

NATURAL AND HISTORIC RESOURCES PLAN Chapter 9

Natural features, open space, and historic resources have been recognized as important assets that contribute to the township's environmental health, diversity, character, and overall quality of life. These resources are also interrelated with other components of the comprehensive plan including the plans for land use, community facilities, and housing. Because these natural resources play a major role in the quality of life in the community, they must be recognized, protected, enhanced, and maintained for future generations.

Section 301 of the Pennsylvania Municipalities Planning Code (MPC) states that the municipal comprehensive plan must include a "plan for the protection of natural and historic resources to the extent not preempted by federal or state law. This clause includes, but is not limited to, wetlands and aquifer recharge zones, woodlands, steep slopes, prime agricultural land, flood plains, unique natural areas, and historic sites." The MPC also states, "the comprehensive plan shall include a plan for the reliable supply of water, considering current and future water resources availability, uses and limitations, including provisions adequate to protect water supply sources." Both of these requirements are addressed in this plan component.

GOAL AND OBJECTIVES

Goal

Preserve and enhance the Conewago Creek, and other historic, cultural, and natural resources that exist in the township, and support initiatives that promote education and increased awareness of the value of these resources.

Objectives

- Ensure that municipal ordinances and regulations adequately support the protection, preservation, and enhancement of natural resources.
- Educate residents on the importance of protecting and conserving natural resources in their daily lives.
- Promote and manage the health of the Conewago Creek and streams in the township by limiting nutrient pollution, farm runoff, and development in areas prone to erosion and by improving operation and maintenance of on-lot disposal systems.
- Encourage environmental education initiatives that raise awareness of the natural resources that are assets to the township and encourage conservation.
- Support the preservation of agriculture and viability of farming in the township.
- Establish a network of greenways and open space to protect important ecological resources, preserve sensitive wildlife habitats, and provide for passive recreational opportunities.
- Encourage the identification, documentation, and preservation of historic resources in the township.

OVERVIEW OF KEY FINDINGS

This section revisits the information discussed in the Natural and Historic Resources Profile, and discusses other relevant studies that have been undertaken that pertain to natural resources in the township.

Natural Resources Profile

The Natural and Historic Resources Profile provides a wealth of information on the natural and historic resources that exist in the township including information on water resources, climate, physiography, geology, and soils, wildlife, and woodlands. The following key points provide an indication of the wealth of natural resources in the township.

- The steepest areas of slope in the township are found in the northernmost parts of the township. There are also areas of cautionary slope in the northern parts of the township, and along the geologic diabase intrusions that cut through the township in a southwest to northeast direction.
- Geology in the township includes the Gettysburg Formation, Gettysburg Conglomerate, and Diabase intrusions. The greatest potential for groundwater resources lies within the coarse grained sandstones and conglomerates in the Gettysburg Formation.
- The Conewago Creek is the most significant surface water feature in the township. Hoffer Creek, Brills Run, and Iron Run also flow through portions of the township, as do tributaries to these streams and to Spring Creek.
- The only major flooding that occurs in the township is along the Conewago Creek, although other creeks and streams in the township overflow their banks on occasion.
- The majority of the township is covered with prime agricultural soils, with the greatest concentration of these soils located in the southeastern quadrant of the township.
- In many locations, the degree of suitability of the soils in the township for on-lot disposal systems is considered to be “Very Limited”. There are some areas that are considered to be “Somewhat Limited” for either septic tanks or sewage lagoons.
- The Dauphin County Natural Areas Inventory identifies the Conewago Creek at Koser Run as a site of statewide significance.
- Conewago Township has a rich history, but there are no sites that have been recognized as historically significant at the state or national level. Sites of local historical significance are identified in the profile.

Other Relevant Studies

The Pennsylvania State University Environmental Resources Research Institute prepared, for the Pennsylvania Department of Environmental Protection (DEP), the *Total Maximum Daily Loads (TMDLs) Plan for the Conewago Creek Watershed*. The plan was prepared in 2001 and revised in 2006. The plan was developed to improve the water quality in the Conewago Creek Watershed.

It was first determined that Conewago Creek was not meeting its designated water quality uses for protection of aquatic life based on a 1994 aquatic biological survey, and was again found to be impaired in a 1997 survey. As a consequence, Pennsylvania listed Conewago Creek on the 1996 and 1998 Section 303(d) Lists of Impaired Waters. The 1998 list included, among other sections, all of the Conewago Creek in Conewago Township, Hoffer Creek, and the unnamed tributary to the Conewago Creek west of Hoffer Creek in the township.

A TMDL sets a ceiling on the pollutant loads that can enter a waterbody so that the waterbody will meet water quality standards, which are state regulations with two components. The first component is a use, such as warm water fisheries, or recreation. The protected uses of the watershed are water supply, recreation, and aquatic life. In Conewago Township, Iron Run is designated as a warm water fishery and the Conewago Creek is designated as a trout stocking fishery. The second component relates to instream conditions necessary to protect the uses. These criteria are physical, chemical, or biological characteristics, such as the temperature, minimum concentration of dissolved oxygen, and the maximum concentrations of toxic pollutants. If the criteria are being exceeded, the uses are not being met, and the water is said to be violating water quality standards.

