

Natural Resources

East Rockhill has a wealth of natural resources that affect the quality of life of its residents. Farmland, woodlands, steep slopes, and stream valleys are some of the resources that contribute to the aesthetic and rural character of the township. Land use planning should balance future development with the protection of the township's inherent natural resources. Conventional subdivisions and nonresidential development often place a maximum on density and intensity of land use without regard to the natural resources on a site. While township's zoning ordinance requires that proposed development comply with natural resource protection standards and site capacity calculations for certain types of residential development, there are other tools and techniques that can enhance resource protection on an individual site. For instance, the implementation of Low Impact Development or LID, is a concept that stresses the utilization of a site's natural drainage system while minimizing grading and site disturbances. Site fingerprinting and minimum disturbance are two development techniques that can greatly reduce the impacts of grading. (For more on this topic see the Tools and Techniques section).

The purpose of this section is to provide an inventory of the existing natural resources in East Rockhill and suggest implementation strategies that will help to better plan for their protection and enhancement. Natural resources have been broken into two categories—land and hydrological resources. Land resources include geology, steep slopes, woodlands, and agricultural soils. Hydrologic resources consist of watersheds/streams, floodplains, and wetlands. In order to preserve these resources from the negative impacts of improper land use and development, the following resource inventory was compiled.

Land Resources

Geology

In East Rockhill, there are three major geologic formations, all formed in the Triassic Period: diabase (igneous intrusions), Brunswick (sedimentary shale and sandstones), and Lockatong (sedimentary argillite) (See Figure 2.) Inherently, geology affects future planning and land use decisions through impacts on water supply and topography and soil characteristics. Groundwater supplies largely depend upon geology, surface characteristics, water use and seasonal precipitation. The capacity of these aquifers to transmit and store water is directly related to the specific physical and chemical properties of the underlain geologic formation. The descriptions and water bearing characteristics of each are described below:

- › **Brunswick Formation**—Interlaced with bands of Lockatong, the Brunswick formation composes the majority of the eastern and southern portions of the township. A sedimentary rock consisting mostly of red to reddish-brown shale, gray to greenish-gray mudstone, and siltstone. Brunswick shale is nonporous rock moderately resistant to erosion and weathering. However, because it is highly fractured, the Brunswick Formation is considered a reliable source of groundwater than Lockatong with well yields often greater than 100 gallons per minute (gpm). Yields in the fractured rocks of Brunswick

shale are more predictable than in areas of dense, hard, poorly fracture rocks such as diabase or Lockatong argillite.

- **Lockatong Formation**—More resistant to weathering than the Brunswick formation, the Lockatong formation defines two distinct ridges in the East Rockhill Township, one along Ridge Road and a smaller band parallel to the East Branch of the Perkiomen Creek. Characterized by a gray to black argillite and containing tightly cemented sediment. The Lockatong Formation is a less reliable source of groundwater. Storage areas within the fractures are generally small and often obstructed by the formation itself that weathers to a dense clay-like soil that fills joints and prevents water flows. Therefore, the Lockatong formation has a low capacity to transmit and store water. Median well yields from Lockatong formations are about 10 gpm.
- **Diabase**—This formation covers more than one third of East Rockhill Township, covering the extreme northern and western portions of the township. Diabase consists of a dense, erosion-resistant crystalline, which is the primary rock type underlying many wooded ridges, steep slopes, and narrow stream valleys. Most diabase is too dense and the fractures and fissures too narrow to provide reliable well water on a large scale. Thus, diabase is considered a poor source of groundwater, which is only available within the weathered zone to 30 feet deep. The average well yield is 5 gpm. The shallow depth to bedrock also presents difficulties for excavation of on-site septic systems.

Water supply and methods of protecting water supply will be discussed more thoroughly in the Wastewater and Water Issues section.

