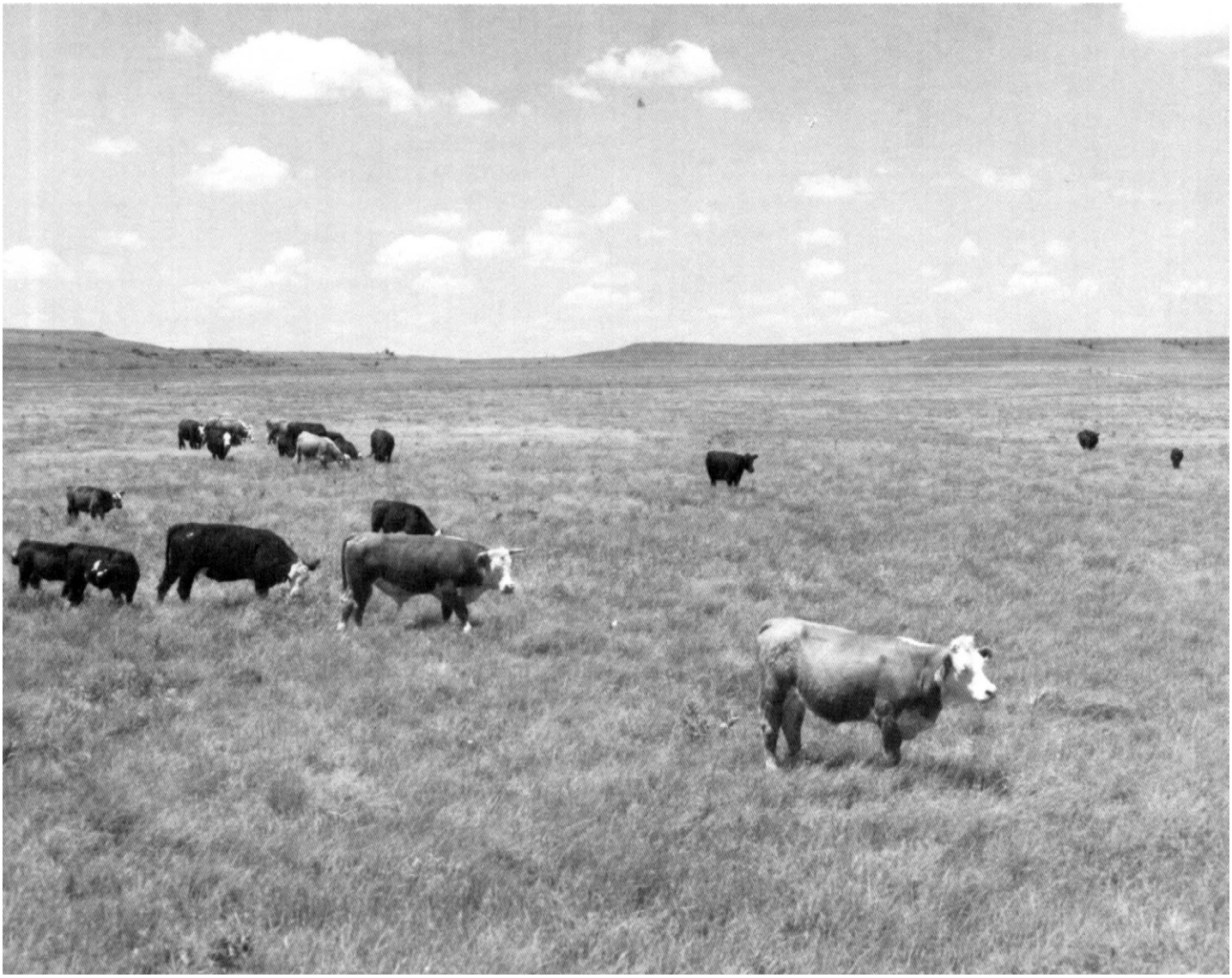
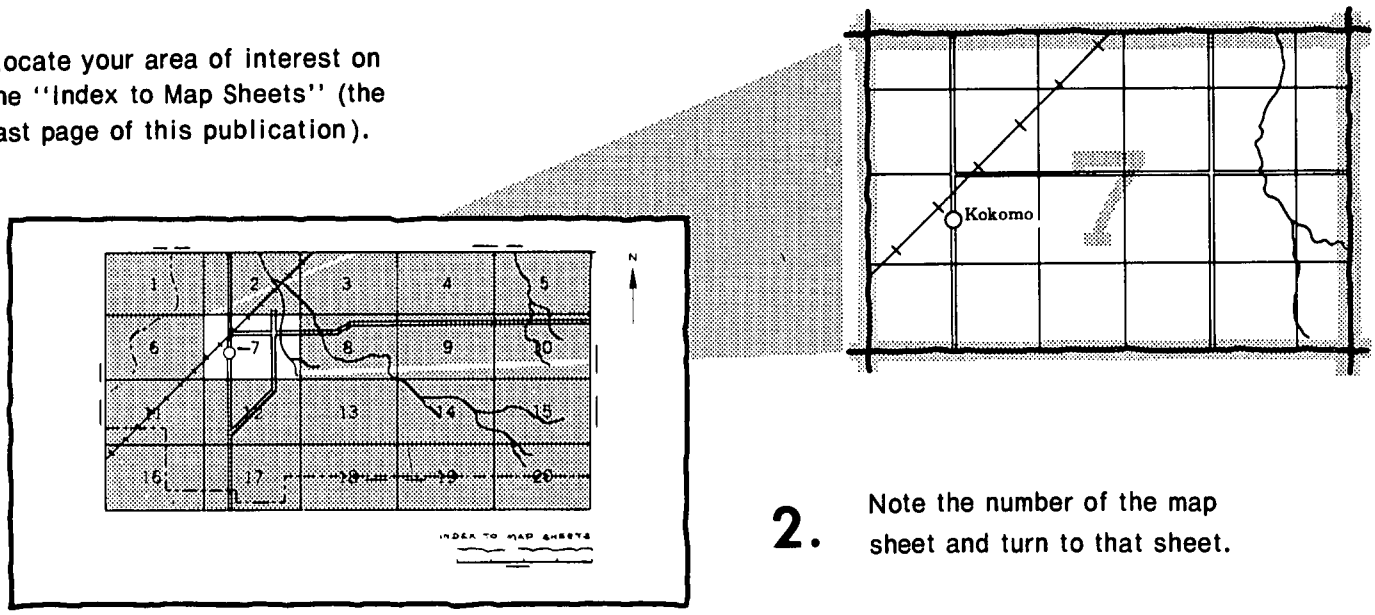
SOIL SURVEY OF
Schuylkill County, Pennsylvania



United States Department of Agriculture
Soil Conservation Service
in cooperation with
The Pennsylvania State University,
College of Agriculture and
The Pennsylvania Department of
Environmental Resources,
State Conservation Commission

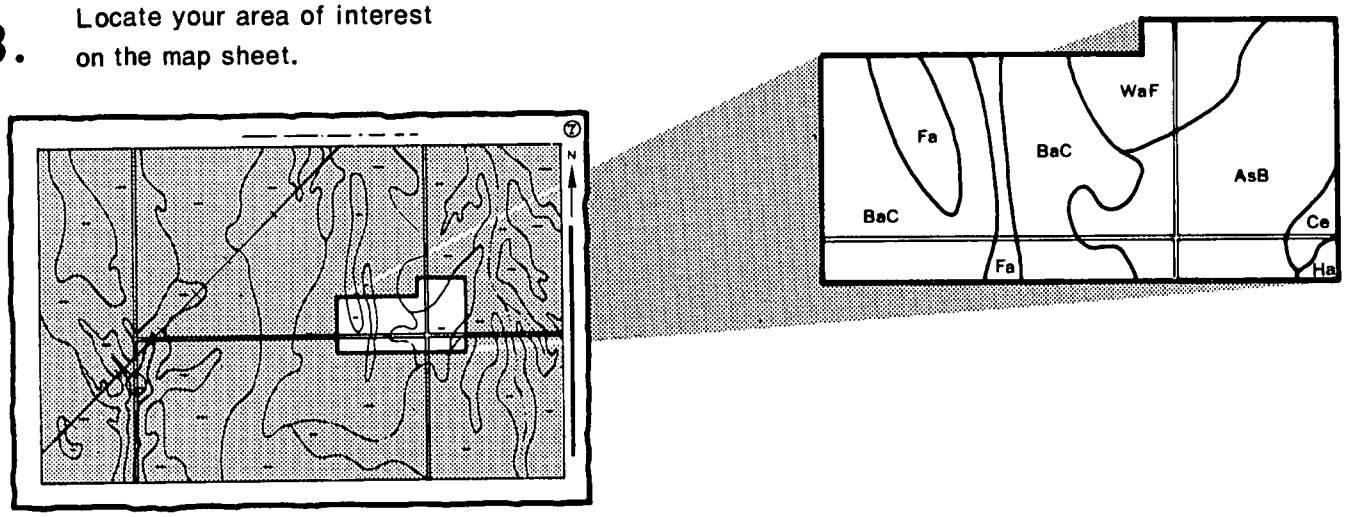
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

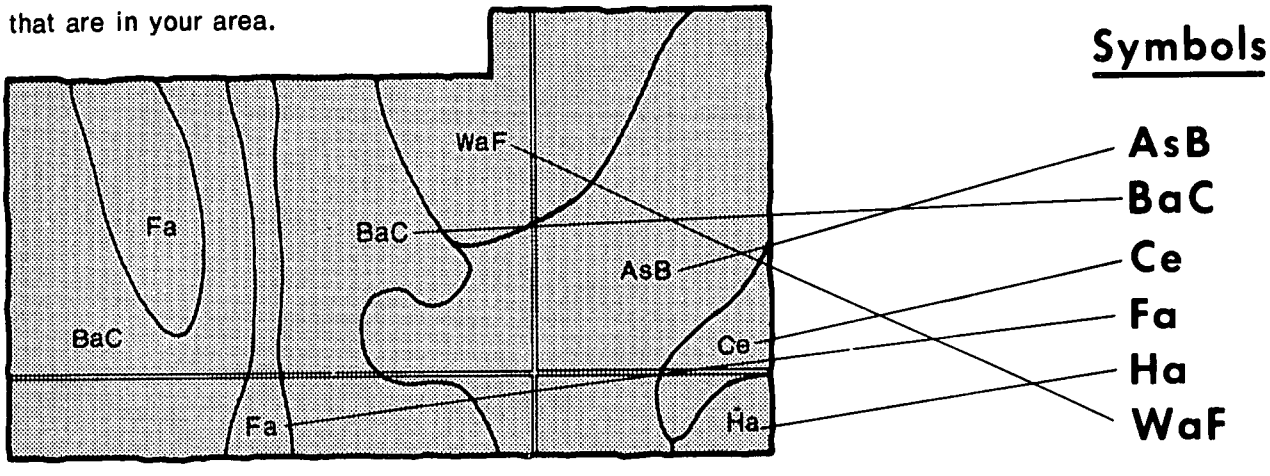


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

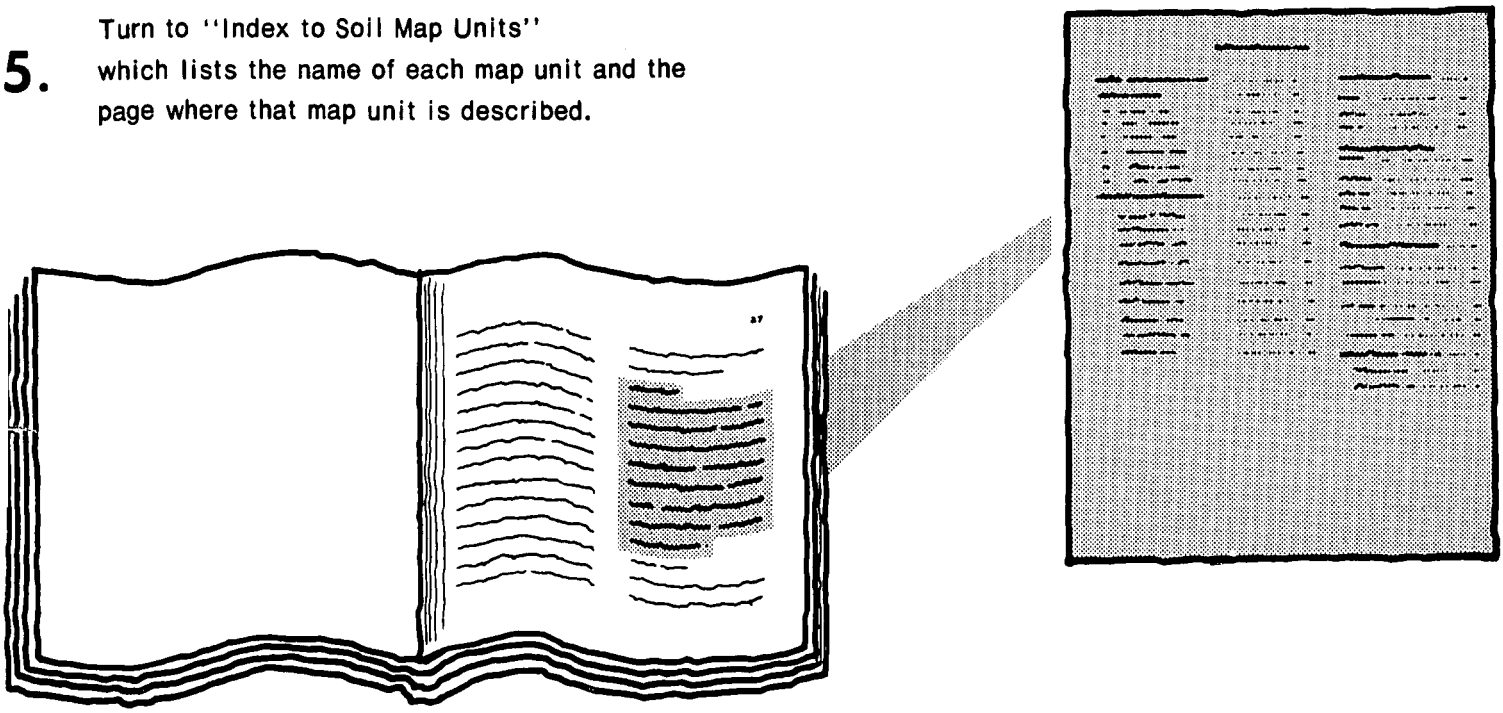


4. List the map unit symbols that are in your area.

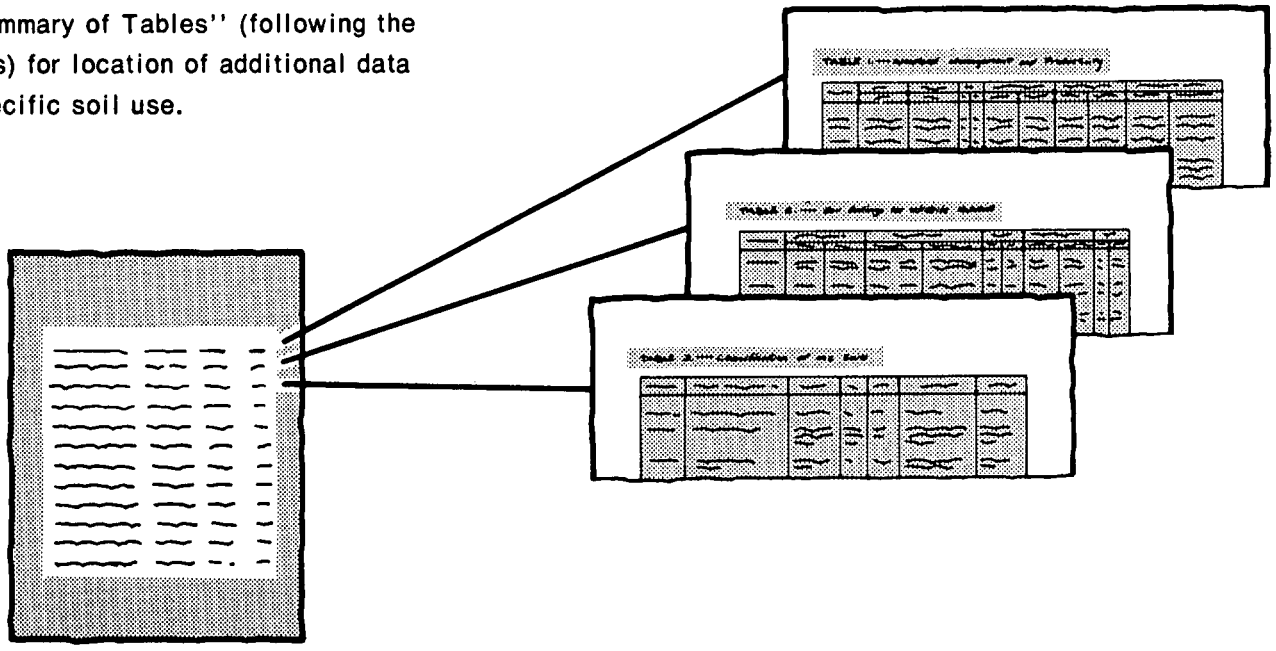


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists, for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1956-76. Soil names and descriptions were approved in 1977. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1976. This survey was made cooperatively by the Soil Conservation Service and The Pennsylvania State University, College of Agriculture and The Pennsylvania Department of Environmental Resources, State Conservation Commission. It is part of the technical assistance furnished to the Schuylkill County Conservation District. Financial assistance was provided by the Department of Housing and Urban Development, under provisions of section 701 of the Housing Act of 1954 as amended.

Cover: Aerial view of Berks-Hartleton-Weikert map unit. Berks and Weikert soils are on the steeper and more sloping areas at the upper left and at the right, Hartleton soils are on the rolling areas in the left center, and included wetter soils are in the center.

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Issued July 1982

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Foreword

It is my pleasure to introduce the Soil Survey of Schuylkill County, Pennsylvania. The survey contains much information useful in land planning programs. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use it to help them understand, protect, and enhance the environment.