The approach to TMDL development in Pennsylvania involves comparing nutrient and sediment loads of the impacted watershed to those of a healthy reference watershed or watersheds. In this study, the reference watersheds were the Lehman-Muddy Run watershed and a portion of the Little Swatara Creek watershed. Based on the predominance of agricultural land use, nutrients and sediments are the most likely pollutants that are causing Conewago Creek to violate the aquatic life use. Therefore, the TMDLs propose reducing the phosphorus and sediment loadings in Conewago Creek to levels consistent with those found in the reference watersheds. Because of the similarities in size and land use existing between the subbasins and the reference watersheds, achieving nutrient and sediment loadings in the Conewago Creek TMDL will ensure that the aquatic life use is achieved and maintained as evidenced in the reference watersheds.¹

The Conewago Creek Watershed was determined to be impaired from excess nutrient and sediment contributions and the proposed plan provides calculations of the stream's total capacity to accept nitrogen, phosphorus, and sediments. All of the pollution in the watershed comes from non-point sources of pollution and the pollutants come primarily from overland runoff.

The pollutant reductions in the TMDLs are entirely allocated to agricultural activities in the watershed. Implementation of best management practices (BMPs) in the affected areas should achieve the established loading reduction goals. The plan notes the following practices that may be utilized to reduce the amounts of sediments and phosphorus entering the water. These practices are supported in the comprehensive plan.

- The planting of riparian buffer zones, contour strips, and cover crops help to reduce sediment pollution and will also help to reduce phosphorus pollution.
- The installation of more effective animal waste management systems and stone ford cattle crossings will also help to reduce phosphorus amounts.
- Streambank stabilization and fencing can also help to reduce phosphorus and sediment.

The plan notes that further testing will assess the extent of existing BMPs and determine the most cost effective and environmentally positive combination of BMPs required to meet the nutrient and sediment reductions.

¹ TMDL Plan for the Conewago Creek Watershed. Pennsylvania State University, Environmental Resources Research Institute, 2006.

INTERRELATIONSHIP OF NATURAL RESOURCES TO OTHER PLAN ELEMENTS

As mentioned previously, the natural resources plan is directly related to other components of the comprehensive plan. This section discusses these interrelationships and their implications to natural resources in the township.

Future Land Use Plan

The plan for future land use in the township is probably the most directly related to natural resources of all of the plan elements. The type and location of land uses will be pertinent in ensuring natural resources protection. The ways in which the land is used, for example, BMPs in agricultural operations, will have an influence on waterways and other natural resources in the township. Land uses that adversely affect natural resources have the potential to endanger certain wildlife sensitive habitats, and will eventually lead to a reduced quality of life for residents.

For these reasons, a conservation overlay has been integrated into the future land use plan to protect the most sensitive environmental resources in the township. It is discussed in more detail later in this plan, but its purpose as an overlay is to indicate areas which may require additional protection or restrictions on development, when considering the designated underlying use.

Furthermore, land use strategies that work to enhance the relationship between land uses and natural resources are discussed in the land use toolbox section of the future land use plan. These tools are meant to serve as options for the township to consider in managing growth and can assist the township in recognizing the effects of development on natural resources. Because these tools relate to land use and growth more directly than they do natural resources, they are included in the future land use plan. Conservation by design or open space development is another land use tool, but because of its direct relationship to natural resources conservation, it is discussed in this plan in conjunction with the conservation overlay.

Housing Plan

The design and placement of new housing developments have the potential to impact natural resources in the township. Efforts should be made to conserve sensitive features in the design of a site for a residence, and larger housing developments may consider open space conservation in their design to preserve large contiguous tracts of open space that foster wildlife habitat. Additionally, when natural resources are incorporated into specific site designs, they have the potential to benefit the homeowner by reducing energy consumption.

Other Plan Elements

Other plan elements are also related to natural resources. These features should be considered in the placement and design of roadways, and greenways have the potential to provide pedestrian connections throughout the township. In these ways, natural resources are related to certain aspects of the transportation plan.

Natural resources in the township may also be related to community facilities, including schools and emergency services providers. A good water source will assist fire protection service

providers deliver quality services when called upon. Natural resources in the township may also provide alternative methods of education for the youth in the township.

CONSERVATION OVERLAY

In order to protect the most sensitive natural resources in the township, a conservation overlay has been developed and incorporated into the future land use plan. It accounts for floodplains, wetlands, stream corridor protection, and areas of steep slope. Because the conservation classification has been developed as an overlay, it indicates areas of unique natural features that mandate attention and may require more stringent regulations. For example, areas along the Hoffer Creek stream corridor may require additional protection and may not be able to be developed in the same manner as areas of the township which are located further from these sensitive areas.