Steep Slopes

East Rockhill's topography may be characterized by two geologic systems: the hilly terrain of the diabase intrusion and the alternating ridges and valleys of the parallel Lockatong and Brunswick formations. The dominant topographic feature of the Pennridge Area is the Rockhill chain, a major outcropping of diabase running across upper Bucks County from Haycock Mountain through East and West Rockhill, where the major hills are the so-called Rock Hills. Rock Hill, located in the northern portion of East Rockhill Township, between Three Mile Run Road, PA Route 313, and Rockhill Road, has the highest elevation in the Pennridge Area (over 840 feet above mean sea level). It is a striking geologic formation, identified by the Pennsylvania Geological Survey as an Outstanding Scenic Geological Feature of Pennsylvania. A second major ridge parallels most of the length of PA Route 563/Ridge Road, forming a steep natural barrier. Three Mile Run is a very sharply defined valley between Rockhill and Ridge Road. The lowest elevation in the township is 310 feet above mean sea level located at the western most edge of the East Branch of the Perkiomen Creek. Approximately 1,557 acres or 19 percent of the township is covered by slopes of 15 percent or greater (See Figure 2.)

If improperly regulated and designed, development on steep slopes can lead to accelerated erosion, instability of structures, limited access, and obstruction of scenic views. The East Rockhill Township Zoning Ordinance (Sections 27-1900 and 27-1901) restricts development of areas with slopes of 15 percent or greater as shown in the table below:

Table 15. Steep Slope Regulations

Slope	Allowable Disturbance
15 to 25 percent	No more than 30 percent
15 to 25 percent <i>tracts less than 10 acres in Agricultural Preservation District</i>	No more than 75 percent
26 percent or steeper	No more than 20 percent
26 percent or steeper <i>tracts more than 10 acres in Agricultural Preservation District</i>	No more than 70 percent

Township officials may wish to examine these existing provisions to determine if the zoning ordinance should be amended to incorporate additional protection measures and/or allowances for limited disturbance areas. For instance, for sites containing slopes of 26 percent or steeper that are located outside the Agricultural Preservation District, increasing the maximum allowable disturbance to 15 percent would be consistent with Bucks County's policy in the *Natural Resources Plan* (1999). Furthermore, the county plan minimal disturbance areas (e.g., areas of steep slopes that are less than 3000 square feet) to be exempted from steep slope standards.

Woodlands

In East Rockhill Township nearly 4,892 acres (59 percent of the area of the township) contains woodlands (See Figure 2.) Much of these woodlands are concentrated in the northwest of the township, northwest of Three Mile Run Road. The predominate woodland cover is oak-hickory association. These woodland resources provide numerous benefits to the environment including water and air purification, local and regional climate control, open space, erosion control, wildlife habitat, and providing a commercial value as timber and firewood. Vegetative cover also enhances groundwater recharge by reducing the volume and rate of runoff, which is invaluable, especially in the low-yielding aquifers of the diabase formation.

The wooded hillsides in East Rockhill Township dominate the landscape and contribute to its rural character. Woodlands provide visual and audible buffering while contributing to the township's scenic value. When woodlands are located in environmentally sensitive areas, such as steep slopes areas, along tributaries and wetlands, even minor disturbances can lead to serious environmental degradation.

The East Rockhill Township Zoning Ordinance (Section 27-1900.d) provides for the protection of woodlands as shown in the table below:

Table 16. Woodland Protection Regulations

Zoning District	Allowable Disturbance
Resource Protection (RP) Rural Residential (RR) Suburban (S) Agricultural Preservation (AP) <i>tracts less than 10 acres</i>	No more than 20 percent.
Residential (R-1) Commercial-Office (C-O) Extraction (E) Industrial (I-1, I-2) Agricultural Preservation (AP) <i>tracts 10 acres or larger</i>	No more than 40 percent. No more than 75 percent.
All other zoning districts	No more than 20 percent.