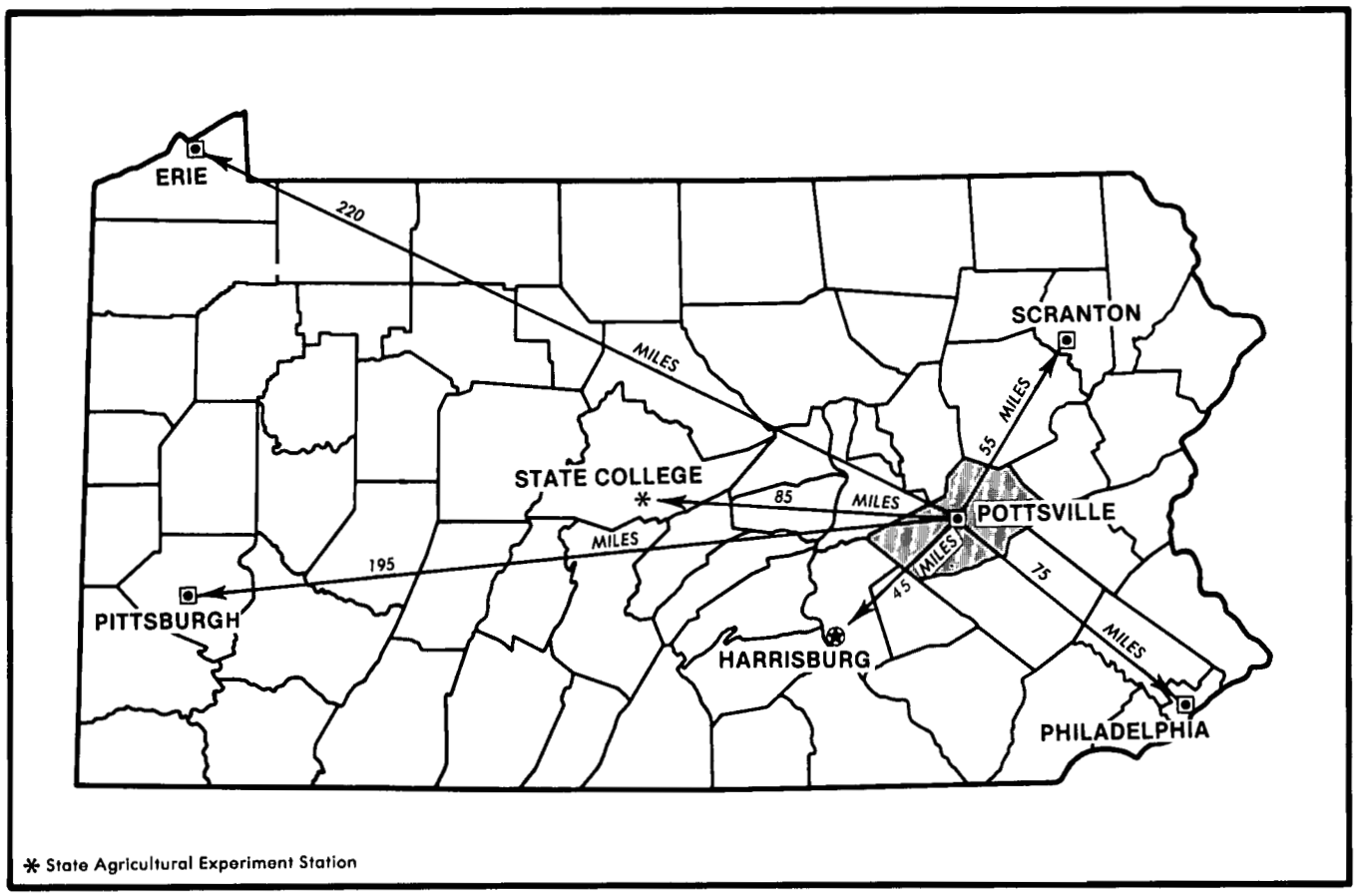
Great differences in soil properties can occur within short distances. Soils can be seasonally wet or subject to flooding, shallow to bedrock, or too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to onsite sewage disposal. Soils that have a high water table are poorly suited to basements or underground utilities.

This report consists of two parts: (1) the first part is made up of descriptions of the soils in Schuylkill County, and the potentials, hazards, and limitations of these soils; (2) the second part is made up of detailed maps showing the soils in the county.

It is not possible to list all the ways that this soil survey can be used. Additional information and assistance concerning use of the soils can be obtained from your local office of the Soil Conservation Service or the Cooperative Extension Service.

I believe that use of the information in this soil survey report can help create a better environment and provide conditions for a better life. The widespread use of this information will greatly assist in the development of conservation and in the productive use of our soils, water, and related resources.

Graham T. Munkittrick
State Conservationist
Soil Conservation Service



Location of Schuylkill County in Pennsylvania.

SOIL SURVEY OF SCHUYLKILL COUNTY, PENNSYLVANIA

By Frank A. Kopas, Soil Conservation Service

Field work by Frank A. Kopas and David J. Belz, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with
The Pennsylvania State University, College of Agriculture and The Pennsylvania Department of
Environmental Resources, State Conservation Commission.

SCHUYLKILL COUNTY is in the east-central part of Pennsylvania. It has an area of 784 square miles or 501,760 acres. Schuylkill County is bordered on the north by Northumberland, Columbia, and Luzerne Counties; on the south by Lehigh and Berks Counties; and on the west by Lebanon and Dauphin Counties. Most of the eastern part of the county is in the Delaware River Basin; the western part and the northeastern tip are in the Susquehanna River Basin.

Schuylkill County is in the Appalachian Mountain section of the Ridge and Valley Province. It has six distinct mountain ridges which lie in a northeast-southwest direction. Several streams flowing in four different directions have cut gaps through these ridges. The county is underlain by parts of the Southern and Western Middle Anthracite Coal Fields.

The elevation ranges from 1,000 to more than 2,000 feet in the northern part of the county to less than 1,000 feet in the southern part. Bears Head in the northeastern part has the highest elevation, 2,094 feet. The Schuylkill River, at the place where it enters Berks County south of Port Clinton, has the lowest elevation, 395 feet. Pottsville, the county seat, ranges from about 600 to 1,000 feet in elevation.

The soils formed in materials weathered from mostly shale, siltstone, sandstone and conglomerate, and some limestone and quartzite. Because the limestone material is not sufficient in quantity to produce nonacid soils, these soils are acid.

General nature of the county

This section provides general information about the history, geology, water, minerals, climate, population, transportation, farming, and original vegetation of Schuylkill County.

History

During the French and Indian wars, a series of forts were built in the area of Schuylkill County. Fort Lebanon near Pennsylvania Route 61 at Auburn, Fort Dietrich-Schneider on Route 183 near the Berks County line, and Fort Franklin along U.S. Route 209 south of Synders helped to protect the settlers. In 1811, Schuylkill County was formed from parts of Berks and Northampton Counties, and in 1818 the northern part of the county was extended by additions from Columbia and Luzerne Counties. The county seat was Orwigsburg, but in 1851 it was moved to Pottsville (*9*).

The Centre Turnpike, completed in 1812, was one of the first major roads in the United States. It was constructed from Reading to Sunbury and ran through Schuylkill County. The 108-mile long Schuylkill Canal between Pottsville and Philadelphia was completed in 1824. It operated until 1888. The third railroad in the United States, a half-mile stretch of wooden rails, was built near Pottsville in 1826. The first miners' union was formed in Saint Clair in 1868. It was known as the Workingmen's Benevolent Association and was the predecessor of the United Mine Workers of America.

Coal was discovered in the Schuylkill County area around 1792 when the campfire of Necho Allen ignited an outcropping of coal on Broad Mountain. Anthracite, or "hard coal", is almost pure carbon and gives off very little smoke. The Anthracite Region extends from Pottsville in Schuylkill County in the south, through Hazleton and Wilkes Barre in Luzerne County, to near Scranton in Lackawanna County. The production of coal was the most important industry in the area from 1900 to 1930. During this period Schuylkill County developed rapidly and was considered one of the most prosperous areas in the country. Nearly 35,000 men were employed in coal mining, and more than 100 million tons of coal were produced annually. The population of the county in 1930 was 235,000. The use of anthracite as fuel began to recede after this time, and in the post World War II years

the use of oil and natural gas increased. Today most coal operations are strip mining.

Geology

Joseph N. Van, geologist, Soil Conservation Service, assisted in preparing this section.

Schuylkill County is in the Valley and Ridge Physiographic Province of the Appalachian Highlands Division (*7*). The bedrock of the entire area has been folded and faulted and has left ridges of hard sandstone and conglomerate trending in a northeast direction across the county (*6*). The mountains range from 1,300 feet to 2,100 feet above sea level and contrast with the areas where the Schuylkill River leaves the county at 385 feet above sea level (*3*).

Two major structures predominate in the county, and numerous anticlines and synclines are present. The Minersville Synclinorium in the center of the county has an axis trending north 65 degrees east. In the western part of the Minersville Synclinorium at Tremont, the basin forks toward the western part of the county. These forks are the Southern Synclinorial Trough and the Northern Synclinorial Trough (*17*). In the eastern half of the Western Middle Synclinorium north of Minersville, the axis trends approximately north 75 degrees east. The beds of these structures have a southward inclination. The youngest bedrock exposed in these structures is of the Post-Pottsville Formations and the Pottsville Group (Pennsylvanian). It is made up of sandstone, conglomerate, siltstone, shale, and anthracite coal beds. The maximum exposed thickness of the two formations is more than 2,500 feet and more than 1,475 feet, respectively (*8*). In these areas, the soils of the Leck Kill-Meckesville-Calvin and Berks-Hartleton-Weikert map units are dominant. Also included are all soils of the Hartleton-Udorthents-Udults map unit.

The underlying upper and lower Mississippian beds include the Mauch Chunk Formation which consists of red shale and sandstone and some conglomerate, and the Pocono Formation which consists of hard, gray sandstone and conglomerate. The maximum exposure of the Mauch Chunk beds in the county is approximately 2,950 feet thick; the maximum exposure of the Pocono beds is about 1,600 feet thick. The soils of the Leck Kill-Meckesville-Calvin map unit are dominant in these areas. Other included soils are of the Dekalb-Buchanan-Hazleton map unit.

In the western part of the county and between the two syncline structures lies the Broad Mountain Anticline which contains exposures of the Pottsville, Mauch Chunk, and Pocono Formations. These three bedrock formations are the predominant outcrops in the northern and eastern parts of Schuylkill County (*4*). The soils of Leck Kill-Meckesville-Calvin and Berks-Hartleton-Weikert map units are the dominant soils.

The older Mississippian, Devonian, and Silurian beds are exposed in the southern part of the county and trend in a northeast direction. The anticlines and synclines make low to high angle dips to the northwest and southeast. The Catskill Formation and Marine beds of the Susquehanna Group have an exposed thickness of approximately 6,000 feet of sandstone, shale, and siltstone. The Mahantango Formation, of which the middle member is the Montebello Sandstone, and the Marcellus Shale are in the Hamilton Group. Leck Kill-Meckesville-Calvin and Berks-Hartleton-Weikert map units make up the major soils in these areas.

Underlying thin bands of Selinsgrove Limestone and conglomeratic sandstone are in the vicinity of Schuylkill Haven. Some local, undifferentiated rocks include the Ridgeley Sandstone, Helderberg Formation, Decker Formation, Bossardville Limestone, and the Poxono Island Formation (*16*).

The Bloomsburg Red Beds, which consist of shale and siltstone, are the most pronounced exposures in southern Schuylkill County. Dominant soils are of the Leck Kill-Meckesville-Calvin map unit. The Clinton Group and the hard, quartzitic Tuscarora Sandstone are the oldest rocks and form Kittatinny (Blue) Mountain at the southern boundary of the county. The major soils are of the Dekalb-Buchanan-Hazleton map unit.

Much of the flood plain of the Schuylkill River and the streams have recent alluvial deposits and some alluvial terraces. Other Quaternary deposits include large bands of unconsolidated talus which are spread over the Pottsville Beds, the Mauch Chunk Formation, and members of the Catskill Formations. A part of the Bloomsburg Red Beds east of Drehersville is covered by talus.

Water

Ground water is plentiful in most of the bedrock in Schuylkill County from the youngest Pennsylvanian to the oldest Silurian Formations. Because of the intense folding and faulting of the bedrock, even the impervious shales contain many joints and fractures and are porous. Adequate water for domestic purposes is provided by shallow water wells from porous sandstones and conglomerates. Some wells have been drilled to a depth of more than 1,000 feet. Most industrial and municipal needs are supplied by ground water. Some of the municipalities are supplied by surface water from a few reservoirs that have emergency water wells in case of drought. A few wells have artesian flow, but most water has to be pumped.

The Post-Pottsville sandstone and conglomerate yields small to large supplies of potable water. These supplies, however, are gradually becoming polluted in the vicinity of coal operations. The Pottsville coarse quartz conglomerate yields large supplies of good water from wells at a depth of 350 to 1,000 feet and from a few artesian wells. The Mauch Chunk shales, sandstones, and conglomerates are the most important water-bearing formations in the county. They yield 10 to 30 gallons per minute to shallow domestic wells and 15 to 350 gallons per minute

to deep wells. Good quality water is produced, and several wells have artesian flow. The Catskill shale and sandstone provide adequate supplies to shallow wells and moderate supplies of good quality water to deep wells. The Bloomsburg Red Beds of shale and sandstone provide good quality water and yield small to moderately large supplies of water. Other bedrock formations also yield adequate water supplies for domestic use.

Minerals

The most important mineral resource in Schuylkill County is anthracite coal. In the center of the county is the large Southern Anthracite Field which trends in a northeast direction, and to the north is a part of the Western Middle Anthracite Coal Field. In 1976 the nine anthracite coal producing counties produced 5,291,776 tons of coal. Schuylkill County led this production with 2,646,600 tons mined from about 36 coal beds. Of the output, 409,460 tons were from deep mines; 1,507,246 tons, from strip mines; and 729,894 tons, from bank mines (*5*). The thickness of the 13 coal beds at Pottsville range from 2 feet, 2 inches to 56 feet, 5 inches. Anthracite coal varies from 7.5 percent of volatile matter in the west corner of the county to less than 2 percent at the northeastern edge.

Sandstone material suited to use for construction purposes is available in all parts of Schuylkill County. Quarries in North Manheim and North Union Townships provide crushed stone for concrete and road metal. Sandstone from various formations, including the Pocono sandstone, Pottsville conglomerate, and the coal measures (Post-Pottsville), has been used for building stone.

In the southern part of the county, the Helderberg mestone formation was quarried many years ago for agricultural lime. Limestone was later quarried for concrete aggregate and road metal near Andreas and a mile east of Shuylkill Haven.

Shale is common throughout the county and is used for making brick. The Bloomsburg Red Beds are used for making bricks at Auburn, and face brick of various colors and textures, radial chimney brick, and paving block are produced here.

Climate

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Winters are cold and snowy at high elevations in Schuylkill County, and summers are fairly warm on the mountain slopes. It is frequently cold in the valleys, but intermittent thaws keep the snow cover from lasting. Summers in the valleys are very warm and occasionally there are very hot days. Rainfall is evenly distributed during the year, but it is considerably heavier on the windward, west-facing slopes than it is in the valleys. Normal annual precipitation is adequate for all crops; however, the summer temperatures may be too cool, and the growing season too short, particularly at higher elevations.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Port Clinton for the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 28 degrees F, and the average daily minimum temperature is 18 degrees. The lowest temperature on record, which occurred at Port Clinton on January 22, 1961, is -22 degrees. In summer the average temperature is 69 degrees, and the average daily maximum temperature is 83 degrees. The highest recorded temperature, which occurred on July 4, 1966, is 104 degrees.

Growing degree days, shown in table 1, are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 26 inches, or 55 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 22 inches. The heaviest 1-day rainfall during the period of record was 4.40 inches at Port Clinton on July 9, 1952. Thunderstorms occur on about 35 days each year, mostly in summer.

Average seasonal snowfall is 32 inches. The greatest snow depth at any one time during the period of record was 14 inches. On the average, 21 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average humidity at dawn is about 80 percent. The percentage of possible sunshine is 70 in summer and 50 in winter. The prevailing wind is from the west. Average windspeed is highest, 12 miles per hour, in March.

Population

According to the U. S. Census, the population of Schuylkill County in 1970 was 160,089. Ashland had a population of 4,737; Frackville, 5,445; Mahanoy City, 7,257; Minersville, 6,012; Pottsville, 19,715; St. Clair, 4,576; Schuylkill Haven, 6,125; Shenandoah, 8,286; and Tamaqua, 9,246. It is estimated that more than 44,000 people were within a 5-mile radius of Pottsville, and that the primary market area included more than 120,000 people.

Transportation

Most of Schuylkill County is ideally located for manufacturing, industry, warehousing, and distribution. The

metropolitan areas of New York City, Philadelphia, Baltimore, and Washington, D.C., are within a few hours' driving distance, and networks of highways are readily accessible. Schuylkill County has about 43 miles of interstate highways, 704 miles of state and federal highways, and 924 miles of surfaced secondary and municipal roads. U.S. Interstate Highway 81, a modern divided highway, extends north through New York State and south to New Orleans. Pennsylvania Route 61 also runs north and south. Several trucking facilities are available in the county for intra-state and inter-state trucking.

Large commercial airports at Avoca (Wilkes-Barre), Reading, Harrisburg, Allentown, and Philadelphia are within 2 hours travel time. Small general service commercial airports are at Buck Run, Minersville, Orwigsburg, Suedberg, and Tower City.

Most of the old railroads in Schuylkill County have been abandoned or acquired by the newly established Con-Rail Railroad System. Con-Rail operates a small commuter train between Pottsville and Philadelphia.

Farming

Eleven percent of the acreage in Schuylkill County was in harvested crops in 1974. There were 498 farms, according to the U.S. Census of Agriculture. The total acreage farmed was 102,246 acres, and the average size of farm was 128 acres. The value of agricultural products sold increased 107 percent from 1969 to 1974.

The largest farm income was produced by the poultry industry, and the second largest was by the dairy industry, according to the 1975 Pennsylvania Crop and Livestock Report. Meat products; vegetables, including potatoes; field crops; and fruit were also produced.