Overlay districts are often applied to municipal ordinances that regulate land use and development as a way to protect environmental features, and impose additional regulations or restrictions on the development and use of the land. This plan recommends that the conservation overlay in the future land use plan be developed as an overlay district in the Conewago Township Zoning Ordinance to ensure protection of the area's natural resources.

The conservation overlay was developed with information shown in **Map 7-7**, Environmental Constraints. Prime agricultural soils and farmland of statewide importance are also shown on this map. Each of these features is discussed in detail in the profile. Those features included in the conservation overlay are described in this section.

Slope Protection

The areas of steepest slope, those slopes greater than 25%, are found in the northernmost parts of the township. There are also areas of cautionary slope, those 15% to 25%, that are located in the northern parts of the township and along the diabase intrusion that traverses a large part of the township in a southwest to northeast direction. The comprehensive plan recognizes steep slopes and hillsides as unique areas which are fragile and susceptible to erosion, landslides, mudslides, and degradation of their natural vegetation. Conventional development practices often increase these threats. By protecting this asset, the township intends to:

- Guide development away from steep slopes
- Minimize grading and other site preparation in steep areas
- Provide a safe means for ingress and egress while minimizing scaring from hillside construction
- Preserve natural conditions in steep areas
- Prevent flooding and the deteriorating effects of erosion to streams and drainage areas.

It is recommended that areas of prohibitive slopes, those slopes 25% and greater, and cautionary slopes, those slopes 15% to 25%, be subject to regulations that will control the intensity of development that can occur in these sensitive areas. Prohibitive slopes and cautionary slopes are included in the conservation overlay, shown in **Map 8-1**. Their specific locations are shown in **Map 7-7**.

Stream and Surface Water Protection

The comprehensive plan identifies and recognizes streams and the natural areas around them as important hydrological assets that support sensitive ecological habitats. It is the intent of this plan to preserve natural and man-made waterways. By protecting this asset, Conewago Township intends to:

- Protect wildlife
- Reduce human exposure to high water and flood hazards
- Preserve existing vegetation along waterways, lakes, and ponds
- Minimize the negative effects on waterways from agriculture and development related runoff and erosion
- Minimize scenic degradation
- Protect water quality by reducing stormwater runoff
- Protect the integrity of ponds and lakes as functioning wetland habitat areas

Stream protection has been included in the conservation overlay by applying a 100 foot buffer to all of the streams and watercourses in the township, as shown in **Map 8-1**. Additional water resources protection tools are described later in this chapter.

Wetland Protection

Wetlands are unique places that have several socioeconomic, environmental quality, and wildlife values associated with them. As such, the comprehensive plan recognizes that wetlands are a sensitive hydrologic natural resource that should be preserved. Damaging or destroying wetlands threatens public safety and the general welfare. Because of their importance, wetlands are to be protected from negative impacts of development and other activities. It is the intent of this plan to:

- Require planning to avoid and minimize damage of wetlands whenever prudent or feasible
- Require that activities not dependent upon wetlands be located on other sites
- Allow wetland losses only where all practical or legal measures have been applied to reduce these losses that are unavoidable and in the public interest.

There are not many areas of wetlands that have been delineated in the township, but individual site investigations may result in additional designated areas. Wetlands are included in the conservation overlay, as shown in **Map 8-1**. The specific location of wetlands is shown on **Map 7-7**, Environmental Constraints.

Floodplain Protection

Preserving floodplain areas from development is crucial in minimizing potential damages to property and the risk of injury caused by flooding. Allowing floodplain areas to remain in their natural state will also minimize any major changes to the balance of the hydrologic system and allow for groundwater recharge. Areas identified in the 100-year floodplain have been included in the conservation overlay. Currently, Conewago Township employs a floodplain management overlay district in the zoning ordinance.

DEVELOPMENT STYLES THAT SUPPORT THE CONSERVATION OF NATURAL FEATURES

The future land use plan identifies several strategies, or tools, that Conewago Township may consider during implementation. This section looks more specifically conservation by design, due to its direct relationship with natural resources and open space preservation.

Conservation by Design / Open Space Development

■ Description

- Conservation by design, or open space development, is an enhanced variation of the cluster zoning technique in which a higher percentage of the site is dedicated to open space. The purpose of this advanced technique is to preserve a larger amount of land for conservation uses, while still allowing full-density development. In contrast to cluster development, where the emphasis is more often placed on providing active recreational areas, open space zoning is more suited for protecting farmland, woodland habitat, historic sites, and scenic views. Under this technique, developers of a subdivision are required to dedicate a significant portion of their unconstrained land to permanent open space uses. Housing is designed to compliment the aesthetic views of the preserved land and streets are designed to access the residential community in a manner that minimizes disturbance of natural areas.