Forestry use (Use A4) includes commercial logging operations; clearing or destruction of forested or wooded areas; selective cutting or clearing for commercial or development purposes, or clearing of vegetation in reserved open space or resource protection areas. A reforestation plan is required that will provide a reestablishment of the forest on a sustained yield except where clearing is for agricultural use. All plans are required to illustrate how the general habitat and visual appearance of the forest is to be maintained so that the forest retains its visual and habitat qualities at all stages of the long-term cutting plan. Clear cutting of vegetation is restricted to no more than 5 acres or more than 20 percent of the forest in any one calendar year, whichever is less. Township officials may wish to review these regulations to provide more restrictive clear-cutting standards. For instance, the Forestry use regulations could be revised to establish a maximum area limit for tree removal (e.g., 20 percent of the site) for the lifetime of the lot, and a deed restriction may be placed on the remaining lot area to restrict further clear-cutting. Also, a permanent forested buffer area (e.g., 50 feet) may be required along adjacent roadway that will function to preserve forested areas and minimize the visual impact to passing motorists.

Agricultural Soils

The U.S. Department of Agriculture—Natural Resources Conservation Service (NRCS) has recently recertified the soils in Bucks County and has identified and mapped important farmlands. This identification takes into account not only soil quality but also other environmental conditions that affect agricultural productivity, such as climate and soil acidity. Generally, in Bucks County, the important farmlands surveyed by the NRCS

include soil capability classes I through IV, grouped into two classifications—Prime Farmland (soils with land capability class 1 and 2 soils) and Additional Farmland of Statewide Importance (soils with land capability class 2 and 3 soils). Class 3 soils and class 2 soils that do not qualify as Prime Farmland are classified as Additional Farmland of Statewide Importance.

NRCS defines Prime Farmland as land that has the best combination of physical and chemical characteristics for producing feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land or other land, but not urban built-up land or water. Additional Farmland of Statewide Importance generally includes those lands that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable.

As shown in Figure 3, the highest concentration of agricultural soils are located in the central and southeast portions of the township. Based upon the NRCS soil classification, there are 459 acres of Prime Farmland and 2,530 acres of Additional Farmland of Statewide Importance in East Rockhill Township. This accounts for 31 and 6 percent of the area of the township, respectively.

In 2000, township officials created a new zoning district—AP, Agricultural Preservation District that is intended to promote the preservation of agriculture as a primary use. Limited residential uses are permitted. The standards and densities are intended to provide a positive incentive for the preservation of large amounts of open space and agriculture. In May 2003, (Ordinance No. 201) the Agricultural Preservation district regulations was revised to prohibit no more than 40 percent of the Prime Farmland and Additional Farmland of Statewide Importance soils to be developed.

Hydrological Resources

Watersheds/Streams

East Rockhill Township contains two primary watersheds—Tohickon and East Branch Perkiomen (See Figure 4.) The Tohickon Watershed originates in the northern portion of Bucks County, includes Lake Nockamixon (a man-made impoundment), and discharges its stream flow into the Delaware River at Point Pleasant in Plumstead Township. In East Rockhill, the Tohickon Watershed contains two secondary watersheds—Three Mile Run and Bog Run. Three Mile Run Secondary Watershed, originally a tributary to the Tohickon Creek, starts in West Rockhill Township, crosses East Rockhill Township, and flows directly into Lake Nockamixon. The Bog Run Secondary Watershed is located in portions of East Rockhill and Richland townships and generally corresponds to the environmentally sensitive area known as the Quakertown (Great) Swamp. The headwaters of Bog Run originate in East Rockhill and flows eastward across the northern tip of the township to Tohickon Creek.

The dividing line between the Tohickon and East Branch Perkiomen watersheds generally parallels Ridge Road. The latter is located to the southeast. A small portion of the Morris Creek Secondary Watershed corresponding to the confluence of Morris Creek and the East Branch of the Perkiomen Creek is located along East Rockhill's border with Hilltown Township.