Schuylkill County ranked third among the Commonwealth counties in the production of eggs; sixth in potatoes; seventh in chickens, including broilers; and ninth in hogs and pigs.

There were 36 businesses in Schuylkill County that manufactured "food and kindred products", according to the 1975 Pennsylvania Industrial Report, and 12 firms that produced lumber and wood products.

Original vegetation

At one time Schuylkill County was entirely covered with forest, and in some places the trees were of superior quality. Broad Mountain had a dense growth of yellow pine, hemlock, and several species of oak. When the coal industry was developed, this timber was used to supply the collieries and to build houses for the miners.

In the southern part of Schuylkill County, mostly on the mountains and hills, the original forest cover was mainly chestnut and white oak, together with varieties of beech, maple, and gum trees. The valleys in the northern mountainous areas were covered with spruce and hemlock and a thick undergrowth of laurel, and the upper slopes of the mountains were covered with yellow pine and pitch pine. White pine and hemlock were considered the most valuable trees for lumber. At the present time, except as nature has reproduced the trees in later growths, desirable timber has disappeared from Schuylkill County.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated

on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soil map delineations have been matched as closely as possible to bordering counties. There are a few discrepancies in matching bordering counties because of changes in series concept and legend design.

1. Leck Kill-Meckesville-Calvin

Gently sloping to moderately steep, deep and moderately deep, well drained soils; on uplands

This map unit (fig. 1) makes up 25 percent of the county. It is 30 percent Leck Kill soils, 25 percent Meckesville soils, 22 percent Calvin soils, and 23 percent soils of minor extent.

Figure 1.—Aerial view of Leck Kill-Meckesville-Calvin map unit. Leck Kill and Calvin soils are at the left and right of the ponded areas. The ponds and surrounding areas are on Meckesville soils and included wetter soils.

The deep Leck Kill soils formed in residual material on uplands. They are underlain by interbedded sandstone, siltstone, and shale. Leck Kill soils have a dusky red, medium textured surface layer and a weak red, medium textured subsoil. Permeability is moderate or moderately rapid.

The deep Meckesville soils formed in colluvial material on uplands. They are underlain by interbedded sandstone, siltstone, and shale. Meckesville soils have a reddish brown, medium textured surface layer and a reddish brown to weak red, moderately fine textured or medium textured subsoil that has a fragipan. Permeability is moderately slow.

The moderately deep Calvin soils formed in residual material on uplands. They are underlain by interbedded sandstone, siltstone, and shale. Calvin soils have a reddish brown, medium textured surface layer and a weak red, medium textured subsoil. Permeability is moderately rapid.

Soils of minor extent are the somewhat poorly drained and moderately well drained Kedron soils and the poorly drained Shelmadine soils. These soils are on foot slopes and colluvial fans. Also included are the shallow, well drained Klinesville soils on hillsides, the poorly drained Atkins soils, and the somewhat poorly drained and moderately well drained Basher soils on flood plains.

Most areas of this map unit are used for farming and urban development. Some areas are used for woodland. The moderately slow permeability and moderate depth to bedrock are the main limitations for most uses.

2. Berks-Hartleton-Weikert

Gently sloping to very steep, deep to shallow, well drained soils; on uplands

This map unit makes up 18 percent of the county. It is 29 percent Berks soils, 15 percent Hartleton soils, 14 percent Weikert soils, and 42 percent soils of minor extent.

The Berks soils are moderately deep and gently sloping to moderately steep. They formed in residual material on uplands and are underlain by interbedded sandstone, siltstone, and shale. Berks soils have a dark brown, medium textured surface layer and a strong brown to yellowish red medium textured subsoil. Permeability is moderate and moderately rapid.

The Hartleton soils are deep and gently sloping to moderately steep. They formed in residual material on uplands and are underlain by interbedded sandstone, siltstone, and shale. Hartleton soils have a dark grayish brown, medium textured surface layer and a yellowish brown, medium textured subsoil. Permeability is moderate and moderately rapid.

The Weikert soils are shallow and steep and very steep. They formed in residual material on uplands and are underlain by interbedded sandstone, siltstone, and shale. Weikert soils have a dark brown, medium textured surface layer and a yellowish brown, medium textured subsoil. Permeability is moderately rapid.

Soils of minor extent are the moderately well drained Watson soils, the somewhat poorly drained Alvira soils, and the poorly drained Shelmadine soils. These soils are on foot slopes and colluvial fans. Also included are the shallow, well drained Klinesville soils on hillsides; the deep, well drained Allenwood soils on ridgetops and side slopes; and the poorly drained Atkins soils and the moderately well drained Philo soils on flood plains.

Most areas of this map unit are used for farming and urban development. The soils have good potential for farming. Permeability, depth to bedrock, and coarse fragments are limitations for engineering and other nonfarm uses.

3. Dekalb-Buchanan-Hazleton

Gently sloping to very steep, deep and moderately deep, well drained to somewhat poorly drained soils; on uplands

This map unit makes up 32 percent of the county. It is 27 percent Dekalb soils, 19 percent Buchanan soils, 10 percent Hazleton soils, and 44 percent soils of minor extent.

The Dekalb soils are moderately deep, well drained, and gently sloping to very steep. They formed in residual material on uplands and are underlain by interbedded sandstone and conglomerate. Dekalb soils have a very dark grayish brown and pale brown, moderately coarse textured surface layer and a yellowish brown to reddish yellow, moderately coarse textured subsoil. Permeability is rapid.

The Buchanan soils are deep, moderately well drained and somewhat poorly drained, and gently sloping to moderately steep. They formed in colluvial material on uplands and are underlain by interbedded sandstone, siltstone, and shale. Buchanan soils have a dark gray, medium textured surface layer; a brown, medium textured subsurface layer; and a yellowish brown, medium textured or moderately fine textured subsoil that has a fragipan. Permeability is slow.

The Hazleton soils are deep, well drained, and gently sloping to moderately steep. They formed in residual material on uplands and are underlain by interbedded sandstone and conglomerate. Hazleton soils have a brown, moderately coarse textured surface layer and a yellowish brown, moderately coarse textured subsoil. Permeability is moderately rapid and rapid.

Soils of minor extent are the well drained Laidig soils and the poorly drained Andover soils. These soils are on foot slopes and colluvial fans. Also included are the moderately deep Lehew soils and the deep Clymer soils on ridgetops and side slopes.

Most areas of this map unit are used for woodland. The soils have good potential for trees and poor potential for farming. Permeability, depth to bedrock, and large

Figure 2.—Typical area of the Udorthents-Dekalb-Hazleton map unit. The dominant Udorthents soils are in the center. Dekalb and Hazleton soils are on the ridge in the background. The large dragline is stripping the land for coal.

stones on the surface are limitations for engineering and other nonfarm uses.

4. Udorthents-Dekalb-Hazleton

Gently sloping to very steep, deep and moderately deep, well drained soils; on uplands

This map unit (fig. 2) makes up 20 percent of the county. It is 30 percent Udorthents soils, 13 percent Dekalb soils, 8 percent Hazleton soils, and 49 percent soils of minor extent.

The Udorthents soils are deep and gently sloping to very steep. They formed in overburdened material on uplands from sandstone, quartzite, conglomerate, shale, and slate stripped for coal mining. Soil characteristics are variable.

The Dekalb soils are moderately deep, well drained, and gently sloping to very steep. They formed in residual material on uplands and are underlain by interbedded sandstone and conglomerate. Dekalb soils have a very dark grayish brown and pale brown, moderately coarse textured surface layer and a yellowish brown to reddish yellow, moderately coarse textured subsoil. Permeability is rapid.

The Hazleton soils are deep, well drained, and gently sloping to moderately steep. They formed in residual material on uplands and are underlain by interbedded sandstone and conglomerate. Hazleton soils have a brown, moderately coarse textured surface layer and a yellowish brown, moderately coarse textured subsoil. Permeability is moderately rapid and rapid.

Soils of minor extent are the well drained Laidig soils, the moderately well drained and somewhat poorly drained Buchanan soils, and the poorly drained Andover soils. These soils have a fragipan and are on foot slopes and colluvial fans. The deep, well drained Clymer soils are on broad mountaintops. Rubble land is mainly on steep slopes. Dumps, mine and Dumps, coal waste, are intermingled with the Udorthents soils.

Most areas of this map unit are used for woodland. Some small areas are used for urban development. These soils have good potential for trees and poor potential for farming. Permeability, depth to bedrock, large stones on the surface, and slope are limitations for engineering and other nonfarm uses.

5. Hartleton-Udorthents-Udults

Gently sloping to very steep, deep, well drained to somewhat poorly drained soils; on uplands

This map unit makes up 5 percent of the county. It is 26 percent Hartleton soils, 20 percent Udorthents soils,

11 percent Udults soils, and 43 percent soils of minor extent.

The Hartleton soils are deep, and gently sloping to moderately steep. They formed in residual material on uplands and are underlain by interbedded sandstone, siltstone, and shale. Hartleton soils have a dark grayish brown, medium textured surface layer and a yellowish brown, medium textured subsoil. Permeability is moderate and moderately rapid.

The Udorthents soils are deep and gently sloping to very steep. They formed in overburdened material on uplands from sandstone, quartzite, conglomerate, shale, and slate stripped for coal mining. Soil characteristics are variable.

The Udults soils are gently sloping to moderately steep and well drained to somewhat poorly drained. They formed in colluvial and residual material on uplands and are underlain by interbedded sandstone, siltstone, and shale. Soil characteristics are variable.

Soils of minor extent are the somewhat poorly drained Alvira soils and the poorly drained Shelmadine soils. These soils are on foot slopes and colluvial fans. The deep, well drained Hazleton and Clymer soils and the moderately deep, well drained Dekalb soils are on mountaintops. Dumps, mine and Dumps, coal waste, are closely intermingled with the Udorthents soils.

Most areas of this map unit are used for woodland. Some small areas are used for urban development. These soils have good potential for trees and poor potential for farming. Permeability, slope, and coarse fragments are limitations for engineering and other nonfarm uses.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Hazleton series, for example, was named for the town of Hazleton in Luzerne County, Pennsylvania.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Hazleton channery fine sandy loam, 3 to 8 percent slopes, is one of several phases within the Hazleton series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes, soil associations, and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Urban land-Udults complex is an example.

A *soil association* is made up of soils that are geographically associated and are shown as one unit on the map because it is not practical to separate them. A soil association has considerable regularity in geographic pattern and in the kinds of soil that are a part of it. The extent of the soils can differ appreciably from one delineation to another; nevertheless, interpretations can be made for use and management of the soils. Hazleton-Clymer association, sloping is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Dekalb and Lehew extremely stony soils, steep is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineat-

ed on the soil map and given descriptive names. Dumps, mine is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

AeB—Allenwood gravelly silt loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on the tops and sides of hills. Slopes are 200 to 400 feet long. Areas are rectangular and are mainly 4 to 20 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsoil is about 55 inches thick. It is yellowish red silty clay loam in the upper 7 inches, red gravelly silty clay loam in the next 36 inches, and yellowish red gravelly clay loam in the lower 12 inches.

Included with this soil in mapping are a few small areas of Hartleton channery silt loam and Watson silt loam. Also included are areas of soils similar to this Allenwood soil that are sandy loam throughout. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is moderate to slow, and available water capacity is high. Runoff is medium. Unless limed, this soil is strongly acid to extremely acid. The hazard of erosion is moderate.

This Allenwood soil is used mainly for cultivated crops and some pasture. It has very good potential for cultivated crops, pasture, and trees and good potential for most nonfarm uses.

This soil is well suited to cultivated crops. Contour stripcropping, minimum tillage, no tillage, diversion terraces, and sod waterways help control erosion. The use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth.

This soil is well suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is well suited to trees. Productivity is moderately high. Management problems are few. Logging roads constructed on the contour help prevent erosion. Removal of undesirable trees helps increase production. Machine planting is practical on large areas.

This Allenwood soil has limitations for some nonfarm uses. The moderate to slow permeability is a limitation for onsite waste disposal.

This soil is in capability subclass IIe and woodland group 3o.

AeC—Allenwood gravelly silt loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on the tops and sides of hills. Slopes are 300 to 600 feet long. Areas are rectangular and are mainly 4 to 20 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsoil is about 55 inches thick. It is yellowish red silty clay loam in the upper 7 inches, red gravelly silty clay loam in the next 36 inches, and yellowish red gravelly clay loam in the lower 12 inches.

Included with this soil in mapping are a few small areas of Hartleton channery silt loam and Watson silt loam. Also included are areas of soils similar to this Allenwood soil that are sandy loam throughout. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is moderate to slow, and available water capacity is high. Runoff is medium. Unless limed, this soil is strongly acid to extremely acid. The hazard of erosion is severe.

This Allenwood soil is used mainly for cultivated crops. Some areas are used for pasture. It has very good potential for cultivated crops, pasture, and trees and good potential for most nonfarm uses.

This soil is well suited to cultivated crops. Contour stripcropping, minimum tillage, no tillage, diversion terraces, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth.

This soil is well suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients are needed to maintain fertility for optimum production.

This soil is well suited to trees. Productivity is moderately high. Management problems are few. Logging roads constructed on the contour help prevent erosion. Removal of undesirable trees helps increase production. Machine planting is practical on large areas.

This Allenwood soil has a few limitations for most nonfarm uses because of moderate to slow permeability and slope. The moderate to slow permeability is a limitation for onsite waste disposal.

This soil is in capability subclass IIIe and woodland group 3o.

AgA—Alvira silt loam, 0 to 3 percent slopes. This nearly level, deep, somewhat poorly drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 800 feet long. Areas are rectangular and are mainly 4 to 40 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil extends to a depth of 70 inches. In sequence, it is mottled, yellowish brown silt loam in the upper 11 inches; mottled, yellowish brown clay loam in the next 9 inches; mottled, yellowish brown shaly clay loam in the next 31 inches; and mottled, yellowish brown shaly loam in the lower 10 inches.

Included with this soil in mapping are small areas of Watson silt loam and Shelmadine silt loam. Also included are areas of soils that are similar to this Alvira soil that have a surface layer of yellowish brown silty clay loam. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is very slow. The rooting depth is restricted by the very firm and firm fragipan. A seasonal high water table is within a depth of 6 to 18 inches during wet periods. Unless limed, this soil is strongly acid to extremely acid. The hazard of erosion is slight.

This Alvira soil is used mainly for pasture and cultivated crops. It has fair potential for these uses. This soil has good potential for trees and poor potential for most nonfarm uses.

This soil is suited to cultivated crops if it is drained of excess water. Where proper outlets are available, surface and subsurface drains help improve drainage. Mixing crop residue and manure into the surface layer helps maintain content of organic matter and good tilth.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees. Because of the seasonal high water table, the use of equipment is restricted during wet periods. Removal of undesirable trees helps increase production. Machine planting is practical on large areas.

This Alvira soil has limitations for most nonfarm uses. The slow permeability and a seasonal high water table are limitations for onsite waste disposal and for buildings with basements. Buildings with basements constructed on this soil need foundation drains to remove water from the basement area.

This soil is in capability subclass IIIw and woodland group 3w.

AgB—Alvira silt loam, 3 to 8 percent slopes. This gently sloping, deep, somewhat poorly drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 800 feet long. Areas are rectangular and are mainly 4 to 40 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil extends to a depth of 70 inches. In sequence, it is mottled, yellowish brown silt loam in the upper 11 inches; mottled, yellowish brown clay loam in the next 9 inches; mottled, yellowish brown shaly clay loam in the next 31 inches; and mottled, yellowish brown shaly loam in the lower 10 inches.

Included with this soil in mapping are small areas of Watson silt loam and Shelmadine silt loam. Also included are areas of soils that are similar to this Alvira soil that have a surface layer of yellowish brown clay loam. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is moderate. The rooting depth is restricted by the very firm and firm fragipan. A seasonal high water table is within a depth of 6 to 18 inches during wet periods. Unless limed, this soil is mainly strongly acid to extremely acid. The hazard of erosion is moderate.

This Alvira soil is used mostly for pasture and cultivated crops. It has fair potential for these uses. This soil has good potential for trees and poor potential for most nonfarm uses.

This soil is suited to cultivated crops if it is drained of excess water. Where proper outlets are available, surface and subsurface drains help improve drainage. Mixing crop residue and manure into the surface layer helps maintain content of organic matter and good tilth.

This soil is suited to pasture. Overgrazing and grazing of pasture when this soil is wet are main concerns of pasture management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees. Removal of undesirable trees helps increase production. Because of the seasonal high water table, the use of equipment can be restricted. Machine planting is practical on large areas.

This Alvira soil has limitations for most nonfarm uses. Slow permeability and a seasonal high water table are limitations for onsite waste disposal and for buildings with basements. Buildings with basements constructed on this soil need foundation drains to remove water from the basement area.

This soil is in capability subclass IIIw and woodland group 3w.

AnA—Andover gravelly loam, 0 to 3 percent slopes. This nearly level, deep, poorly drained soil is on toe slopes, along drainageways, and in swales. Slopes are concave and about 200 to 800 feet long. Areas are rectangular and are mainly 8 to 30 acres.

Typically, the surface layer is very dark grayish brown gravelly loam about 5 inches thick. The subsoil is about 41 inches thick. It is mottled, grayish brown gravelly clay loam in the upper 15 inches; mottled, yellowish brown gravelly clay loam in the next 10 inches; and mottled, brown gravelly sandy clay loam in the lower 16 inches. The substratum is mottled, brown gravelly sandy loam to a depth of about 62 inches.

Included with this soil in mapping are small areas of Atkins silt loam and Buchanan gravelly loam. Also included are a few areas of Andover extremely stony loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is slow. The lower part of the subsoil

has a very firm and brittle fragipan. A high water table is within a depth of 6 inches during wet periods. The rooting depth is restricted by the high water table and the fragipan. Unless limed, this soil is strongly acid and very strongly acid. The hazard of erosion is slight.

This Andover soil is used mainly for pasture and cultivated crops. A few small areas are used for trees. This soil has fair potential for cultivated crops and pasture where drainage is adequate. It has good potential for water-tolerant trees and poor potential for many nonfarm uses.