■ How it Works

- Conservation subdivisions can be formalized within an ordinance. One of the more popular methods is a four step process that first identifies primary and secondary conservation areas, then designs open space to protect them, next arranges houses outside of those protected areas, and finally lays out streets, lots, and infrastructure.
- Open space regulations can also be implemented through a zoning ordinance. The number of dwellings permitted is based on the net acreage of buildable land and the underlying density in the zoning district. Easements are then placed on the open space to ensure that it will not be further subdivided or developed.
- Conservation by design is fully supported by the Natural Lands Trust, and is detailed in the Pennsylvania Department of Conservation and Natural Resources publication, *Growing Greener – A Conservation Planning Workbook for Municipal Officials in Pennsylvania*.

■ Pros and Cons

- Benefits of development through conservation by design include:
 - Open space design achieves a community goal of preserving open space at the same density standard.
 - None of the land is taken for public use unless the developer/owners want it to be.
 - There are a variety of ownership choices.
 - If implemented under a plan and with conservation as the motivation, potential benefits lie in things that are not included or required as a result of the plan. For example, the design does not require public expenditure of funds, depend on landowner charity, involve complicated regulations for shifting rights to other parcels, or depend on the cooperation of two or more adjoining land owners to make it work.
- Conservation by design does not work in all areas or for all communities. Negative aspects that should be considered include:
 - Conservation by design should take place with a planning framework and conservation goals in place.
 - These subdivisions should connect to a broader network of conservation areas to prevent a “chopped up” landscape.

- Conservation subdivisions that are not attached to already developed areas and are not connected to services may result in poor land use practices.
- Conservation subdivisions do not always decrease the need for the automobile and may not provide affordable housing.

WATER RESOURCES PROTECTION TOOLBOX

An understanding of a community's water resources is critical to achieve balance among human, economic, and environmental needs. The most significant challenge for preserving future water resource goals is growth patterns and activities on land. Protecting water supplies by strategically directing growth and development to suitable areas, promoting safe use and disposal of pollutants, such as fertilizers, industrial wastes, sewerage effluent from septic systems, and minimizing excessive erosion, is crucial in municipal planning.

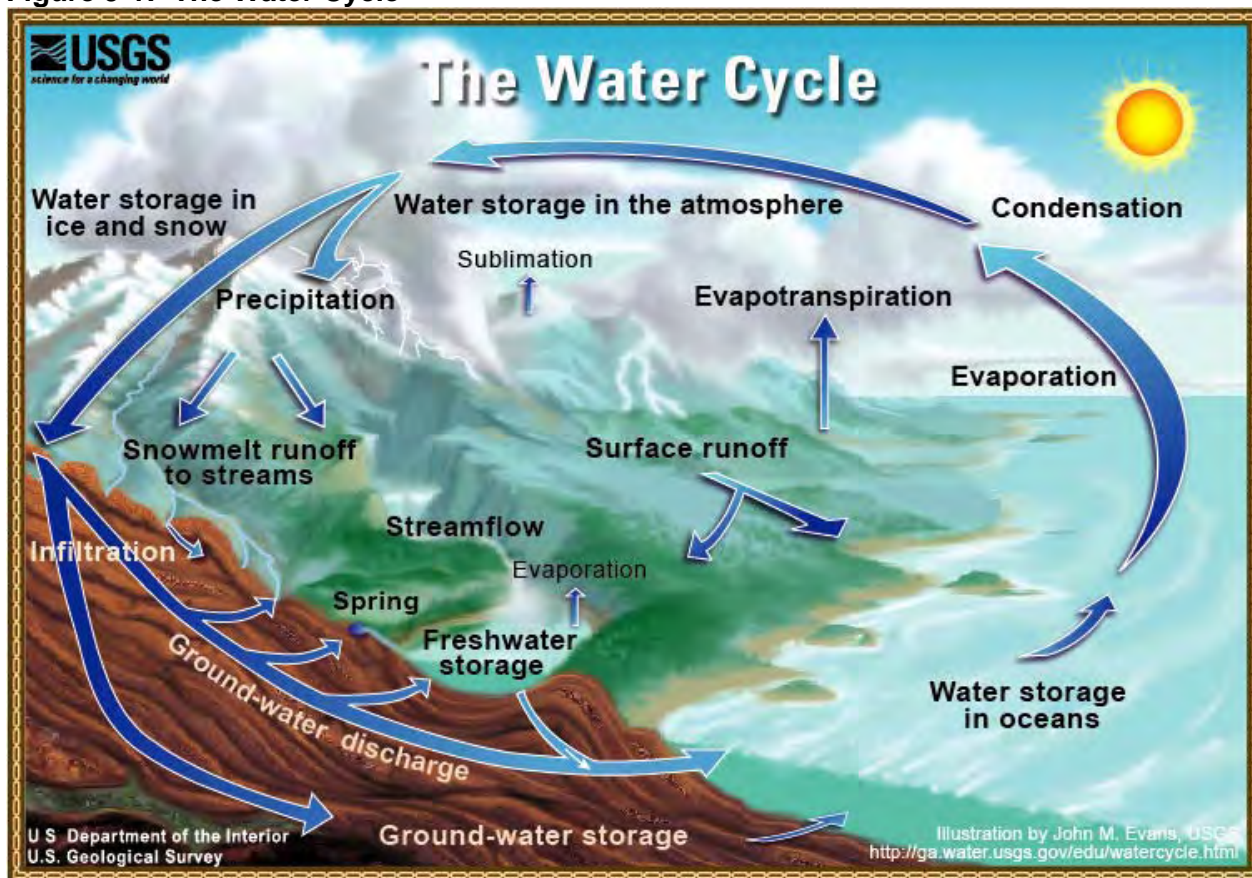
This section presents a series of tools that the township may consider as it moves forward with implementing the plan. Not all of these tools will be applicable to the township's current situation, but these tools are meant to assist the township with understanding the resources that are available to them. These tools include:

