two areas, the Rural Residential section and the Planned Commercial – Industrial section. The Plan states that these areas are to accommodate the anticipated growth of the Township and to control and regulate development so as to coordinate the Township’s growth with the provision of public services. For commercial and industrial, or residential development appropriate wastewater facilities must be provided by the developer. A full range of residential housing types is permitted in the residential area at a maximum density that is compatible with the natural resource limitations of the area. The Residential Development Area should be large enough to accommodate the population and housing growth that is anticipated to occur over the next ten years. Planned industrial and commercial uses are intended for the other section of the Development Area.

This section will examine the proposed Residential Development Area to estimate the capacity of the vacant land in the Area. An estimate will be made of the number of dwelling units that could be constructed in the area using current zoning regulations for the Area. If the capacity of the Area is greater than the forecasted increase, then it will not be necessary to expand the Development Area at this time.

HOUSING FORECASTS

There are 521 total housing units as of 2010 as indicated in Table 6 – Housing Unit Characteristics in Chapter Three. It is difficult to predict with any certainty how many new houses could be built in the Township over the next 10 or 20 years due to the complexity of the natural resources protection calculations. However, the chapter on Population and Housing presents forecasts for the increase in population for 2020 through 2030. The Delaware Valley Regional Planning Commission made the forecasts of the population increase for those time periods.

REVIEW OF EXISTING DEVELOPMENT DISTRICT

The 1977/2006 Comprehensive Plan maps designates Development Districts in the northeastern area of the Township – one, Rural Residential and the other Planned Commercial – Industrial.

RURAL RESIDENTIAL DISTRICT

The Rural Residential District encompasses approximately 250 acres. The following are some of the distinguishing features of the District that are relevant to the update of the Comprehensive Plan.

1. There are four parcels that are over twenty acres in area. The minimum tract size for a Performance Subdivision in the Zoning Ordinance is five acres.
2. The Durham Carbonate Valley extends through the northern portion of Durham Township and to the west through a portion of Springfield Township. The area is delineated on the Zoning Map, dated April 10, 2014.
3. There are two parcels in the Rural Residential District that are partially within the Carbonate Geology Region.

Tax Map Parcel 11-2-50: 106.88 acres and Tax Map Parcel 11-2-36: 30.49 acres

The other two parcels are entirely within the Carbonate Geology Region.

Tax Map Parcel 11-2-57: 89.63 acres and Tax Map Parcel 11-5-106: 20.25 acres

4. The publication *Conservation and Management Practices for Buckingham and Durham Carbonate Valleys*, February, 1985 identifies a larger area of the Township as being underlain by carbonate geology. The report recommends that the carbonate area extend 200 feet beyond the delineated boundary to account for the difficulty in precisely identifying the limits of the carbonate geology.
5. The report prepared by the Durham Township Environmental Advisory Council, *Cooks Creek Watershed Rivers Conservation Plan*, included limestone geology in its inventory of the natural features in the Township. Figure 13 – Durham Carbonate Valley Parcels in the *Conservation Plan* designates all of the parcels within the Rural Residential Development District as being within the Carbonate Valley.
6. In the Rural Residential Development District most of the land is rolling active farmland with slopes that generally range from 3 to 15 percent, with isolated areas of slopes between 15 and 25 percent. However, there are areas that are steeply sloped with grades in excess of 25 percent being common.
7. The zoning classification for the residential part of the Development District is Rural Residential.
8. The two primary residential uses permitted in the RR District are single-family detached houses (Use B11), which is permitted by right. The other is Performance Subdivision (Use B7) which is permitted by Conditional Use.

Single-Family Detached Cluster and Performance Subdivision are permitted at a maximum density of 4 with a minimum lot size of three acres.

A variety of housing types, ranging from single-family detached to garden apartments, are permitted within a Performance Subdivision. Five different housing types are provided for in this option. At least 35 percent of the site must be maintained as open space and natural resources must be preserved. The maximum density is 4 dwelling units per net acre.

9. The Durham Comprehensive Plan (1977/2006) advocates the protection of natural resources during the land development process and the Zoning Ordinance implements that recommendation.
10. The Zoning Ordinance implements that recommendation with protection standards for the following natural resources. The protection standard is expressed in the percentage of the resource that must be protected when a tract is proposed for development. The following natural resource protection standards are included in the Zoning Ordinance that was adopted by the Board of Supervisors on March 16, 2015. (Ordinance No. 2015-1).