This soil is fairly suited to cultivated crops. If drainage is adequate, it can be used occasionally for row crops. Surface and subsurface drains help remove excess water and permit tillage. Use of cover crops and grasses and legumes in the cropping system help to maintain fertility and content of organic matter. The gravelly surface layer tends to interfere with the seeding and harvesting of some crops.

This soil is fairly suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to water-tolerant trees. Wetness is a limitation to use and management. Removal of undesirable trees helps increase production. Because of the high water table, the use of equipment can be restricted during wet periods. Machine planting is practical on large areas.

This Andover soil has limitations for most nonfarm uses. Slow permeability and a high water table are limitations for onsite waste disposal and for buildings with basements. Buildings with basements constructed on this soil need foundation drains to remove water from the basement area.

This soil is in capability subclass IVw and woodland group 3w.

AnB—Andover gravelly loam, 3 to 8 percent slopes. This gently sloping, deep, poorly drained soil is on toe slopes, along drainageways, and in swales. Slopes are concave and about 200 to 800 feet long. Areas are rectangular and are mainly 8 to 60 acres.

Typically, the surface layer is very dark grayish brown gravelly loam about 5 inches thick. The subsoil is about 41 inches thick. It is mottled, grayish brown gravelly clay loam in the upper 15 inches; mottled, yellowish brown gravelly clay loam in the next 10 inches; and mottled, brown gravelly sandy clay loam in the lower 16 inches. The substratum is mottled, brown gravelly sandy loam to a depth of about 62 inches.

Included with this soil in mapping are small areas of Buchanan gravelly loam and a few areas of Andover extremely stony loam. The included soils make up 10 to 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan. A high water table is within a depth of 6 inches during wet periods. The rooting depth is restricted by the water table and the fragipan. Unless limed, this soil is very strongly acid and strongly acid. The hazard of erosion is moderate.

This Andover soil is used mainly for pasture and cultivated crops. A few small areas are used for trees. This soil has fair potential for cultivated crops and pasture if drainage is adequate and good potential for water-tolerant trees. It has poor potential for many nonfarm uses.

This soil is fairly suited to cultivated crops if drainage is adequate. Surface and subsurface drains help remove excess water and permit timely tillage. Use of cover crops and grasses and legumes in the cropping system help maintain fertility and content of organic matter. The gravelly surface layer tends to interfere with the seeding and harvesting of some crops.

This soil is fairly suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to water-tolerant trees. Wetness is a limitation to use and management. Removal of undesirable trees helps increase production. Because of the high water table, the use of equipment is restricted during wet periods. Machine planting is practical on large areas.

This Andover soil has limitations for most nonfarm uses. Slow permeability and a high water table are limitations for onsite waste disposal and for buildings with basements. Buildings with basements constructed on this soil need foundation drains to remove water from the basement area.

This soil is in capability subclass IVw and woodland group 3w.

ArB—Andover extremely stony loam, 0 to 8 percent slopes. This nearly level and gently sloping, deep, poorly drained soil is on toe slopes, along drainageways, and in swales. Slopes are concave and about 200 to 800 feet long. Areas are rectangular and are mainly 6 to 40 acres.

Typically, the surface layer is very dark grayish brown gravelly loam about 5 inches thick. Stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsoil is about 41 inches thick. It is mottled, grayish brown gravelly clay loam in the upper 15 inches; mottled, yellowish brown gravelly clay loam in the next 10 inches; and mottled, brown gravelly sandy clay loam in the lower 16 inches. The substratum is mottled, brown gravelly sandy loam to a depth of about 62 inches.

Included with this soil in mapping are small areas of Atkins silt loam and Buchanan extremely stony loam.

Also included are small areas of Andover gravelly loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is slow to medium. The lower part of the subsoil has a very firm and brittle fragipan. Numerous large stones are on the surface. A high water table is within a depth of 0 to 6 inches during wet periods. The rooting depth is restricted by the high water table and the fragipan. Unless limed, this soil is strongly acid and very strongly acid.

This Andover soil is mainly used for woodland. It has poor potential for cultivated crops and pasture, good potential for water-tolerant trees, and poor potential for most nonfarm uses.

This soil is poorly suited to cultivated crops and pasture because of the high water table and many large stones on the surface. Cultivation and harvesting are difficult because of stones.

This soil is suited to water-tolerant trees. Productivity is moderately high. Use of equipment is restricted because of many large stones on the surface and a high water table. Tall trees can be windthrown because of shallow rooting depth.

This Andover soil has limitations for most nonfarm uses because of a high water table, slow permeability, and numerous large stones on the surface.

This soil is in capability subclass VIIs and woodland group 3x.

At—Atkins silt loam. This nearly level, deep, poorly drained soil is on flood plains. Slopes are concave and about 200 to 500 feet long. Areas are long and narrow and are mainly 4 to 20 acres.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsoil extends to a depth of 38 inches. It is mottled, olive gray silt loam in the upper 12 inches and mottled, olive gray loam in the lower 22 inches. The substratum is mottled, light olive gray gravelly sandy loam to a depth of 62 inches.

Included with this soil in mapping are areas of soils similar to this Atkins soil that are very poorly drained. Also included are small areas of Basher silt loam and Philo silt loam. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is moderate to slow, and available water capacity is high. A high water table is within a depth of 6 inches during wet periods. Runoff is very slow. Rooting depth is restricted by the high water table. Unless limed, this soil is strongly acid and very strongly acid. The hazard of erosion is slight.

This Atkins soil is mainly used for woodland and pasture. If drained, it has fair potential for cultivated crops and pasture. This soil has very good potential for water-tolerant trees. It has poor potential for most nonfarm uses because of flooding and a high water table.

If this soil is drained, it is suited to cultivated crops. Excess water causes the soil to warm slowly in spring. Surface and subsurface drains help remove excess water. Crops can be damaged by flooding.

This soil is fairly suited to pasture. Grazing and overgrazing of pasture when this soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is well suited to water-tolerant trees. Because of the high water table, the use of equipment is restricted during part of the year. Seedling mortality and the hazard of windthrow are management concerns.

This Atkins soil has limitations for most nonfarm uses. A high water table and flooding are serious limitations for onsite waste disposal.

This soil is in capability subclass IIIw and woodland group 1w.

Ba—Basher silt loam. This nearly level, deep, moderately well drained and somewhat poorly drained soil is on flood plains. Slopes are concave and about 300 to 600 feet long. Areas are long and narrow and are mainly 4 to 20 acres.

Typically, the surface layer is dark reddish brown silt loam about 10 inches thick. The subsoil is about 29 inches thick. It is reddish brown silt loam in the upper 11 inches and mottled, reddish brown fine sandy loam in the lower 18 inches. The substratum is mottled, reddish brown gravelly fine sandy loam and mottled, brown gravelly sandy loam to a depth of 60 inches.

Included with this soil in mapping are a few areas of Atkins silt loam and Linden silt loam. Also included are areas of Basher soils that are not subject to flooding. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is moderate, and available water capacity is high. Runoff is slow. A water table is within a depth of 18 to 24 inches during wet periods. This soil is subject to occasional flooding of brief duration. Unless limed, this soil is extremely acid to medium acid in the solum and very strongly acid to slightly acid in the substratum. The hazard of erosion is slight.

This Basher soil is used mainly for cultivated crops, pasture, and trees. It has good potential for these uses. Potential is limited for many nonfarm uses.

This soil is well suited to cultivated crops but is subject to flooding. Crops can be damaged by floods. Use of cover crops, crop residue, and grasses and legumes in the cropping system help maintain content of organic matter and good tilth. Where outlets are available, surface and subsurface drains help remove excess water and permit timely tillage.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of

pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees. Removal of undesirable trees helps increase production. Use of equipment can be restricted briefly during wet periods because of the seasonal high water table. Machine planting is practical on large areas.

This soil has limitations for nonfarm uses, including recreation sites. Flooding and a seasonal high water table are serious limitations for onsite waste disposal and for buildings.

This soil is in capability subclass IIw and woodland group 2o.

BeB—Berks shaly silt loam, 3 to 8 percent slopes. This gently sloping, moderately deep, well drained soil is on hilltops. Slopes are slightly concave and about 300 to 600 feet long. Areas are rectangular and are mainly 10 to 40 acres.

Typically, the surface layer is dark brown, shaly silt loam about 8 inches thick. The subsoil is 23 inches thick. It is strong brown, shaly silt loam in the upper 6 inches; strong brown, very shaly silt loam in the next 8 inches; and yellowish red, very shaly silt loam in the lower 9 inches. The substratum is brown very shaly loam to a depth of 39 inches. Rippable shale bedrock is at a depth of 39 inches (fig. 3).

Included with this soil in mapping are small areas of Hartleton channery silt loam and areas of soils similar to the Berks soil that are deep to bedrock. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is moderate to moderately rapid, and available water capacity is low. Runoff is medium. Bedrock is at a depth of 20 to 40 inches. The rooting depth is restricted by moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid in the solum. The hazard of erosion is moderate.

Most areas of this Berks soil are used for cultivated crops. A few areas are used for woodland. The soil has fair potential for cultivated crops, pasture, and trees. It has some limitations for nonfarm uses.

This soil is fairly suited to cultivated crops. Contour stripcropping, minimum tillage, sod waterways, diversions, and cover crops help reduce runoff and control erosion. Use of cover crops, crop residue, and grasses and legumes in the cropping system help maintain content of organic matter and tilth. The shaly surface layer interferes with the seeding and harvesting of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species, deferment of grazing, rotation of pasture, and application of plant nutrients are suitable methods of management.

This soil is suited to trees. About 25 percent of the area is used for woodland. Productivity is moderately high. Seedling mortality is a management concern. Removal of undesirable trees and construction of roads on the contour to reduce erosion are suitable methods of management. Machine planting is practical on large areas.

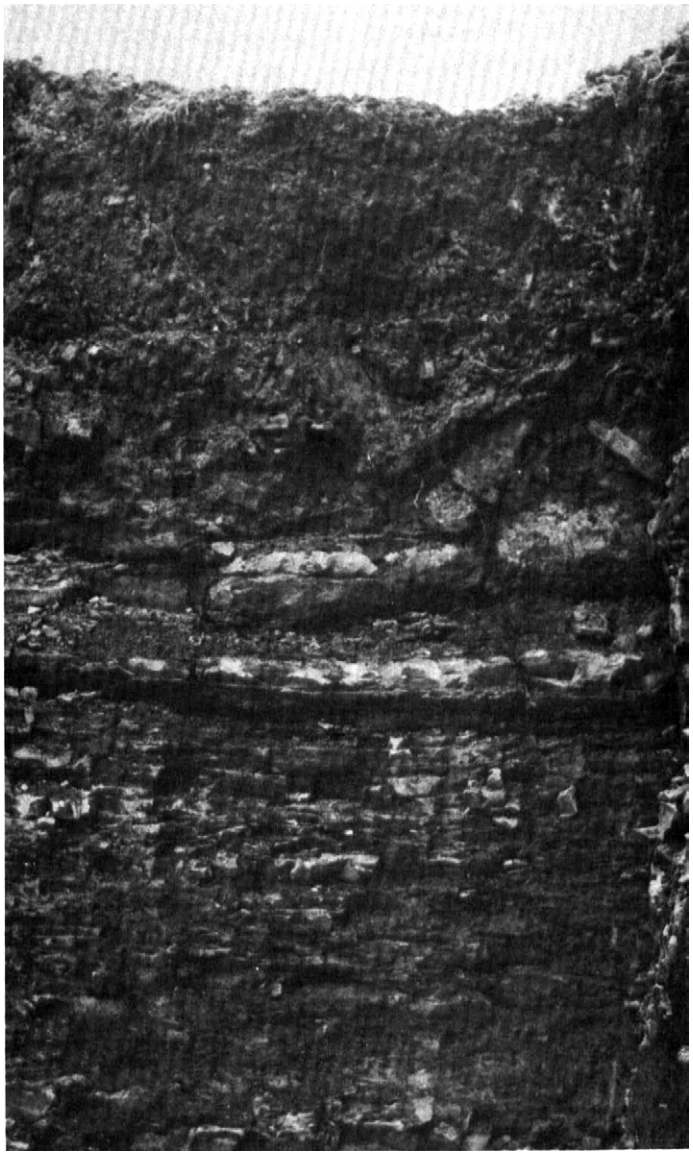


Figure 3.—Profile of moderately deep Berks shaly silt loam, 3 to 8 percent slopes. Bedrock is at a depth of about 39 inches.

This soil has limitations for many nonfarm uses because of moderate depth to bedrock and coarse fragments. Moderate depth to bedrock is a serious limitation for onsite waste disposal.

This soil is in capability subclass IIe and woodland group 3f.

BeC—Berks shaly silt loam, 8 to 15 percent slopes. This sloping, moderately deep, well drained soil is on the

tops and sides of hills. Slopes are slightly concave and about 300 to 600 feet long. Areas are rectangular and are mainly 10 to 40 acres.

Typically, the surface layer is dark brown shaly silt loam about 8 inches thick. The subsoil is 23 inches thick. It is strong brown shaly silt loam in the upper 6 inches; strong brown very shaly silt loam in the next 8 inches; and yellowish red very shaly silt loam in the lower 9 inches. The substratum is brown very shaly loam to a depth of 39 inches. Rippable shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Hartleton channery silt loam and areas of soils similar to the Berks soil that are deep to bedrock. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is moderate to moderately rapid, and available water capacity is low. Runoff is rapid. Bedrock is at a depth of 20 to 40 inches. The rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid in the solum. The hazard of erosion is severe.

Most areas of this Berks soil are used for cultivated crops. A few areas are used for woodland. The soil has fair potential for cultivated crops, pasture, and trees. It has limitations for nonfarm uses.

This soil is fairly suited to cultivated crops. Contour stripcropping, minimum tillage, sod waterways, diversions, and cover crops help reduce runoff and control erosion. Use of cover crops, crop residue, and grasses and legumes in the cropping system help maintain content of organic matter and tilth. The shaly surface layer interferes with the seeding and harvesting of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species, deferment of grazing, rotation of pasture, and applications of plant nutrients are suitable methods of management.

This soil is suited to trees. About 30 percent of the area is used for woodland. Productivity is moderately high. Seedling mortality is a management concern. Removal of undesirable trees and construction of roads on the contour to control erosion are suitable methods of management. Machine planting is practical on large areas.

This soil has limitations for nonfarm uses because of moderate depth to bedrock and slope. Moderate depth to bedrock is a serious limitation for onsite waste disposal.

This soil is in capability subclass IIIe and woodland group 3f.

BeD—Berks shaly silt loam, 15 to 25 percent slopes. This moderately steep, moderately deep, well drained soil is on the sides of hills. Slopes are slightly concave and about 150 to 400 feet long. Areas are rectangular and are mainly 20 to 60 acres.

Typically, the surface layer is dark brown shaly silt loam about 8 inches thick. The subsoil is 23 inches thick. It is strong brown shaly silt loam in the upper 6 inches; strong brown very shaly silt loam in the next 8 inches; and yellowish red very shaly silt loam in the lower 9 inches. The substratum is brown very shaly loam to a depth of 39 inches. Rippable shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Hartleton channery silt loam and areas of soils that are similar to Berks soil that are shallow to bedrock. The included soils make up as much as 5 to 15 percent of the map unit.

Permeability is moderate to moderately rapid, and available water capacity is low. Runoff is rapid. Bedrock is at a depth of 20 to 40 inches. Rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid in the solum. The hazard of erosion is very severe.

Most areas of this Berks soil are used for cultivated crops. A few areas are used for woodland. The soil has fair potential for cultivated crops, pasture, and trees. It has limitations for nonfarm uses.

This soil is fairly suited to cultivated crops. Use of cover crops, crop residue, and grasses and legumes in the cropping system help maintain content of organic matter and tilth. Stripcropping, diversions, sod waterways, and minimum tillage help control erosion. The shaly surface layer interferes with the seeding and harvesting of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species, deferment of grazing, rotation of pasture, and applications of plant nutrients are suitable methods of management.

This soil is suited to trees. About 35 percent of the area is used for woodland. Productivity is moderately high. Use of proper equipment is needed. Seedling mortality is a management concern. Removal of undesirable trees and construction of roads on the contour to reduce erosion are suitable methods of management. Machine planting is practical on large areas.

This soil is limited for nonfarm uses. Moderate depth to bedrock and moderately steep slopes are serious limitations for onsite waste disposal.

This soil is in capability subclass IVe and woodland group 3f.

BuB—Buchanan gravelly loam, 3 to 8 percent slopes. This gently sloping, deep, somewhat poorly drained and moderately well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and are generally 300 to 700 feet long. Areas are fan-shaped or rectangular and are mainly 8 to 25 acres.

Typically, the surface layer is dark gray gravelly loam about 3 inches thick. The subsurface layer is brown gravelly loam about 5 inches thick. The subsoil is about 46 inches thick. It is yellowish brown gravelly loam and gravelly clay loam in the upper 21 inches and is mottled in the lower 9 inches. It is mottled, yellowish brown

gravelly sandy clay loam in the lower 25 inches. The substratum is mottled, yellowish brown gravelly loam to a depth of 72 inches.

Included with this soil in mapping are small areas of Laidig gravelly loam, Laidig extremely stony loam, and Buchanan extremely stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a firm and very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is at a depth of 6 to 36 inches during wet seasons. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is moderate.

Most areas of this Buchanan soil are used for cultivated crops. A few small areas are used for pasture. This soil has good potential for cultivated crops, pasture, and trees and poor potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, diversions, and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. Diversions and surface and subsurface drains help remove excess water and permit timely tillage. The gravelly surface layer interferes with the seeding and harvesting of some crops.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are the chief management needs.

This soil is suited to trees, and some areas are used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Because of the seasonal high water table, the use of equipment can be restricted briefly during wet periods. Machine planting is practical on large areas.

This Buchanan soil has limitations for most nonfarm uses. The slow permeability and the seasonal high water table are limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass IIe and woodland group 3o.

BuC—Buchanan gravelly loam, 8 to 15 percent slopes. This sloping, deep, somewhat poorly drained and moderately well drained soil is on foot slopes and along drainageways. Slopes are concave and generally 300 to 700 feet long. Areas are fan-shaped or rectangular and are mainly 10 to 25 acres.