The juxtaposition of the two primary watersheds in East Rockhill Township has significance for water supply planning. Currently, public water is being withdrawn through a series of wells that are owned by the Perkasio Borough Authority (PBA) but located in East Rockhill (within the Three Mile Run Secondary Watershed). These wells serve certain homes and businesses in Perkasio Borough and East Rockhill Township within the East Branch Perkiomen Watershed. Subsequently, wastewater is treated and discharged into the East Branch Perkiomen Creek. However, these wells also supply water to certain businesses in the East Rockhill portion of Tohickon Watershed, which discharges sewage into Three Mile Run interceptor. Ultimately, this wastewater is also treated and discharged into the East Branch of the Perkiomen Creek. These transfers of water across watershed boundaries have implications for development district and infrastructure planning in the township. Conservation easements should be encouraged on the PBA sites to prevent future development or improvements that may have a negative impact on the water quality of the respective wells.

Floodplains

Floodplains or alluvial soils indicate where flooding has occurred in the past. These soils are composed of a mix of other soil types that have been eroded from the land and deposited along streambeds by stormwater. Floodplain/alluvial soils are crucial for the protection of water quality and aquatic life and they store water and accommodate fluctuations of stream volume during heavy rains. Floodplain soils indicate where flooding has occurred in the past. Many of East Rockhill's scenic areas are found within the floodplain of stream valleys with their lush vegetation, steep slopes, and attractive open space. There are approximately 693 acres (or about 8 percent of the area in the township) floodplains East Rockhill Township. (See Figure 4.)

Wetlands

Typically, wetlands occur as marshes, swamps, and bogs. Often, they are saturated lands or areas that display a seasonal high water table. Wetlands are important resources providing habitat for wildlife, filtering stormwater runoff and improving water quality, reducing potential flood damage, and increasing groundwater recharge. Wetland areas greater than 10 acres in size are dispersed throughout the Pennridge Area, though many are located along the area's streams. There are a few concentrations of wetland areas greater than 10 acres in the headwater area of Bog Creek in East Rockhill Township, as part of the Quakertown (Great) Swamp. (See Figure 4.)

The Quakertown Swamp is one of the few significantly large wetlands in upper Bucks County. It is a palustrine nonglacial bog that provides a critical wildlife habitat and is a natural plant community for numerous wetland species. Seasonally high water tables and

large areas subject to occasional ponding or puddling identify this region as a remnant of the original great swamp. The majority of this significant natural feature is located in Richland and East Rockhill townships, but a small portion is located in northeastern part of West Rockhill Township.

The natural resource protection standards in the township zoning ordinance (sections 27-1900 a., b., f., g., h.,i., j) includes provisions for the preservation of hydrologic resources. Encroachment and disturbances are prohibited within floodplain and floodplain soils, streams, watercourses, lake, ponds, wetlands, and riparian buffer zones,¹ except as noted below. A maximum of 20 percent disturbance is allowed for lake and pond shorelines and wetland margins for wetlands over an acre in size as shown the table below.²

Table 17. Hydrologic Resources Regulations

Hydrologic Resource	Allowable Disturbance
Floodplain/Floodplain Soils	None*
Streams, Watercourses, Lakes, and Ponds	None**
Lake or Pond Shorelines	No more than 20 percent
Wetlands	None**
Wetlands Margins <i>wetlands 1 acre and over</i>	No more than 20 percent
Riparian Buffer Zones	None***

* Except disturbances that are permitted by Section 27-1902 of the zoning ordinance.

** Except that roads and utilities may cross streams and watercourses where no other reasonable access is available and where design approval is obtained from the township, as well as State and Federal permitting agencies.

*** Except for road and utility crossings where design approval is obtained from the township.

Overall, township officials may wish to examine the natural resource protection standards in order to enhance the protection of the township land and hydrological resources.

¹ A riparian buffer is a wooded, natural area within 75 feet of the top of stream/watercourse bank of any perennial or intermittent stream or watercourse identified on USGS or NRCS mapping.

² Wetland margins is an area that extends 100 feet from the wetland boundary or to the limit of hydric soils, whichever is less (in no case shall the margin be less than 50 feet).