- Critical Aquifer Recharge Area Identification
- Water Budget and Groundwater Availability Analysis
- Wellhead Protection
- Well Drilling Techniques
- Groundwater Management Plans
- Water Supply Plans
- Stormwater Management Plans
- Integrated Water Resources Plan
- Water Conservation Plan

The Hydrologic Cycle

The occurrence and interrelationship of water from and to the atmosphere, on the land surface, and in the ground is known as the hydrologic cycle, shown in **Figure 9-1**. Understanding the pathways and impact from human activities is fundamental to proper management of water resources. Surface waters consist of perennial and intermittent streams, lakes, reservoirs, ponds, wetlands, springs, and natural seeps. Groundwater is water contained in the soils and rock formations of the township. Most groundwater is derived from precipitation that has infiltrated and percolated through the soil after recharging the aquifer. The rates of recharge vary by location due to the diverse properties of soils in the underlying bedrock. After reaching the water table, groundwater moves towards points of discharge, such as surface waters, springs, and wells.

Figure 9-1: The Water Cycle



Source: United States Geological Survey

While surface water and groundwater are often characterized separately, it is important to acknowledge that they represent one resource. The two “feed” one another, and also have the potential to contaminate one another. Run-off and ground-based pollutants often percolate into the water table, degrading the groundwater. Contaminated groundwater, emerging from springs, wells, and marshes, can pose threats to surface water.

Several water resources protection strategies are discussed in the TMDL report for the Conewago Creek watershed, and are mentioned in the section of this chapter that discusses that report. Additional strategies are listed and described below:

Critical Aquifer Recharge Area Identification (CARA)

Groundwater recharge refers to areas where water is added to the groundwater. These are areas where precipitation sinks into the ground, or a stream dives underground, sometimes called a swallow. Recharge occurs wherever the land surface is pervious and the water table is below the surface. However, some areas are characterized by features that provide an exceptional amount of recharge to the aquifer per unit area. These are termed critical aquifer recharge areas (CARAs). These areas are more vulnerable to contamination that could affect the potability of the water.

One indication of a high recharge area is a watershed containing a low tributary density. The high permeability results in a water table with a low gradient under the land surface, thus fewer perennial streams. Other features are very deep soils or weathered zones that lie above bedrock aquifers. These areas are high volume storage areas that allow slow percolation of

water from the shallow groundwater zone into the deeper aquifer. Groundwater aquifers associated with high recharge areas are also at a higher risk of becoming contaminated.

Identifying and maintaining CARAs will maximize recharge and the amount of groundwater available for utilization. The following steps can be followed in identifying and protecting CARAs:

- Identify where groundwater resources are located
- Analyze the susceptibility of the natural setting where groundwater occurs
- Inventory existing potential sources of groundwater contamination
- Classify the relative vulnerability of groundwater to contamination events
- Designate areas that are most at risk to contamination events
- Protect by minimizing activities and conditions that pose contamination risks
- Ensure that contamination prevention plans and best management practices are followed
- Manage groundwater withdrawals and recharge impacts to:
 - Maintain availability for drinking water sources
 - Maintain stream base flow from groundwater to support in-stream flows, especially for salmon-bearing streams.²

Water Budget and Groundwater Availability Analysis

A water budget analysis provides an understanding of water flows through an area by treating the water resources of an area as an account, with recharge (income); withdrawals and in-stream flow needs (expenses); and storage (savings). Water budgets are useful for evaluating surface and groundwater resources available for development, troubleshooting water supply and well interference issues, and planning for future water needs. A groundwater availability analysis provides an assessment of the total volume of water withdrawn from (demand) and recharged to (supply) aquifers in a defined area, providing an indication of stress upon aquifers and stream base flow. When compared to projected demand in a defined area, a municipality can better prepare for targeting growth areas.

Wellhead Protection

Pennsylvania's Wellhead Protection (WHP) Program is a proactive effort designed to apply proper management techniques and various preventive measures to protect groundwater supplies, thereby ensuring public health and preventing the need for expensive treatment of wells to comply with drinking water standards. The underlying principle of the program is that it is much less expensive to protect groundwater than it is to try to restore it once it becomes contaminated.