Typically, the surface layer is dark gray gravelly loam about 3 inches thick. The subsurface layer is brown gravelly loam about 5 inches thick. The subsoil is about 46 inches thick. It is yellowish brown gravelly loam and gravelly clay loam in the upper 21 inches and is mottled in the lower 9 inches. The subsoil is mottled, yellowish brown gravelly sandy clay loam in the lower 25 inches. The substratum is mottled, yellowish brown gravelly loam to a depth of 72 inches.

Included with this soil in mapping are small areas of Laidig gravelly loam, Laidig extremely stony loam, and Buchanan extremely stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is rapid. The lower part of the subsoil has a firm and very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 6 to 36 inches for long periods during wet seasons. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is severe.

This Buchanan soil is used mainly for cultivated crops. A few small areas are used for pasture. The soil has good potential for cultivated crops, pasture, and trees and poor potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, cover crops, diversions, and stripcropping help to reduce runoff and control erosion. Diversions and surface and subsurface drains help remove excess water and permit timely tillage. The gravelly surface layer interferes with the seeding and harvesting of some crops.

This soil is suited to pasture. Overgrazing and grazing of pasture when this soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees and a small area is used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Because of the seasonal high water table, the use of equipment can be restricted briefly during wet seasons. Machine planting is practical on large areas.

This Buchanan soil has limitations for most nonfarm uses. The slow permeability and the seasonal high water table are serious limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass IIIe and woodland group 3o.

BxB—Buchanan extremely stony loam, 3 to 8 percent slopes. This gently sloping, deep, somewhat poorly drained and moderately well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and generally 300 to 700 feet long. Areas are fan-shaped or rectangular and are mainly 10 to 30 acres.

Typically, the surface layer is dark gray gravelly loam about 3 inches thick. Stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent

of the surface. The subsurface layer is brown gravelly loam about 5 inches thick. The subsoil is about 46 inches thick. It is yellowish brown gravelly loam and gravelly clay loam in the upper 21 inches and is mottled in the lower 9 inches. The subsoil is mottled, yellowish brown gravelly sandy clay loam in the lower 25 inches. The substratum is mottled, yellowish brown gravelly loam to a depth of 72 inches.

Included with this soil in mapping are small areas of Laidig extremely stony loam, Laidig gravelly loam, Buchanan gravelly loam, and Andover extremely stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a firm and very firm and brittle fragipan. A seasonal high water table is within a depth of 6 to 36 inches for long periods during wet seasons. The rooting depth is restricted by the fragipan. Unless limed, this soil is extremely acid to strongly acid.

This Buchanan soil is used mainly for woodland. A few small areas are used for pasture. The soil has poor potential for cultivated crops, pasture and many nonfarm uses. It has good potential for trees. This soil is poorly suited to cultivated crops and pasture because of numerous large stones on the surface.

This soil is suited to trees. Most areas are used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Large stones on the surface interfere with use of equipment and machine planting.

This Buchanan soil has limitations for most nonfarm uses. Slow permeability, a seasonal high water table, and numerous large stones on the surface are serious limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIIs and woodland group 3x.

BxD—Buchanan extremely stony loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, somewhat poorly drained and moderately well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and are generally 300 to 700 feet long. Areas are fan-shaped or rectangular and are mainly 10 to 30 acres.

Typically, the surface layer is dark gray gravelly loam about 3 inches thick. Stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is brown gravelly loam about 5 inches thick. The subsoil is about 46 inches thick. It is yellowish brown gravelly loam and gravelly clay loam in the upper 21 inches and is mottled in the lower 9 inches. The subsoil is mottled, yellowish brown gravelly sandy clay loam in the lower 25 inches. The substratum is mottled, yellowish brown gravelly loam to a depth of 72 inches.

Included with this soil in mapping are small areas of Laidig extremely stony loam, Laidig gravelly loam, Buchanan gravelly loam, and Andover extremely stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a firm and very firm and brittle fragipan. A seasonal high water table is within a depth of 6 to 36 inches for long periods during wet seasons. The rooting depth is restricted by the fragipan. Unless limed, this soil is extremely acid to strongly acid.

This Buchanan soil is used mainly for woodland. A few small areas are used for pasture. The soil has poor potential for cultivated crops and pasture and good potential for trees. It has poor potential for many nonfarm uses.

This soil is poorly suited to cultivated crops and pasture because of numerous large stones on the surface.

This soil is suited to trees, and most areas are used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Large stones on the surface interfere with use of equipment and with machine planting.

This Buchanan soil has limitations for most nonfarm uses. Slow permeability, a seasonal high water table, slope, and numerous large stones on the surface are serious limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIIs and woodland group 3r.

CaB—Calvin shaly silt loam, 3 to 8 percent slopes. This gently sloping, moderately deep, well drained soil is on the tops and sides of hills. Slopes are convex and about 300 to 600 feet long. Areas are round and rectangular and are mainly 10 to 40 acres.

Typically, the surface layer is reddish brown shaly silt loam about 7 inches thick. The subsoil is about 20 inches thick. It is weak red shaly silt loam in the upper 10 inches and weak red very shaly silt loam in the lower 10 inches. The substratum is weak red very shaly silt loam about 12 inches thick. Fractured shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Leck Kill channery silt loam and Klinesville shaly silt loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderately rapid, and available water capacity is low. Runoff is medium. The rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is very strongly acid to medium acid. The hazard of erosion is moderate.

This Calvin soil is used mainly for cultivated crops. A few areas are used for woodland. The soil has fair potential for cultivated crops (fig. 4) and good potential for

Figure 4.—Slightly wilted corn on Calvin shaly silt loam, 3 to 8 percent slopes. Shale fragments are on the surface. Because of the low available water capacity, this soil has only fair suitability for corn.

pasture and trees. It has limitations for many nonfarm uses.

This soil is suited to cultivated crops; however, loss of soil, plant nutrients, and organic matter and a decrease in available water capacity result if there is an increase in erosion. Minimum tillage, contour stripcropping, and the use of cover crops and grass and legumes in the cropping system help reduce runoff and control erosion. Mixing crop residue into the surface layer helps maintain content of organic matter and tilth.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients are required to maintain fertility for optimum production.

This soil is well suited to trees. A few small areas are used for woodland. Productivity is high. The rooting depth is restricted by the moderate depth to bedrock. Because of low available water capacity, seedling mortality is a main management concern. Machine planting is practical on large areas.

This Calvin soil has limitations for nonfarm uses because of moderate depth to bedrock and a shaly surface layer. The moderate depth to bedrock is a serious limitation for onsite waste disposal. Management to help control erosion and prevent the accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass IIe and woodland group 2f.

CaC—Calvin shaly silt loam, 8 to 15 percent slopes. This sloping, moderately deep, well drained soil is on the tops and sides of hills. Slopes are convex and about 300 to 600 feet long. Areas are rectangular and are mainly 10 to 40 acres.

Typically, the surface layer is reddish brown shaly silt loam about 7 inches thick. The subsoil is about 20 inches thick. It is weak red shaly silt loam in the upper 10 inches and weak red very shaly silt loam in the lower 10 inches. The substratum is weak red very shaly silt loam about 12 inches thick. Fractured shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Leck Kill channery silt loam and Klinesville shaly silt loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderately rapid, and available water capacity is low. Runoff is rapid. The rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is very strongly acid to medium acid. The hazard of erosion is severe.

This Calvin soil is used mainly for cultivated crops. A few small areas are used for woodland. The soil has fair potential for cultivated crops and good potential for pasture and trees. It has limitations for many nonfarm uses.

This soil is suited to cultivated crops; however, loss of soil, plant nutrients, and organic matter and a decrease in available water capacity result if there is further erosion. Contour stripcropping, minimum tillage, diversions, and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Moderate depth to bedrock hinders construction of diversions in places. Mixing crop residue and manure into the surface layer helps maintain the content of organic matter and tilth.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Application of nutrients is needed to maintain fertility for optimum production.

This soil is well suited to trees and a few small areas are used for woodland. Productivity is high. Rooting depth is restricted by the moderate depth to bedrock. Seedling mortality because of low available water capacity is a main management concern. Machine planting is generally practical on large areas.

This Calvin soil has limitations for most nonfarm uses because of slope, moderate depth to bedrock, and the shaly surface layer. The moderate depth to bedrock is a serious limitation for onsite waste disposal. Soil depth is

a limitation for excavation of buildings. Management to help control erosion and prevent the accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass IIIe and woodland group 2f.

CaD—Calvin shaly silt loam, 15 to 25 percent slopes. This moderately steep, moderately deep, well drained soil is on hillsides. Slopes are convex and 150 to 400 feet long. Areas are rectangular and are mainly 10 to 30 acres.

Typically, the surface layer is reddish brown shaly silt loam about 7 inches thick. The subsoil is about 20 inches thick. It is weak red shaly silt loam in the upper 10 inches and weak red very shaly silt loam in the lower 10 inches. The substratum is weak red very shaly silt loam about 12 inches thick. Fractured shale bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Leck Kill channery silt loam and Klinesville shaly silt loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderately rapid, and available water capacity is low. Runoff is rapid. Rooting depth is restricted by the moderate depth to bedrock. Unless unlimed, this soil is very strongly acid to medium acid. The hazard of erosion is very severe.

This Calvin soil is used mainly for cultivated crops and trees. It has poor potential for cultivated crops, fair potential for pasture, and good potential for trees. This soil has limited potential for most nonfarm uses because of moderate depth to bedrock and moderately steep slope.

This soil is fairly suited to poorly suited to cultivated crops. Loss of soil, plant nutrients, and organic matter and a decrease in available water capacity result if there is further erosion. Minimum tillage, diversions, and the use of cover crops, and grasses and legumes in the cropping system help reduce runoff and control erosion. Stripcropping can be used where the topography is suitable. In places, bedrock hinders construction of diversions. Mixing crop residue and manure into the surface layer helps maintain the content of organic matter and tilth.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of nutrients to maintain fertility are needed for optimum production.

This soil is well suited to trees. Many areas are used for woodland. Productivity is high. The rooting depth is restricted by moderate depth to bedrock. Because of low available water capacity, seedling mortality is a main management concern.

This Calvin soil has limitations for most nonfarm uses. The moderate depth to bedrock and moderately steep slope are serious limitations for onsite waste disposal. Management to help control erosion and the accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass IVe and woodland group 2f.

DeB—Dekalb channery sandy loam, 3 to 8 percent slopes. This gently sloping, moderately deep, well drained soil is on the tops and sides of mountains and hills. Slopes are convex and about 200 to 600 feet long. Areas are round or rectangular and are mainly 10 to 40 acres.

Typically, the surface layer is very dark grayish brown channery sandy loam about 3 inches thick. The subsurface layer is pale brown channery sandy loam about 4 inches thick. The subsoil extends to a depth of 32 inches. It is yellowish brown channery sandy loam in the upper 5 inches and reddish yellow channery sandy loam and very channery sandy loam in the lower 20 inches. The substratum is yellowish brown very channery loamy sand to a depth of 39 inches. Hard sandstone and conglomerate bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Hazleton channery fine sandy loam and Dekalb extremely stony sandy loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is low. Runoff is medium. The rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is moderate.

This Dekalb soil is used mostly for cultivated crops. Some small areas are used for trees. This soil has fair potential for cultivated crops, pasture, and trees. It has limitations for most nonfarm uses.

This soil is fairly suited to cultivated crops. Loss of soil and a decrease in available water capacity result if there is further erosion. Minimum tillage, contour stripcropping, diversions, and the use of cover crops, and grasses and legumes in the cropping system help reduce runoff and control erosion. In places, bedrock hinders construction of diversions. Mixing crop residue and manure into the surface layer helps maintain content of organic matter and tilth.

This soil is fairly suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is fairly suited to trees. Productivity is moderate. The rooting depth is restricted by the moderate depth to bedrock. Removal of undesirable trees and construction of logging roads on the contour to control erosion are suitable methods of management. Machine planting is practical on large areas.

This Dekalb soil has limitations for most nonfarm uses because of moderate depth to bedrock and the channery surface layer. The moderate depth to bedrock is a serious limitation for onsite waste disposal. Depth to rock also limits excavation of buildings. Management to help control erosion and prevent the accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass IIe and woodland group 4f.

DeC—Dekalb channery sandy loam, 8 to 15 percent slopes. This sloping, moderately deep, well drained soil is on the tops and sides of mountains and hills. Slopes are convex and about 300 to 800 feet long. Areas are rectangular and are mainly 10 to 40 acres.

Typically, the surface layer is very dark grayish brown channery sandy loam about 3 inches thick. The subsurface layer is pale brown channery sandy loam about 4 inches thick. The subsoil extends to a depth of 32 inches. It is yellowish brown channery sandy loam in the upper 5 inches and reddish yellow channery sandy loam and very channery sandy loam in the lower 20 inches. The substratum is yellowish brown very channery loamy sand to a depth of 39 inches. Hard sandstone and conglomerate bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Hazleton channery fine sandy loam and Dekalb extremely stony sandy loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is low. Runoff is rapid. The rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is severe.

This Dekalb soil is used mainly for cultivated crops and trees. It has fair potential for cultivated crops, pasture, and trees. The moderate depth to bedrock, the channery surface layer, and slope are limitations for most nonfarm uses.

This soil is fairly suited to cultivated crops. Loss of soil and a decrease in available water capacity result if there is further erosion. Minimum tillage, diversions, contour stripcropping, and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. In places, bedrock hinders construction of diversions. Mixing crop residue and manure into the surface layer helps maintain the content of organic matter and tilth.

This soil is fairly suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is fairly suited to trees. Productivity is moderate. The rooting depth is restricted by the moderate depth to bedrock. Removal of undesirable trees and construction of logging roads on the contour to help control erosion are suitable methods of management. Machine planting is practical on large areas.

This Dekalb soil has limitations for most nonfarm uses. Slope, moderate depth to bedrock, and rapid permeability are limitations for onsite waste disposal. The moderate depth to hard bedrock limits the excavation of buildings. Management to help control erosion and prevent the accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass IIIe and woodland group 4f.

DeD—Dekalb channery sandy loam, 15 to 25 percent slopes. This moderately steep, moderately deep, well drained soil is on the sides of mountains and hills. Slopes are convex and about 200 to 500 feet long. Areas are rectangular and are mainly 20 to 60 acres.

Typically, the surface layer is very dark grayish brown channery sandy loam about 3 inches thick. The subsurface layer is pale brown channery sandy loam about 4 inches thick. The subsoil extends to a depth of 32 inches. It is yellowish brown channery sandy loam in the upper 5 inches and reddish yellow channery sandy loam and very channery sandy loam in the lower 20 inches. The substratum is yellowish brown very channery loamy sand to a depth of 39 inches. Below this layer is hard sandstone and conglomerate bedrock.

Included with this soil in mapping are small areas of Hazleton channery fine sandy loam and Dekalb extremely stony sandy loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is low. Runoff is rapid. Rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is very severe.

This Dekalb soil is used mainly for trees. A few small areas are used for cultivated crops. The soil has fair potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is fairly suited to cultivated crops. Loss of soil and a decrease in available water capacity result if there is further erosion. Minimum tillage, diversions, the use of cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion. In places, bedrock hinders construction of diversions. Mixing crop residue and manure into the surface layer helps maintain content of organic matter and tilth.

This soil is fairly suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is fairly suited to trees. Productivity is moderate. The rooting depth is restricted by moderate depth to bedrock. Use of proper equipment is needed because of the moderately steep slope. Removal of undesirable trees and construction of logging roads on the contour are suitable methods of management. Machine planting is practical on large areas.

This Dekalb soil has limitations for most nonfarm uses. Slope and moderate depth to bedrock are limitations for onsite waste disposal. Moderate depth to hard bedrock limits the excavation of buildings. Management to help control erosion and the accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass IVe and woodland group 4f.

DkB—Dekalb extremely stony sandy loam, 3 to 8 percent slopes. This gently sloping, moderately deep, well drained soil is on the tops and sides of mountains and hills. Slopes are convex and about 300 to 800 feet long. Areas are round and rectangular and are mainly 25 to 150 acres.

Typically, the surface layer is very dark grayish brown channery sandy loam about 3 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is pale brown channery sandy loam about 4 inches thick. The subsoil is about 25 inches thick. It is yellowish brown channery sandy loam in the upper 5 inches and reddish yellow channery sandy loam and very channery sandy loam in the lower 20 inches. The substratum is yellowish brown very channery loamy sand about 7 inches thick. Hard sandstone and conglomerate bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Hazleton extremely stony fine sandy loam, Clymer extremely stony sandy loam, Laidig extremely stony loam, and Dekalb channery sandy loam. Also included are a few small areas of rock outcrop and Rubble land. The included areas make up as much as 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is low. Runoff is medium. The rooting depth is restricted by moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid. Numerous large stones are on the surface.

This Dekalb soil is used mainly for trees. It has poor potential for cultivated crops and pasture, fair potential for trees, and poor potential for many nonfarm uses.

This soil is poorly suited to cultivated crops and pasture because of numerous large stones on the surface. Removal of the stones is not practical.

This soil is suited to trees. Productivity is moderate. Removal of undesirable trees helps increase production. Large stones on the surface interfere with use of equipment and machine planting.

This Dekalb soil has limitations for most nonfarm uses. The rapid permeability, large stones on the surface, and moderate depth to bedrock are limitations for onsite waste disposal. The moderate depth to bedrock and large stones on the surface are limitations for the excavation of buildings. Management to help control erosion and the accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass VIIs and woodland group 4x.

DkC—Dekalb extremely stony sandy loam, 8 to 25 percent slopes. This sloping and moderately steep, moderately deep, well drained soil is on the tops and sides of mountains and hills. Slopes are convex and about 300 to 800 feet long. Areas are rectangular and are mainly 25 to 200 acres.

Typically, the surface layer is very dark grayish brown channery sandy loam about 3 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is pale brown channery sandy loam about 4 inches thick. The subsoil is about 25 inches thick. It is yellowish brown channery sandy loam in the upper 5 inches and reddish yellow channery sandy loam and very channery sandy loam in the lower 20 inches. The substratum is yellowish brown very channery loamy sand about 7 inches thick. Hard sandstone and conglomerate bedrock is at a depth of 39 inches.