Natural Resource	Percent of Resource to be protected
Floodplain	100%
Floodplain soils	100%
Watercourses or streams	100%
Commonwealth Waters	100%
Lakes, ponds	100%
Wetlands	100%
Lake and pond shorelines	100%
Carbonate geology, caves and/or sink holes	100%
Steep slopes (8 – 15%)	60%
Steep slopes (16 – 25%)	70%
Steep slopes (over 25%)	85%
Forest and woodlands	70%
Prime Agricultural Soils	0%

11. Under the provisions of the Zoning Ordinance, one of the first steps in the process of developing a tract of land for a Performance Subdivision within the Rural Residential Development District is an analysis of the site. In doing the analysis of the tract, the applicant must follow the Natural Resource Mapping and Site Capacity Calculations in Section 509 of the Zoning Ordinance. Through these calculations, the applicant will determine the area of each natural resource on the site that must be protected, the minimum amount of open space that must be preserved, the maximum number of dwelling units that may be developed and the maximum impervious surface.
12. The carbonate geology is the most significant natural resource in terms of evaluating the development potential of the Rural Residential portion of the Development District. By placing a 100 percent protection standard on the resource, the area of a tract in the District that is underlain by that bedrock may not be developed and is not included in the land area used to calculate the maximum number of units permitted.

The most significant issue is the fact there are two delineations of the carbonate geology in

this area of the Township. The delineation on the Zoning Map includes most, but not all of the parcels in the District. However, the *Conservation and Management Practices for Buckingham & Durham Carbonate Valleys* delineates a larger area that is carbonate geology, and the *Cooks Creek Watershed Rivers Conservation Plan* (Figure 13) includes all of the parcels within the carbonate geology area.

13. Using the delineation of the carbonate geology in the Watershed Plan, the following is a calculation of the approximate development potential of the Rural Residential District with the Performance Subdivision option. The following table contains calculations that determine the approximate number of dwelling units that could potentially be constructed on the properties in the RR District. The calculations used the Site Capacity Calculations in the Zoning Ordinance and the minimum open space and maximum density for a Performance Subdivision. In all cases the minimum required open space was used to determine the Net Buildable Site Area. It should be noted that any tract, upon site-specific surveys, may in fact have more Resource Protection Land than Minimum Required Open Space, thereby decreasing the Net Buildable Site Area and the maximum number of dwelling units permitted.

Property with Development Potential

PARCEL #	ACREAGE	
11-2-50	106.88	Approximately 56% of tract limestone
11-2-36	30.49	Approximately 4% of tract limestone

Development Potential - 100% limestone protection

11-2-50	106.88 ac.	Tract area
	- 59.81 ac.	56% of tract in carbonate
	<u>=46.99 ac.</u>	Net Buildable Site Area
	x 4	Dwelling units per acre
	187	Potential number of dwelling units

For Parcel No. 11-2-50, there is more Resource Protection Land than Minimum Required Open Space.

11-2-36	30.49 ac.	Tract area
	- 1.22 ac.	4% of tract in carbonate
	<u>= 29.27 ac.</u>	Net Buildable Site Area
	x 4	Dwelling units per acre
	117	Potential number of dwelling units

	30.49 ac.	Tract area
	- 10.67 ac.	35% Minimum open space
	<u>= 19.82 ac.</u>	Net Buildable Site Area
	x 4	Dwelling units per acre
	19	Potential number of dwelling units

For Parcel No. 11-2-36, there is more Minimum Required Open Space than Resource Protection Land, so the

Open Space calculation would be used.

Note that all other site specific resource protection factors would need to be considered in an accurate evaluation.

Development potential of parcels in RR District if the limestone restrictions are not applied.

11-2-50	106.88 ac.	
11-2-36	30.49 ac.	
11-2-57 & 11-3-8	89.63 ac.	
11-5-106	<u>20.25 ac.</u>	
	= 247.25 ac.	Total Area
	<u>86.54 ac.</u>	35% Minimum open space
	247.25 ac.	Total Area
minus	<u>86.54 ac.</u>	Minimum open space
	=160.71 ac.	Net Buildable Site Area
x	<u>4</u>	Density
	642	Potential number of dwelling units