A wellhead protection plan should detail the provisions of the local program including a schedule for implementation and demonstrate the commitment needed to support the ongoing efforts necessary for a successful local wellhead protection program. Therefore, the plan should not only describe how sources will be protected, but also document the resources necessary to implement the plan, thus linking implementation and management to finances. In order to be considered for DEP approval, a wellhead protection plan must have the following elements:

- Steering committee and public participation
- Wellhead protection area delineation
- Contaminant source inventory
- Wellhead protection area management and commitment
- Contingency planning
- New source planning

² Critical Aquifer Recharge Areas Guidance Document, Washington State Department of Ecology.

Well Drilling Techniques

State law requires drillers to have a valid rig permit and a Water Well Drillers License. They must also give the state and homeowner a copy of the Water Well Completion report. This report describes where, when, and how the well was constructed. However, when a new well is drilled, no state requirements for construction materials, yield, or quality apply. Pennsylvania is second among states in the number of residences served by private water wells, with more than a million households relying on private wells. Pennsylvania is also among only four states that do not have private water well construction standards. Poor well construction is increasingly the prime suspect in the presence of bacterial contamination. A properly constructed well minimizes the threat of contamination entering the well, and keeps people healthy who might otherwise get sick from their own well water.

A few local and county governments have adopted standards for private water supplies, e.g. Chester and Montgomery Counties. Those rules and regulations have established minimum standards for the location, construction, modification, or abandonment of water wells and installation; required a permit for the construction of a water supply including production wells, test wells, test borings, and monitoring wells, and/or the installation of pumping equipment; and required a license for well contractors and pump installation contractors.

Other specific situations may also require additional regulations, including instances in which mortgages associated with federal housing may require certain water analyses for the well. Other lending institutions also may have sampling requirements, but for the most part, private well owners must take responsibility for their own water quality and for maintaining their well.

Groundwater Management Plans

Groundwater management plans provide a thorough understanding of the watershed's hydrogeologic characteristics to protect and improve water supply reliability. The plan should address three components: identify existing and anticipated quantity and quality groundwater problems and management issues; recommend a series of actions needed to ensure the sustainability of the watershed; and address impacts on the resource, including those from growth and development, droughts, current and past mining, transfers out of watersheds, unknown and unregulated uses, and management measures. Components of the plan may include monitoring, as well as identification of wellhead protection areas and appropriate areas for development of groundwater models.

Water Supply Plans

The goal of a water supply plan is to provide a guidance document for municipal officials and local planners, water suppliers, and other interested groups to follow and implement as they address water supply needs for the municipality. The water supply plan provides basic information and the direction needed to make planning decisions to provide residents with safe, adequate, and reliable drinking water at reasonable cost.

These plans inventory and evaluate available data and information on water systems and service areas. Results are compared to existing water system capabilities and future water need. Water system overviews for each community water system include estimates of water demands; identification of potential deficiencies; formulating water supply alternatives; presenting preliminary cost estimates for the selected alternatives; and providing recommendations for implementing improvements. Water systems need to provide an adequate

supply of water, treatment capacity, treated storage capacity, and fire flow. The plan presents recommendations on supply-side and demand-side options.

Stormwater Management Plans

Stormwater discharges are generated by runoff from land and impervious areas such as paved streets, parking lots, and building rooftops during precipitation events. Changes in watershed hydrology due to growth and development directly impact the availability and quality of water resources. For example, in areas where residents depend on wells for their drinking water supply, underground aquifers can be depleted because of increasing demand from new development and an associated decrease in infiltration as impervious surfaces replace natural land cover. Changes in watershed hydrology include:

- Increases in stormwater flows and flooding
- Decrease in infiltration and groundwater recharge
- Reduction in stream networks due to stormwater conveyances channeling water away from developing areas
- Lowering of stream base flows and groundwater levels
- Increased contaminant loading to streams and groundwater

Proper stormwater management efforts attempt to minimize the above problems by addressing not only the quantity of stormwater produced, but also the quality of the stormwater and the amount of water that is lost from the watershed. The Pennsylvania DEP promotes a comprehensive watershed approach to stormwater management to improve water quality and quantity through the use of best management practices (BMPs). The stormwater management approaches integrate existing planning and regulatory requirements to reduce pollutant loads to streams, recharge aquifers, maintain stream base flows, prevent stream bank erosion, and protect the environmental integrity of receiving waters.

The types and degree of BMPs that are prescribed in the watershed plan are based on the expected development pattern and hydrologic characteristics of each individual watershed. The final product of the Act 167 watershed planning process is a comprehensive and practical implementation plan and stormwater ordinance developed with a firm sensitivity to the overall needs, i.e. financial, legal, political, technical, etc., of the municipalities in the watershed.

Integrated Water Resources Plans

Integrated Water Resource Plans (IWRPs) provide guidance to balance land use and growth that is consistent with the sustainability of aquifers and streams. Objectives outlined in IWRPs should be consistent with Pennsylvania's State Water Plan (Act 220) and should recognize stormwater, water quality, and aquatic resource issues. IWRPs are very comprehensive and include components of other water resource related plans, such as Act 167 stormwater management plans, groundwater management plans, wellhead protection areas, and water conservation. Water supply and wastewater planning needs are a component of the plan. The IWRP should allow a county to understand needs and opportunities within its watersheds, as well as present recommendations for improving and sustaining resources.