Included with this soil in mapping are small areas of Hazleton extremely stony fine sandy loam, Clymer extremely stony sandy loam, Laidig extremely stony loam, and Dekalb channery sandy loam. Also included are a few small areas of rock outcrop and Rubble land. The included areas make up as much as 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is low and very low. Runoff is medium. The rooting depth is restricted by moderate depth to bedrock. Unless limed, this soil is extremely acid to strongly acid. Numerous large stones are on the surface.

This Dekalb soil is used mostly for trees. It has poor potential for cultivated crops and pasture, fair potential for trees, and poor potential for many nonfarm uses because of moderate depth to bedrock and numerous stones on the surface.

This soil is too stony to use for cultivated crops and pasture.

This soil is suited to trees. Most areas are wooded. Productivity is moderate. Removal of undesirable trees helps increase production. Large stones on the surface (fig. 5) interfere with use of equipment and machine planting.

This Dekalb soil has limitations for most nonfarm uses. The rapid permeability, large stones on the surface, moderate depth to bedrock, and slope are limitations for onsite waste disposal. The moderate depth to bedrock and large stones on the surface are limitations for excavation of buildings. Management to help control erosion and accumulation of sediment is needed if this soil is disturbed by construction.

This soil is in capability subclass VIIs and wooodland group 4x.

DMF—Dekalb and Lehew extremely stony soils, steep. These steep and very steep, moderately deep, well drained soils are on the sides of mountains and on ridges. They are mapped together because they are dominantly influenced by stoniness and steep slopes and their expected use and management are similar. Composition of this map unit is more variable than most other map units in the survey area, but mapping was controlled well enough for the expected uses of these soils. Individual areas of the map unit may contain all Dekalb soils, all Lehew soils, or a combination of the two. Dekalb soils make up about 45 percent of the acreage of this map unit; Lehew soils, 35 percent; and other soils, 20 per-

Figure 5.—Dekalb extremely stony sandy loam, 8 to 25 percent slopes, in woodland. The large stones and boulders interfere with harvesting and planting.

cent. Slopes are 25 to 70 percent and are complex. Areas are long and rectangular and are mainly 50 to 250 acres.

Typically, the surface layer of the Dekalb soils is very dark grayish brown channery sandy loam about 3 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is pale brown channery sandy loam about 4 inches thick. The subsoil is about 25 inches thick. It is yellowish brown channery sandy loam in the upper 5 inches and reddish yellow channery sandy loam and very channery sandy loam in the lower 20 inches. The substratum is yellowish brown very channery loamy sand about 7 inches thick. Hard sandstone and conglomerate bedrock is at a depth of 39 inches.

Typically, the surface layer of the Lehew soils is dark brown channery loam about 3 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is reddish brown channery loam about 5 inches thick. The subsoil is about 19 inches thick. It is reddish brown channery sandy loam in the upper 6 inches and reddish brown very channery loam in the lower 13 inches. The substratum is reddish brown very channery sandy loam about 10 inches thick. Fractured, reddish brown sandstone bedrock is at a depth of 37 inches.

Included with these soils in mapping are small areas of Hazleton extremely stony fine sandy loam, Clymer extremely stony sandy loam, and Dekalb channery sandy loam. Also included are small areas of rock outcrop and Rubble land and areas that have more than 50 percent large stones on the surface. The included soils make up as much as 20 percent of the map unit.

Permeability is rapid in the Dekalb soils and moderately rapid in the Lehew soils. Both soils have low available water capacity. Runoff is rapid. Rooting depth is restricted by the moderate depth to bedrock. The Dekalb soils are extremely acid to strongly acid, and the Lehew soils

are very strongly acid to strongly acid. Numerous large stones are on the surface.

These soils are used mainly for woodland, wildlife habitat, and watershed protection. They have poor potential for cultivated crops and pasture, fair potential for trees, and poor potential for most nonfarm uses. They have potential for wildlife habitat, watershed protection, and recreation.

These soils are poorly suited to cultivated crops and pasture because of steep and very steep slopes and numerous large stones on the surface.

These soils are suited to trees and have moderate and moderately high productivity. Steep and very steep slopes and large stones and boulders on the surface are the main limitations to use and management for woodland. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion.

These Dekalb and Lehew soils have limitations for nonfarm uses because of steep and very steep slopes and numerous large stones on the surface.

These soils are in capability subclass VIIs. The Dekalb soils are in woodland group 4r, and the Lehew soils are in woodland group 3r.

DR—Dekalb-Rubble land association. This association consists of nearly level to very steep, extremely stony, moderately deep, well drained Dekalb soil and Rubble land, on the tops and sides of ridges and mountains. Rubble land consists mostly of large stones and boulders. Dekalb soils and Rubble land are mapped together because they are dominantly influenced by numerous large stones and slope and their expected use and management are similar. Composition of this map unit is more variable than most other map units in the survey area, but mapping was controlled well enough for the expected uses of the unit. The relative proportions of Dekalb soils and Rubble land vary appreciably from one area to another. Dekalb soils make up about 60 percent of the acreage of this map unit; Rubble land, 30 percent; and other soils, 10 percent. Areas are round or rectangular and mainly 8 to 30 acres.

Typically, the surface layer of the Dekalb soils is very dark grayish brown channery sandy loam about 3 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is pale brown channery sandy loam about 4 inches thick. The subsoil is about 25 inches thick. It is yellowish brown channery sandy loam in the upper 5 inches and reddish yellow channery sandy loam and very channery sandy loam in the lower 20 inches. The substratum is yellowish brown very channery loamy sand about 7 inches thick. Hard sandstone and conglomerate bedrock is at a depth of 39 inches.

Typically, Rubble land consists of large stones and boulders that are 10 inches to several feet in diameter. These stones and boulders are conglomerate and sandstone that are highly resistant to weathering.

Included with this association in mapping are a few small areas of rock outcrop and areas of Dekalb soils that have more than 50 percent large stones on the surface. The included areas make up as much as 20 percent of the association.

Permeability is rapid in the Dekalb soils, and available water capacity is low. Rooting depth is restricted by the moderate depth to bedrock. Unless limed, the Dekalb soils are extremely acid to strongly acid. Numerous large stones are on the surface. Rubble land consists of large stones and boulders and does not have most soil characteristics.

The soils in this association are used mainly for wildlife habitat. Small trees and shrubs grow on the Dekalb soil. Trees are of poor quality. Rubble land is barren. These soils have poor potential for cultivated crops, pasture, and trees and for nonfarm uses. They have some potential for use as watershed protection and wildlife habitat.

These soils are poorly suited to cultivated crops and pasture because of steep and very steep slopes, numerous large stones and boulders on the surface, and areas of Rubble land that have no soil characteristics.

These soils are poorly suited to trees.

The Dekalb-Rubble land association has serious limitations for most urban uses because of numerous large stones and boulders on the surface and steep and very steep slopes in many areas.

The Dekalb soil is in capability subclass VIIs and woodland group 4x. Rubble land is not assigned to a capability class or woodland group.

Ds—Dumps, coal waste. This map unit consists of coal refuse from coal processing plants and coal refuse, sand, and gravel dredged from desilting dams on the Schuylkill and Little Schuylkill Rivers. These dumps range from 10 to 50 feet deep. About 80 percent of the map unit is silt-size coal waste from coal processing plants, and about 20 percent is sediment dredged from desilting dams. Slopes range from 0 to 3 percent. Areas are mainly 20 to 100 acres.

Included with this unit in mapping are small areas of Udorthents, strip mine, and Dumps, mine. The included areas make up as much as 10 percent of the map unit.

Permeability is rapid, and available water capacity is very low. Runoff is slow. Natural fertility is very low. These waste materials are strongly acid to extremely acid.

This map unit is idle. It has poor potential for cultivated crops, pasture, and trees and for most nonfarm uses.

Dumps, coal waste, are poorly suited to cultivated crops, pasture, and trees because of rapid permeability, very low available water capacity, and very low natural fertility. They do not generally support plant growth. The unit has many limitations for most nonfarm uses because of rapid permeability and the severe hazard of erosion.

This map unit is not assigned to a capability subclass or woodland group.

Du—Dumps, mine. This map unit consists of coal refuse from underground mines. It is mainly very poor quality coal and rock materials that were stockpiled during mining operations. The piles are mainly conical and range from 5 to more than 50 feet deep. Coarse fragments range from 35 to 90 percent. Slopes range from 10 to 35 percent. Areas are rectangular and are mainly 10 to 400 acres.

Included with this unit in mapping are small areas of Udorthents, strip mine, and Dumps, coal wash. The included areas make up as much as 10 percent of the map unit.

Permeability is rapid, and available water capacity is very low. Runoff is very rapid. Runoff and seepage from these dumps are a source of acid water pollution to streams. Natural fertility is very low. Unless limed, these materials are very strongly acid and extremely acid. The hazard of erosion is very severe.

This map unit is idle. In a few areas the materials are used as road base. This unit has poor potential for cultivated crops, pasture, and trees and for most nonfarm uses.

Dumps, mine, are poorly suited to cultivated crops, pasture, and trees because of very low available water capacity, very low natural fertility, and accumulations of rock and coal fragments. In addition, these materials are acid. The unit has many limitations for most nonfarm uses because of rapid permeability, slopes that are 10 to 35 percent, a very high amount of coarse fragments, and materials that are very strongly acid and extremely acid.

This map unit is not assigned to a capability subclass or woodland group.

HaB—Hartleton channery silt loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on the tops and sides of hills. Slopes are convex and about 200 to 600 feet long. Areas are rectangular and are mainly 8 to 30 acres.

Typically, the surface layer is dark grayish brown channery silt loam about 8 inches thick. The subsoil is about 25 inches thick. It is yellowish brown channery heavy silt loam in the upper 7 inches, yellowish brown very channery silt loam in the next 11 inches, and yellowish brown very channery loam in the lower 7 inches. The substratum is brown very channery loam about 13 inches thick. Brown sandstone bedrock is at a depth of 46 inches (fig. 6).

Included with this soil in mapping are a few small areas of Allenwood gravelly silt loam, Berks shaly silt loam, and Watson silt loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderate and moderately rapid, and available water capacity is moderate. Runoff is medium. Unless limed, this soil is strongly acid and very strongly acid. The hazard of erosion is moderate.

This Hartleton soil is used mostly for cultivated crops. A few small areas are used for trees and pasture. The soil has good potential for cultivated crops, pasture, and trees and fair potential for most nonfarm uses.

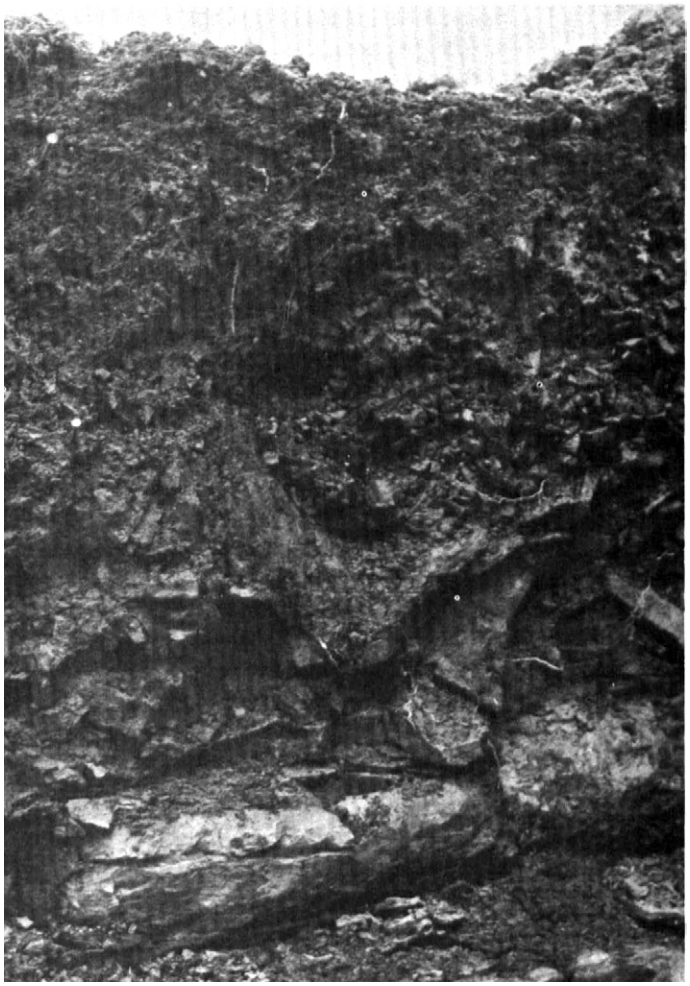


Figure 6.—Profile of deep Hartleton channery silt loam, 3 to 8 percent slopes. The large amounts of coarse fragments are typical of this soil.

This soil is suited to cultivated crops. Stripcropping, minimum tillage, diversions, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth. The channery surface layer can interfere with the seeding and harvesting of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are the chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is well suited to trees, but only a small acreage is used for trees. Productivity is moderately high. Management problems are few. Removal of undesirable trees and construction of logging roads on the contour to

help control erosion are suitable methods of management. Machine planting is practical on large areas.

This Hartleton soil has limitations for most nonfarm uses. Bedrock at a depth of 42 to 60 inches, moderately rapid permeability in places, and small stones are limitations for onsite waste disposal.

This soil is in capability subclass IIe and woodland group 3f.

HaC—Hartleton channery silt loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on the tops and sides of hills. Slopes are convex and about 200 to 800 feet long. Areas are rectangular and are mainly 8 to 40 acres.

Typically, the surface layer is dark grayish brown channery silt loam about 8 inches thick. The subsoil is about 25 inches thick. It is yellowish brown channery heavy silt loam in the upper 7 inches, yellowish brown very channery silt loam in the next 11 inches, and yellowish brown very channery loam in the lower 7 inches. The substratum is brown very channery loam about 13 inches thick. Brown sandstone bedrock is at a depth of 46 inches.

Included with this soil in mapping are a few small areas of Allenwood gravelly silt loam, Berks shaly silt loam, and Watson silt loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderate and moderately rapid, and available water capacity is moderate. Runoff is medium. Unless limed, this soil is strongly acid and very strongly acid. The hazard of erosion is severe.

This Hartleton soil is used mainly for cultivated crops. A few areas are used for trees and pasture. This soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, diversions, minimum tillage, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth. The channery surface layer can interfere with the seeding and harvesting of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees, but only a small acreage is used for trees. Productivity is moderately high. Management problems are few. Removal of undesirable trees and construction of logging roads on the contour to control erosion are suitable methods of management. Machine planting is practical on large areas.

This Hartleton soil has limitations for most nonfarm uses. Bedrock at a depth of 42 to 60 inches, moderately rapid permeability in places, small stones, and slope are the main limitations for onsite waste disposal.

This soil is in capability subclass IIIe and woodland group 3f.

HaD—Hartleton channery silt loam, 15 to 25 percent slopes. This moderately steep, deep, well drained soil is on the sides of hills. Slopes are convex and about 200 to 500 feet long. Areas are rectangular and are mainly 8 to 40 acres.

Typically, the surface layer is dark grayish brown channery silt loam about 8 inches thick. The subsoil is about 25 inches thick. It is yellowish brown channery heavy silt loam in the upper 7 inches, yellowish brown very channery silt loam in the next 11 inches, and yellowish brown very channery loam in the lower 7 inches. The substratum is brown very channery loam about 13 inches thick. Brown sandstone bedrock is at a depth of 46 inches.

Included with this soil in mapping are a few areas of Allenwood gravelly silt loam and Berks shaly silt loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate and moderately rapid, and available water capacity is moderate. Runoff is rapid. Unless limed, this soil is strongly acid and very strongly acid. The hazard of erosion is very severe.

This Hartleton soil is used mainly for pasture and trees. Some areas are used for cultivated crops. This soil has fair potential for cultivated crops and pasture and good potential for trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, diversions, minimum tillage, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth. The channery surface layer can interfere with the seeding of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees. Most areas are used for native hardwood trees. The hazard of erosion during harvesting is a management concern. Removal of undesirable trees and construction of logging roads on the contour to help control erosion are suitable methods of management. Machine planting is practical on large areas.

This Hartleton soil has limitations for most nonfarm uses. The moderately steep slope and bedrock at a depth of 42 to 60 inches are the main limitations for onsite waste disposal.

This soil is in capability subclass IVe and woodland group 3r.

HeB—Hazleton channery fine sandy loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on the tops and sides of hills and mountains. Slopes are convex and about 300 to 800 feet long. Areas are rectangular and are mainly 8 to 30 acres.

Typically, the surface layer is brown channery fine sandy loam about 5 inches thick. The subsoil is about 30 inches thick. It is yellowish brown channery sandy loam

in the upper 17 inches and yellowish brown very channery sandy loam in the lower 13 inches. The substratum is brownish yellow very channery loamy sand about 14 inches thick. Brownish yellow sandstone bedrock is at a depth of 49 inches.

Included with this soil in mapping are a few small areas of Hazleton extremely stony fine sandy loam, Dekalb channery sandy loam, and Laidig gravelly loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Runoff is medium. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is moderate.

This Hazleton soil is used mainly for cultivated crops. A few small areas are used for pasture and trees. This soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, minimum tillage, diversions, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help to maintain content of organic matter and good tilth. The channery surface layer interferes with the seeding of small grain and the mechanical harvesting of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees, but only a small acreage is used for trees. Productivity is moderately high. Management problems are few. Machine planting is practical on large areas. Removal of undesirable trees and construction of logging roads on the contour are suitable methods of management.

This Hazleton soil has limitations for most nonfarm uses because of bedrock at a depth of 42 to 60 inches or more, moderately rapid to rapid permeability, and coarse fragments.

This soil is in capability subclass IIe and woodland group 3o.

HeC—Hazleton channery fine sandy loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on the tops and sides of hills and mountains. Slopes are convex and about 300 to 800 feet long. Areas are rectangular and are mainly 8 to 40 acres.

Typically, the surface layer is brown channery fine sandy loam about 5 inches thick. The subsoil is about 30 inches thick. It is yellowish brown channery sandy loam in the upper 17 inches and yellowish brown very channery sandy loam in the lower 13 inches. The substratum is brownish yellow very channery loamy sand about 14 inches thick. Brownish yellow sandstone bedrock is at a depth of 49 inches.

Included with this soil in mapping are a few small areas of Hazleton extremely stony fine sandy loam, Dekalb channery sandy loam, and Laidig gravelly loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Runoff is medium. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is severe.

This Hazleton soil is used for cultivated crops. Some areas are used for pastures and trees. The soil has good potential for cultivated crops, pasture, and trees. It is limited for most nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, diversions, minimum tillage, and sod waterways help control erosion. Use of cover crops, crop residue, and hay help maintain content of organic matter and good tilth. The channery surface layer can interfere with the seeding of small grain and the mechanical harvesting of some crops.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees, but only a small acreage is used for trees. Productivity is moderately high, and management problems are few. Machine planting is practical on large areas. Removal of undesirable trees and construction of logging roads on the contour are suitable methods of management.

This Hazleton soil has limitations for most nonfarm uses because of slope, coarse fragments, and bedrock at a depth of 42 to 60 inches. Slope is a limitation for onsite waste disposal.

This soil is in capability subclass IIIe and woodland group 3o.

HeD—Hazleton channery fine sandy loam, 15 to 25 percent slopes. This moderately steep, deep, well drained soil is on the sides of hills and mountains. Slopes are convex and about 300 to 600 feet long. Areas are rectangular and are mainly 8 to 40 acres.

Typically, the surface layer is brown channery fine sandy loam about 5 inches thick. The subsoil is about 30 inches thick. It is yellowish brown channery sandy loam in the upper 17 inches and yellowish brown very channery sandy loam in the lower 13 inches. The substratum is brownish yellow very channery loamy sand about 14 inches thick. Brownish yellow sandstone bedrock is at a depth of 49 inches.

Included with this soil in mapping are a few small areas of Hazleton extremely stony fine sandy loam, Dekalb channery sandy loam, and Laidig gravelly loam. The included soils make up as much as 10 to 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Runoff is rapid. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is very severe.

This Hazleton soil is used mainly for woodland. Some areas are used for cultivated crops and pasture. This soil

has fair potential for cultivated crops and pasture and good potential for trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, minimum tillage, diversions, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth. The channery surface layer can interfere with the seeding of small grain.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees, and most areas are used for trees. Productivity is moderately high. Slope is a management concern. Machine planting is practical on large areas. Removal of undesirable trees and construction of logging roads on the contour are suitable methods of management.

This Hazleton soil has limitations for most nonfarm uses because of slope, the channery surface, and bedrock at a depth of 42 to 60 inches. Slope is a serious limitation for onsite waste disposal.

This soil is in capability subclass IVe and woodland group 3r.

HfB—Hazleton extremely stony fine sandy loam, 3 to 8 percent slopes. This gently sloping, deep, extremely stony, well drained soil is on the tops and sides of hills and mountains. Slopes are convex and about 300 to 900 feet long. Areas are rectangular and are mainly 10 to 60 acres.

Typically, the surface layer is brown channery fine sandy loam about 5 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsoil is about 30 inches thick. It is yellowish brown channery sandy loam in the upper 17 inches and yellowish brown very channery sandy loam in the lower 13 inches. The substratum is brownish yellow very channery loamy sand about 14 inches thick. Brownish yellow sandstone bedrock is at a depth of 49 inches.

Included with this soil in mapping are a few small areas of Clymer extremely stony sandy loam, Dekalb extremely stony sandy loam, Laidig extremely stony loam, and Hazleton fine sandy loam. The included soils make up 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Runoff is medium. Numerous large stones and boulders are on the surface. Unless limed, the soil is extremely acid to strongly acid.

This Hazleton soil is mostly used for trees. It has poor potential for cultivated crops and pasture, good potential for trees, and poor potential for most nonfarm uses.

Because of the numerous large stones on the surface, this soil is poorly suited to cultivated crops and pasture. It is not feasible to remove these stones.

This soil is suited to trees, and most areas are used for trees. Removal of undesirable trees helps increase production. Large stones on the surface interfere with the use of equipment and with machine planting.

This Hazleton soil has limitations for most nonfarm uses because of many large stones on the surface and bedrock at a depth of 42 to 62 inches. The numerous stones on the surface are a serious limitation for onsite waste disposal.

This soil is in capability subclass VIIs and woodland group 3x.

HfC—Hazleton extremely stony fine sandy loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, extremely stony, well drained soil is on the tops and sides of hills and mountains. Slopes are convex and about 200 to 600 feet long. Areas are rectangular and are mainly 20 to 60 acres.

Typically, the surface layer is brown channery fine sandy loam about 5 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsoil is about 30 inches thick. It is yellowish brown channery sandy loam in the upper 17 inches and yellowish brown very channery sandy loam in the lower 13 inches. The substratum is brownish yellow very channery loamy sand about 14 inches thick. Brownish yellow sandstone bedrock is at a depth of 49 inches.

Included with this soil in mapping are a few small areas of Clymer extremely stony sandy loam, Dekalb extremely stony sandy loam, Laidig extremely stony loam, and Hazleton fine sandy loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately rapid and rapid, and available water capacity is moderate. Runoff is medium to rapid. Numerous large stones and boulders are on the surface. Unless limed, this soil is extremely acid to strongly acid.

Most areas of this Hazleton soil are used for woodland. The soil has poor potential for cultivated crops and pasture and good potential for trees. It has poor potential for most nonfarm uses.

Because of the numerous large stones on the surface, this soil is poorly suited to cultivated crops and pasture. It is not feasible to remove these stones.

This soil is suited to trees, and most areas are wooded. Removal of undesirable trees helps increase production. Numerous large stones on the surface interfere with the use of equipment and with machine planting.

This Hazleton soil has limitations for most nonfarm uses because of slope, many large stones, and bedrock at a depth of 42 to 60 inches. The stones on the surface and slope are serious limitations for onsite waste disposal.

This soil is in capability subclass VIIs and woodland group 3x.

HGB—Hazleton-Clymer association, gently sloping. This association consists of gently sloping, deep, ex-

tremely stony, well drained soils on the tops of mountains and ridges. Composition of this map unit is more variable than most other map units in the survey area, but mapping was controlled well enough for the expected uses of the unit. The relative proportions of Hazleton and Clymer soils vary appreciably from one area to another. Hazleton soils make up about 50 percent of the acreage of this map unit; Clymer soils, 35 percent; and other soils, 15 percent. Slopes are complex and are about 300 to 900 feet long. Areas are round or rectangular and are mainly 20 to 60 acres.

Typically, the surface layer of the Hazleton soil is brown channery fine sandy loam about 5 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsoil is about 30 inches thick. It is yellowish brown channery sandy loam in the upper 17 inches and yellowish brown very channery sandy loam in the lower 13 inches. The substratum is brownish yellow very channery loamy sand about 14 inches thick. Brownish yellow sandstone bedrock is at a depth of 49 inches.

Typically, the surface layer of the Clymer soil is very dark brown gravelly sandy loam about 2 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is yellowish brown gravelly sandy loam about 6 inches thick. The subsoil is about 32 inches thick. It is yellowish brown gravelly sandy loam in the upper 7 inches and strong brown gravelly sandy clay loam in the lower 25 inches. The substratum is strong brown very gravelly sandy loam about 24 inches thick. Gray and brown conglomerate and quartzite bedrock is at a depth of 64 inches.

Included with this association in mapping are small areas of Dekalb extremely stony sandy loam and Laidig extremely stony loam. Also included are a few small areas of rock outcrop and areas of Hazleton and Clymer soils that have more than 50 percent large stones covering the surface. The included areas make up about 15 percent of the map unit. Maximum size of individual included areas is about 10 acres.

Permeability is moderately rapid and rapid in the Hazleton soils and moderate in the Clymer soils. Both soils have moderate available water capacity. Runoff is medium. Numerous large stones and boulders are on the surface. Unless limed, these soils are extremely acid to strongly acid.

The soils in this Hazleton-Clymer association are used mainly for trees, wildlife habitat, and watershed protection. The trees in most areas are of poor quality (fig. 7). These soils have poor potential for cultivated crops and pasture, good potential for trees, and poor potential for most nonfarm uses.

Because of many large stones on the surface, these soils are poorly suited to cultivated crops and pasture.

These soils are suited to trees. Productivity is moderately high and high. Large stones on the surface are the main limitation for use and management. Removal of undesirable trees is a suitable method of woodland management.

These Hazleton and Clymer soils have limitations for most nonfarm uses because of large stones. The stones on the surface are a serious limitation for onsite waste disposal.

This association is in capability subclass VIIs. The Hazleton soils are in woodland group 3x, and the Clymer soils are in woodland group 2x.

HGC—Hazleton-Clymer association, sloping. This association consists of sloping, deep, extremely stony, well drained soils on the tops and sides of mountains and ridges. Composition of this map unit is more variable than most other map units in the survey area, but mapping was controlled well enough for the expected uses of the unit. The relative proportions of Hazleton and Clymer soils vary appreciably from one area to another. Hazleton soils makes up about 50 percent of the acreage of this map unit; Clymer soils 35 percent; and other soils, 15 percent. Slopes are rolling and are about 300 to 900 feet long. Areas are round and rectangular and are mainly 20 to 60 acres.

Typically, the surface layer of the Hazleton soil is brown channery fine sandy loam about 5 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsoil is about 30 inches thick. It is yellowish brown channery sandy loam in the upper 17 inches and yellowish brown very channery sandy loam in the lower 13 inches. The substratum is brownish yellow very channery loamy sand about 14 inches thick. Brownish yellow sandstone bedrock is at a depth of 49 inches.

Typically, the surface layer of the Clymer soil is very dark brown gravelly sandy loam about 2 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsurface layer is yellowish brown gravelly sandy loam about 6 inches thick. The subsoil is about 32 inches thick. It is yellowish brown gravelly sandy loam in the upper 7 inches and strong brown gravelly sandy clay loam in the lower 25 inches. The substratum is strong brown very gravelly sandy loam about 24 inches thick. Gray and brown conglomerate and quartzite bedrock is at a depth of 64 inches.

Included with this association in mapping are small areas of Dekalb extremely stony sandy loam and Laidig extremely stony loam. Also included are a few small areas of rock outcrop and soils that have more than 50 percent large stones on the surface. The included areas make up about 15 percent of the association. Maximum size of individual included areas is about 10 acres.

Permeability is moderately rapid and rapid in the Hazleton soil and moderate in the Clymer soil. Both soils have moderate available water capacity. Runoff is medium. Numerous large stones and boulders are on the surface. Unless limed, these soils are extremely acid to strongly acid.

The soils in this Hazleton-Clymer association are used mainly for trees, wildlife habitat, and watershed protection. Most trees are of poor quality. The soils have poor

Figure 7.—Area of Hazleton-Clymer association, gently sloping, showing trees of poor quality.

potential for cultivated trees and pasture, good potential for trees, and poor potential for most nonfarm uses.

Because of the numerous large stones on the surface, these soils are poorly suited to cultivated crops and pasture.

These soils are suited to trees. Productivity is moderately high and high. Large stones on the surface are the main limitations to woodland use and management. Removal of undesirable trees is a suitable method of management.

These Hazleton and Clymer soils have limitations for most nonfarm uses because of large stones on the surface and slope. The numerous stones are a serious limitation for onsite waste disposal.

This association is in capability subclass VIIs. The Hazleton soils are in woodland group 3x, and the Clymer soils are in woodland group 2x.

KeB—Kedron silt loam, 3 to 8 percent slopes. This gently sloping, deep, somewhat poorly drained and moderately well drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 700 feet long. Areas are fan-shaped or rectangular and are mainly 4 to 20 acres.

Typically, the surface layer is reddish brown silt loam about 9 inches thick. The subsoil, is about 49 inches thick. In sequence, it is reddish brown silty clay loam in the upper 8 inches; mottled, reddish brown silty clay loam in the next 10 inches; mottled, reddish brown channery clay loam in the next 8 inches; and mottled, reddish brown channery loam in the lower 23 inches. The substratum is mottled, reddish brown channery loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Meckesville loam, Linden silt loam, and Kedron very stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a firm and brittle fragipan (fig. 8) which restricts the rooting depth. A seasonal high water table is within a depth of 6 to 36 inches during wet periods. Unless limed, the soil is extremely acid to strongly acid. The hazard of erosion is moderate.

This Kedron soil is used mainly for cultivated crops and pasture. A few small areas are used for woodland. The soil has good potential for cultivated crops, pasture, and trees. It has limited potential for many nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, diversions, contour stripcropping, and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. Surface and subsurface drains help remove excess water and permit timely tillage.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are major concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees, and a small acreage is used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion. Because of the seasonal high water table, the use of equipment can be briefly restricted during wet periods. Machine planting is practical on large areas.

This Kedron soil has limitations for most nonfarm uses. Slow permeability and a seasonal high water table are serious limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

Figure 8.—Kedron silt loam, 3 to 8 percent slopes. Water is flowing over the fragipan.

This soil is in capability subclass IIe and woodland group 3o.

KeC—Kedron silt loam, 8 to 15 percent slopes. This sloping, deep, somewhat poorly drained and moderately well drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 600 feet long. Areas are fan-shaped or rectangular and are mainly 6 to 20 acres.

Typically, the surface layer is reddish brown silt loam about 9 inches thick. The subsoil is about 49 inches thick. In sequence, it is reddish brown silty clay loam in the upper 8 inches; mottled, reddish brown silty clay loam in the next 10 inches; mottled, reddish brown channery clay loam in the next 8 inches; and mottled, reddish brown channery loam in the lower 23 inches. The substratum is mottled, reddish brown channery loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Meckesville loam, Linden silt loam, and Kedron very stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is rapid. The lower part of the subsoil has a firm and brittle fragipan which restricts the rooting depth. A seasonal high water table is within a depth of 6 to 36 inches during wet periods. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is severe.

This Kedron soil is used mainly for cultivated crops and pasture. A few small areas are used for woodland. The soil has good potential for cultivated crops, pasture, and trees. It has limited potential for many nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, diversions, contour stripcropping, and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. Surface and subsurface drains help remove excess water and permit timely tillage.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees, but only a small acreage is used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion. Because of the seasonal high water table, the use of equipment can be restricted briefly during wet periods. Machine planting is practical on large areas.

This Kedron soil has limitations for most nonfarm uses. Slow permeability and a seasonal high water table are serious limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. If buildings with basements are constructed on this soil, foundation drains with proper outlets are needed to remove water from the basement area.

This soil is in capability subclass IIIe and woodland group 3r.

KvB—Kedron very stony silt loam, 3 to 8 percent slopes. This gently sloping, deep, very stony, somewhat poorly drained and moderately well drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 700 feet long. Areas are fan-shaped or rectangular and are mainly 8 to 25 acres.

Typically, the surface layer is reddish brown silt loam about 9 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 3 to 15 percent of the surface. The subsoil is about 49 inches thick. In sequence, it is brown silty clay loam in the upper 8 inches; mottled, reddish brown silty clay loam in the next 10 inches; mottled, reddish brown channery clay loam in the next 8 inches; and mottled, reddish brown channery loam in the lower 23 inches. The substratum is mottled, reddish brown channery loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Meckesville very stony loam, Kedron silt loam, and Linden silt loam. Also included are areas of extremely stony Kedron soils. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a firm and brittle fragipan which restricts the rooting depth. A seasonal high water table is within a depth of 6 to 36 inches during wet periods. Unless limed, the soil is extremely acid to strongly acid. Numerous large stones are on the surface.

This Kedron soil is used mostly for woodland. A few small areas are used for pasture. The soil has poor potential for cultivated crops and good potential for pasture and trees. It has limited potential for many nonfarm uses.

Because of the numerous large stones on the surface, this soil is poorly suited to cultivated crops and pasture. Removal of these stones is not practical.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps to increase production.

This soil has limitations for most nonfarm uses. Slow permeability and numerous large stones on the surface are limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIs and woodland group 3o.

KvC—Kedron very stony silt loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, very stony, somewhat poorly drained and moderately well drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 300 to 700 feet long. Areas are fan-shaped and rectangular and are mainly 10 to 25 acres.

Typically, the surface layer is reddish brown silt loam about 9 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 3 to 15 percent of the surface. The subsoil is about 49 inches thick. In sequence, it is reddish brown silty clay loam in the upper 8 inches; mottled, reddish brown silty clay loam in the next 10 inches; mottled, reddish brown channery clay loam in the next 8 inches; and mottled, reddish brown channery loam in the lower 23 inches. The substratum is mottled, reddish brown channery loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Meckesville very stony loam, Kedron silt loam, Linden silt loam, and areas of extremely stony Kedron soils. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is rapid. The lower part of the subsoil

has a firm and brittle fragipan which restricts the rooting depth. A seasonal high water table is within a depth of 6 to 36 inches during wet periods. Unless limed, this soil is extremely acid to strongly acid. Numerous large stones are on the surface.

This Kedron soil is used mainly for woodland. A few small areas are used for pasture. This soil has poor potential for cultivated crops and pasture, good potential for trees, and poor potential for many nonfarm uses.

Because of the numerous large stones on the surface, this soil is poorly suited to cultivated crops and pasture. Removal of the stones is not practical.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps increase production. Slope interferes with use of equipment and with machine planting.

This Kedron soil has limitations for most nonfarm uses. Slow permeability and many large stones are limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIs and woodland group 3r.

LaB—Laidig gravelly loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 600 feet long. Areas are fan-shaped or rectangular and are mainly 8 to 20 acres.

Typically, the surface layer is dark grayish brown gravelly loam about 4 inches thick. The subsoil is 70 inches thick. It is yellowish brown gravelly heavy loam in the upper 6 inches; strong brown channery sandy clay loam in the next 32 inches; and mottled, strong brown channery heavy sandy loam in the lower 32 inches.

Included with this soil in mapping are small areas of Buchanan gravelly loam and Hazleton channery fine sandy loam. The included soils make up as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts the rooting depth. A seasonal high water table is within a depth of 30 to 48 inches during wet seasons. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is moderate.