Water Conservation Plan

The benefits of implementing water conservation concepts throughout a water supply service area are many and should be carefully examined. Saving water will save money for consumers on water, sewer, and water heating bills. Demand for water has a pronounced impact on the environment by lowering stream flows, depleting groundwater aquifers, and in certain cases,

requiring the impoundment of free flowing stream or the diversion of water from one drainage basin to another. Reducing per capita water use will decrease the amount of wastewater generated, and thereby maintain the operating efficiency of treatment plants over a longer period of time. Reducing water consumption will reduce operating costs for utilities, and will delay costly capital improvements. When compared to the cost of expanding existing facilities or developing new water sources, the most cost-effective alternative is conservation.

Pennsylvania's current water conservation program emphasizes education and guidance to reduce water use at the local level. DEP offers guidelines for designing a water conservation program. Under the provisions of recent legislation, the State Water Plan (Act 220), water conservation will continue as a voluntary program. The act establishes a formal program to promote voluntary water conservation and water use efficiency practices for all water users. As a resource to municipalities, DEP will create a Water Resources Technical Assistance Center to promote the use and development of water conservation and water use efficiency education and technical assistance programs. Act 220 also authorizes grants for water resources education and technical assistance.

Land Development and Zoning Ordinances

The most significant challenge for preserving future water resource goals is growth patterns and activities on land. Because local officials are responsible for planning for growth and have the authority to regulate the use of the land, they also have the most direct influence on water resources. The Pennsylvania Municipalities Planning Code grants direct authority to municipalities to regulate development activity through subdivision and land development ordinances and zoning ordinances. Many of the water resource protection strategies discussed in the water resources tool box section can be incorporated into one or both regulatory ordinances.

For example, the subdivision and land development ordinances may require that a development site plan include a specific amount of land for parkland, which could be part of a groundwater preservation strategy. Site design standards that promote pervious surface designs, e.g. porous pavement, can help to protect groundwater by controlling runoff and filtering potential pollutants to the underlying aquifer.

Maps of specific features, such as critical aquifer recharge areas or wellhead protection areas can be incorporated into the zoning map through an overlay district. The overlay would impose an additional series of requirements to the permitted or conditional uses of the underlying district. For example, if vehicle fueling, maintenance, and storage are permitted uses, and if these uses were located in a wellhead protection area, they would require a containment system for collecting and treating all runoff and preventing release of fuels, oils, lubricants, and other automotive fluids into soil, surface water, or groundwater.

Key Practices for Members of the Community

Human uses often have the greatest impacts on water resources; therefore, educating the community is a necessary component in ensuring a water supply of adequate quality and quantity. Commercial and residential uses contribute to runoff from impervious surfaces, pollution from vehicles and chemicals, nutrient deposition from lawn fertilizers and septic tanks, and aquifer distribution from well withdrawals without recharge. Poor management of agricultural lands, in the form of excessive or poorly timed nutrient application or inadequate livestock fencing in riparian areas, can also have profound impacts on water quality.

■ Residential Practices

- Limit lawn watering and fertilizing
 - If lawns and gardens use native plants and grasses, attractive landscaping can be created with plant life adapted to local climate and soils, limiting and often eliminating the need for additional water and nutrients.
- Proper care of septic tanks
 - Beyond eventual contamination of groundwater, periodic maintenance improves public health by limiting contaminants in septic backup and saturated areas.
 - Informing residents of basic upkeep routine, how to spot problems, and how often to pump, households will receive the added benefit of longer system life and fewer major, costly system repairs.
- Proper disposal of household pollutants
 - Items such as used motor oil, gasoline, solvents, paint, insecticides, batteries, oven cleaners, etc., can be very dangerous in areas where drinking water is obtained by wells. Dauphin County offers a free curbside collection program for household hazardous wastes that residents may take advantage of once a year.

■ Agricultural Practices

- Nutrient management
 - This is often considered the most important tool and only takes a minor change in habit that costs the farmer nothing. Timely application of manures and fertilizers is critical. Coordinating application with precipitation and thaws means more can be absorbed by the soil rather than carried off. Applying only as much fertilizer and manure as your soils needs is also valuable, as soil is only capable of absorbing a certain amount of nutrients.
- Maintain cover crops instead of fallow fields
 - Particularly in winter, this will help prevent nutrient loss.
- Nutrient Trading
 - Where one farmer has a nutrient surplus and another has a deficiency, trading solves multiple problems at once. A simple agricultural bulletin board where farmers can post their needs and get in touch with one another could facilitate this.
- Fencing
 - Fencing horses and cattle out of streams except for specific crossings at watering areas prevents bank erosion and manure flowing directly into waterways. This can be done with inexpensive temporary fencing, and adjusted as needed.
- No-till agriculture
 - Transitioning to no-till agriculture is beneficial in crop farming. While it does require an initial investment, it does have the benefit of retaining nutrients year round. Even without no-till, methods such as contour farming and tilling done at appropriate times can keep a great deal of nutrients on the field and out of the water.

HISTORIC AND CULTURAL RESOURCES PRESERVATION PLAN

Although there are many locally significant historical buildings in Conewago Township, there are no places which are listed or are considered eligible for listing of the National Register of Historic Places. In order to preserve sites of historical significance, they must first be identified. The natural and historical features profile chapter lists several sites that are locally considered to be historically significant.

Historic preservation has not been in the forefront of activities in Conewago Township. This plan addresses the need for maintaining those historic resources through measures such as preparing a historical resources inventory and map, working with the Pennsylvania Historical and Museum Commission, and working with local and county historical societies. Another preservation component involves educating residents and local government leaders in the history of the community, and various preservation initiatives. Showcasing historical assets and encouraging preservation initiatives will help to create a better understanding of the history of the community, thus adding to residents' and visitors' sense of place, and encouraging an increased quality of life.

Identification of Historic Resources

A community's history is contained in its historic resources. These resources may take many forms, including architecturally and historically significant buildings, sites, structures, objects, and districts. A comprehensive historic preservation program begins with the identification and evaluation of historic resources. Once this step is performed, programs can be developed for their preservation and enhancement. One tool for identifying historical features is the National Register of Historic Places, which is managed by the National Park Service. Placement of a building or structure on the National Register increases awareness of its level of importance as a historic place, but does not protect the structure.

Legal Foundation for Historic Preservation

Historic preservation techniques and programs are available to facilitate historic resource protection. Most techniques and programs evolved out of federal or state laws. An understanding of the legal foundation for historic preservation is helpful to determine what techniques and programs are available.

Federal Level

The National Historic Preservation Act of 1966 (NHPA) earmarked the beginning of federal historic preservation policy. The NHPA was intended to stop the severe loss of historic resources in large cities and boroughs due to urban renewal. The legislation was intended to create a comprehensive framework for preserving historic resources through a system of reviews, regulations and incentives. The NHPA encouraged cooperation among federal, state and local governments to address historic resources protection. In Pennsylvania, the Bureau for Historic Preservation (BHP), an agency of the Pennsylvania Historical and Museum Commission (PHMC), is the state agency responsible for overseeing this coordination.

The NHPA formalized the National Register of Historic Places, in which a number of resources are either listed or eligible for listing. The NHPA also instituted the review process, discussed below, for any project that receives federal funds. The act also authorizes the Certified Local Government Program, which enables municipalities to participate directly in federal preservation

programs and to access, through the state, certain funds earmarked for historic preservation activities.

Section 106 Review Process

The Section 106 review process requires that any project using federal funds, which includes most PennDOT projects, be reviewed for its impact on historic resources either listed in, or determined to be eligible for, the National Register of Historic Places. Section 106 does not directly prohibit alteration or destruction of these resources, but it does require a thorough investigation of other alternatives and the consideration of mitigating measures.

State Level

The NHPA authorizes the appointment of a State Historic Preservation Office to administer provisions of the act at the state level. In Pennsylvania, the agency assigned to this responsibility is the Pennsylvania Historical and Museum Commission (PHMC). This entity is responsible for making initial determinations of eligibility for the National Register, managing state historic archives and administering a wide variety of historic preservation programs.

The Pennsylvania History Code pertains to conservation, preservation, protection, and management of historical and museum resources and identifies PHMC as the agency responsible for conducting these activities. It outlines Pennsylvania's legal framework for historic preservation and mandates cooperation among other state entities in identifying and protecting historic and archaeological resources.

Pennsylvania legislation provides the legal foundation for municipalities to adopt historic preservation ordinances through Act 167 and Act 247. The Historic District Act of 1961, Act 167 authorizes municipalities to create local historic districts and protect the historical and architectural character of the district through regulating new construction, building reconstruction, alteration, restoration, demolition, or razing of buildings within a certified local historic district. Local districts established under this act must be certified by PHMC. This act also requires the appointment of a Historical Architectural Review Board (HARB).

The Pennsylvania Municipalities Planning Code (MPC), Act 247 which authorizes the use of municipal land use controls such as use regulations and area and bulk regulations, to protect historic resources. The MPC specifically regulates places having unique historical, architectural, or patriotic interest or value through the creation of a specific zoning classification.

County and Local Levels

The County Planning Commission can support and provide necessary technical guidance to those municipalities that have an interest in adopting an historic preservation ordinance. The County Planning Commission can also assist with integrating historic resources in the county with other tourism initiatives.

At the local level, municipalities can adopt single purpose historic preservation ordinances and establish architectural and historic review boards. Generally, historic preservation regulations are part of a zoning ordinance, but some municipalities choose to adopt stand-alone ordinances instead.