This Laidig soil is used mostly for cultivated crops and pasture. A few small areas are used for woodland. The soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, diversions, and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. The gravelly surface layer interferes with the seeding and harvesting of some crops.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of mangement. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps increase production. Machine planting is practical on large areas.

This Laidig soil has limitations for many nonfarm uses. Moderately slow permeability and a seasonal high water table are limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to help remove water from the basement area.

This soil is in capability subclass IIe and woodland group 3o.

LaC—Laidig gravelly loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 600 feet long. Areas are fan-shaped or rectangular and are mainly 8 to 30 acres.

Typically, the surface layer is dark grayish brown gravelly loam about 4 inches thick. The subsoil is 70 inches thick. It is yellowish brown gravelly heavy loam in the upper 6 inches; strong brown channery sandy clay loam in the next 32 inches; and mottled, strong brown channery heavy sandy loam in the lower 32 inches.

Included with this soil in mapping are small areas of Buchanan gravelly loam and Hazleton channery fine sandy loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 48 inches during wet seasons. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is severe.

This Laidig soil is used mainly for cultivated crops and pasture. A few small areas are used for woodland. This soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, diversions, and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Surface and subsurface drains help remove excess water and permit timely tillage. The gravelly surface layer interferes with the seeding and harvesting of some crops.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps increase production. Machine planting is practical on large areas.

This Laidig soil has limitations for most nonfarm uses. Moderately slow permeability, a seasonal high water table, and slope are limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to help remove water from the basement area.

This soil is in capability subclass IIIe and woodland group 3o.

LdB—Laidig extremely stony loam, 3 to 8 percent slopes. This gently sloping, deep, extremely stony, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 600 feet long. Areas are fan-shaped or rectangular and are mainly from 20 to 60 acres.

Typically, the surface layer is dark grayish brown gravelly loam about 4 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsoil is 70 inches thick. It is yellowish brown gravelly heavy loam in the upper 6 inches; strong brown channery sandy clay loam in the next 32 inches; and mottled, strong brown channery heavy sandy loam in the lower 32 inches.

Included with this soil in mapping are small areas of Buchanan extremely stony loam, Hazleton extremely stony fine sandy loam, and Laidig gravelly loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 48 inches during wet seasons. Unless limed, this soil is extremely acid to strongly acid.

This Laidig soil is used mainly for woodland. A few small areas are used for pasture. This soil has poor potential for cultivated crops and pasture and good potential for trees. It has limited potential for most nonfarm uses.

Because of the numerous large stones on the surface, this soil is poorly suited to cultivated crops and pasture.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps increase production. Large stones on the surface interfere with use of equipment and with machine planting.

This Laidig soil has limitations for most nonfarm uses. The moderately slow permeability, a seasonal high water table, and large stones on the surface are limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIIs and woodland group 3x.

LdC—Laidig extremely stony loam, 8 to 25 percent slopes. This gently sloping and moderately steep, deep, extremely stony, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 300 to 900 feet long. Areas are fan-shaped or rectangular and are mainly 20 to 80 acres.

Typically, the surface layer is dark grayish brown gravelly loam about 4 inches thick. Large stones and boulders that are 10 inches to several feet in diameter cover 15 to 50 percent of the surface. The subsoil is 70 inches thick. It is yellowish brown gravelly heavy loam in the upper 6 inches; strong brown channery sandy clay loam in the next 32 inches; and mottled, strong brown channery heavy loam in the lower 32 inches.

Included with this soil in mapping are small areas of Buchanan extremely stony loam, Hazleton extremely stony fine sandy loam, and Laidig gravelly loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium and rapid. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 48 inches during wet seasons. Unless limed, this soil is extremely acid to strongly acid.

This Laidig soil is mainly used for woodland. A few small areas are used for pasture. This soil has poor potential for cultivated crops and pasture and good potential for trees. It has limited potential for most nonfarm uses.

Because of the numerous large stones on the surface, this soil is poorly suited to cultivated crops and pasture.

This soil is suited to trees. Productivity is moderately high. Removal of undesirable trees helps increase production. Large stones on the surface interfere with equipment and with machine planting.

This Laidig soil has limitations for most nonfarm uses. Moderately slow permeability, numerous large stones on the surface, slope, and a seasonal high water table are serious limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIIs and woodland group 3x.

LeB—Leck Kill channery silt loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on the tops and sides of hills and knolls. Slopes are convex and about 300 to 600 feet long. Areas are round or rectangular and are mainly 4 to 20 acres.

Typically, the surface layer is dusky red channery silt loam about 8 inches thick. The subsoil is weak red channery silt loam about 30 inches thick. The substratum is dark red very channery loam about 24 inches thick. Dark reddish brown shale bedrock is at a depth of 62 inches.

Figure 9.—Contour stripcropping of corn and small grain on Leck Kill channery silt loam, 3 to 8 percent slopes. This conservation practice helps to control erosion.

Included with this soil in mapping are a few small areas of Calvin shaly silt loam and Meckesville loam. Also included are some areas of soils that are similar to the Leck Kill soils that have a higher percentage of coarse fragments in the subsoil. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate and moderately rapid, and available water capacity is high. Runoff is medium. Unless limed, the soil is medium acid to very strongly acid. The hazard of erosion is moderate.

This Leck Kill soil is used mainly for cultivated crops. Some areas are used for woodland and nonfarm uses. The soil has good potential for cultivated crops, pasture, and trees and for most nonfarm uses.

This soil is well suited to cultivated crops. Contour stripcropping (fig. 9), minimum tillage, no tillage, diversions, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth. The channery surface layer can interfere with the seeding of small grain and the harvesting of some crops.

This soil is well suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is well suited to trees, but only a small acreage is used for woodland. Productivity is moderately high, and management problems are few. Removal of undesirable trees helps to increase production. Construction of logging roads on the contour helps to control erosion. Machine planting is practical on large areas.

This Leck Kill soil has few limitations for most nonfarm uses. Bedrock at a depth of 42 to 60 inches is the main limitation for onsite waste disposal, and it can interfere with deep excavations.

This soil is in capability subclass IIe and woodland group 3o.

LeC—Leck Kill channery silt loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on the tops and sides of hills and knolls. Slopes are convex and about 300 to 700 feet long. Areas are rectangular and are mainly 6 to 30 acres.

Typically, the surface layer is dusky red channery silt loam about 8 inches thick. The subsoil is weak red channery silt loam about 30 inches thick. The substratum is dark red very channery loam about 24 inches thick.

Dark reddish brown shale bedrock is at a depth of 62 inches.

Included with this soil in mapping are a few small areas of Calvin shaly silt loam and Meckesville loam. Also included are some deep areas of soils that are similar to the Leck Kill soil that have a higher percentage of coarse fragments in the subsoil. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate and moderately rapid, and available water capacity is high. Runoff is medium. Unless limed, the soil is medium acid to very strongly acid. The hazard of erosion is severe.

This Leck Kill soil is used mainly for cultivated crops. Some areas are used for woodland and nonfarm uses. The soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is well suited to cultivated crops. Contour stripcropping, minimum tillage, no tillage, diversions, and sod waterways help control erosion. Use of cover crops, crop residue, and hay in the cropping system help to maintain content of organic matter and good tilth. The channery surface layer interferes with the seeding of small grain and harvesting of some crops.

This soil is well suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is well suited to trees, but only a small acreage is used for trees. Productivity is moderately high, and management problems are few. Removal of undesirable trees helps to increase production. Construction of logging roads on the contour helps control erosion. Machine planting is practical on large areas.

This Leck Kill soil has limitations for most nonfarm uses. Bedrock at a depth of 42 to 60 inches and slope are limitations for onsite waste disposal. The depth to bedrock can interfere with deep excavations.

This soil is in capability subclass IIIe and woodland group 3o.

LgB—Lehew channery loam, 3 to 8 percent slopes. This gently sloping, moderately deep, well drained soil is on the tops of hills and mountains. Slopes are convex and about 200 to 800 feet long. Areas are round or rectangular and are mainly 4 to 40 acres.

Typically, the surface layer is dark brown channery loam about 3 inches thick. The subsurface layer is reddish brown channery loam about 5 inches thick. The subsoil is about 19 inches thick. It is reddish brown channery sandy loam in the upper 6 inches and reddish brown very channery sandy loam in the lower 13 inches. The substratum is reddish brown very channery sandy loam about 10 inches thick. Dark reddish brown sandstone bedrock is at a depth of 37 inches.

Included with this soil in mapping are small areas of soils that are similar to the Lehew soils that are deep to underlying rock. Also included are small areas of Meckesville loam, Calvin shaly silt loam, and Leck Kill channery silt loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate to rapid, and available water capacity is low. Runoff is medium. The rooting depth is restricted by moderate depth to bedrock. Unless limed, the soil is strongly acid and very strongly acid. The hazard of erosion is moderate.

This Lehew soil is used mainly for cultivated crops. A few areas are used for trees. This soil has fair potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. However, loss of soil, plant nutrients, and organic matter and a decrease in available water capacity result if there is further erosion. No tillage, minimum tillage, contour stripcropping, diversions, and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. In places, moderate depth to bedrock obstructs the construction of diversions. Incorporating crop residue and manure into the surface layer helps maintain content of organic matter and tilth.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees. Productivity is moderately high. Rooting depth is restricted by the moderate depth to bedrock. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion. Machine planting is practical on large areas.

This Lehew soil has limitations for most nonfarm uses because of moderate depth to bedrock and rapid permeability in places. The moderate depth to underlying rock is a serious limitation for onsite waste disposal, and it also hinders excavation for buildings. If this soil is disturbed by construction, conservation practices to help control erosion and the accumulation of sediment are needed.

This soil is in capability subclass IIe and woodland group 3o.

LgC—Lehew channery loam, 8 to 15 percent slopes. This sloping, moderately deep, well drained soil is on the tops and sides of hills and mountains. Slopes are convex and about 200 to 800 feet long. Areas are rectangular and are mainly 4 to 40 acres.

Typically, the surface layer is dark brown channery loam about 3 inches thick. The subsurface layer is reddish brown channery loam about 5 inches thick. The subsoil is about 19 inches thick. It is reddish brown channery sandy loam in the upper 6 inches and reddish brown very channery sandy loam in the lower 13 inches. The substratum is reddish brown very channery sandy loam about 10 inches thick. Dark reddish brown sandstone bedrock is at a depth of 37 inches.

Included with this soil in mapping are small areas of soils that are similar to the Lehew soil that are deep to

underlying rock. Also included are small areas of Meckesville loam, Calvin shaly silt loam, and Leck Kill channery silt loam. The included soils make up as much as 15 percent of this map unit.

Permeability is moderate to rapid, and available water capacity is low. Runoff is rapid. The rooting depth is restricted by the moderate depth to underlying rock. Unless limed, this soil is strongly acid and very strongly acid. The hazard of erosion is severe.

This Lehew soil is used mainly for cultivated crops. Some areas are used for trees. This soil has fair potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Loss of soil, plant nutrients, and organic matter and a decrease in available water capacity result if there is further erosion. No tillage, minumum tillage, contour stripcropping, diversions, and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. In places, the moderate depth to bedrock obstructs the construction of diversions. Incorporating crop residue and manure into the surface layer helps maintain content of organic matter and tilth.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees. Productivity is moderately high. Rooting depth is restricted by the moderate depth to bedrock. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion. Machine planting is practical on large areas.

This Lehew soil has limitations for most nonfarm uses because of slope, the channery surface layer, moderate depth to underlying rock, and rapid permeability. The moderate depth to rock is a serious limitation for onsite waste disposal, and it hinders excavation for buildings. If this soil is disturbed by construction, conservation practices help to control erosion and prevent the accumulation of sediment.

This soil is in capability subclass IIIe and woodland group 3o.

LgD—Lehew channery loam, 15 to 25 percent slopes. This moderately steep, moderately deep, well drained soil is on the sides of hills and mountains. Slopes are convex and about 200 to 600 feet long. Areas are rectangular and are mainly 10 to 30 acres.

Typically, the surface layer is dark brown channery loam about 3 inches thick. The subsurface layer is reddish brown channery loam about 5 inches thick. The subsoil is about 19 inches thick. It is reddish brown channery sandy loam in the upper 6 inches and reddish brown very channery sandy loam in the lower 13 inches. The substratum is reddish brown very channery sandy loam about 10 inches thick. Dark reddish brown sandstone bedrock is at a depth of 37 inches.

Included with this soil in mapping are small areas of soils that are similar to the Lehew soil that are deep to bedrock. Also included are small areas of Meckesville loam, Calvin shaly silt loam, and Leck Kill channery silt loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate to rapid, and available water capacity is low. Runoff is very rapid. The rooting depth is restricted by moderate depth to underlying rock. Unless limed, this soil is strongly acid and very strongly acid. The hazard of erosion is very severe.

This Lehew soil is used mainly for cultivated crops and trees. It has fair potential for cultivated crops, pasture, and trees and poor potential for most nonfarm uses.

This soil is fairly suited to cultivated crops. Loss of soil, plant nutrients, and organic matter and a decrease in available water capacity result if there is further erosion. No tillage, minimum tillage, diversions, and the use of cover crops and grasses and legumes in the cropping system reduce runoff and help control erosion. Stripcropping can be used where the topography is suitable. In places, the moderate depth to bedrock hinders the construction of diversions. Incorporating crop residue and manure into the surface layer helps maintain content of organic matter and tilth.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

This soil is suited to trees. Productivity is moderately high. The rooting depth is restricted by moderate depth to bedrock. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion. Machine planting is practical on large areas.

This Lehew soil has limitations for most nonfarm uses because of slope, moderate depth to underlying rock, and rapid permeability. The moderate depth to rock and slope are serious limitations for onsite water disposal. The moderate depth to rock hinders excavation of buildings. If this soil is disturbed for construction, conservation practices help control erosion and prevent the accumulation of sediment.

This soil is in capability subclass IVe and woodland group 3r.

LhB—Lehew extremely stony loam, 3 to 8 percent slopes. This gently sloping, moderately deep, extremely stony, well drained soil is on the tops of hills and mountains. Slopes are convex and about 200 to 1,000 feet long. Areas are round or rectangular and are mainly 8 to 100 acres.

Typically, the surface layer is dark brown channery loam about 3 inches thick. Large stones and boulders cover 15 to 50 percent of the surface area. The subsurface layer is reddish brown channery loam about 5 inches thick. The subsoil is about 19 inches thick. It is reddish brown channery sandy loam in the upper 6

inches and reddish brown very channery sandy loam in the lower 13 inches. The substratum is reddish brown very channery sandy loam about 10 inches thick. Dark reddish brown sandstone bedrock is at a depth of 37 inches.

Included with this soil in mapping are small areas of soils that are similar to the Lehew soil that are deep to bedrock. Also included are small areas of Meckesville very stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate to rapid, and available water capacity is low. Runoff is medium. The rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is strongly acid and very strongly acid.

This Lehew soil is used mainly for woodland. It has poor potential for cultivated crops and pasture, fair potential for trees, and poor potential for most nonfarm uses.

Because of the numerous large stones and boulders on the surface, this soil is poorly suited to cultivated crops and pasture.

This soil is suited to trees, and productivity is moderately high. The rooting depth is restricted by the moderate depth to bedrock. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion. Large stones of the surface interfere with the use of equipment and with machine planting.

This Lehew soil has limitations for most nonfarm uses because of the moderate through rapid permeability, moderate depth to bedrock, and many large stones on the surface. Moderate depth to rock and numerous large stones on the surface are serious limitations for onsite waste disposal, and they also hinder excavation for buildings.

This soil is in capability subclass VIIs and woodland group 3x.

LhC—Lehew extremely stony loam, 8 to 25 percent slopes. This sloping and moderately steep, moderately deep, extremely stony, well drained soil is on the side and tops of hills and mountains. Slopes are convex and about 300 to 800 feet long. Areas are rectangular and are mainly 15 to 100 acres.

Typically, the surface layer is dark brown channery loam about 3 inches thick. Large stones and boulders cover 15 to 50 percent of the surface. The subsurface layer is reddish brown channery loam about 5 inches thick. The subsoil is about 19 inches thick. It is reddish brown channery sandy loam in the upper 6 inches and reddish brown very channery sandy loam in the lower 13 inches. The substratum is reddish brown very channery sandy loam about 10 inches thick. Dark reddish brown sandstone bedrock is at a depth of 37 inches.

Included with this soil in mapping are small areas of soils that are similar to the Lehew soil that are deep to bedrock. Also included are small areas of Meckesville very stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate to rapid, and available water capacity is low. Runoff is medium. Rooting depth is restricted by the moderate depth to bedrock. Unless limed, this soil is strongly acid and very strongly acid.

This Lehew soil is used mainly for woodland. It has poor potential for cultivated crops and pasture, fair potential for trees, and poor potential for most nonfarm uses.

Because of the numerous large stones and boulders on the surface, this soil is poorly suited to cultivated crops and pasture.

This soil is suited to trees, and most areas are used for trees. Productivity is moderately high. The rooting depth is restricted by the moderate depth to bedrock. Removal of undesirable trees helps increase production. Construction of logging roads on the contour helps control erosion. Large stones on the surface interfere with use of equipment and with machine planting.

This Lehew soil has limitations for most nonfarm uses because of moderate to rapid permeability, many large stones on the surface, moderate depth to bedrock, and slope. Moderate depth to bedrock, large stones on the surface, and slope are serious limitations for onsite waste disposal. Moderate depth to bedrock and large stones on the surface hinder excavation for buildings.

This soil is in capability subclass VIIs and woodland group 3x.

Ln—Linden silt loam. This nearly level, deep, well drained soil is on flood plains. Slopes are slightly convex and about 150 to 500 feet long. Areas are narrow and about 4 to 25 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark reddish brown silt loam about 10 inches thick. The subsoil is about 35 inches thick. It is reddish brown silt loam in the upper 8 inches, reddish brown loam in the next 17 inches, and reddish brown gravelly loam in the lower 10 inches. The substratum is reddish brown gravelly sandy loam to a depth of 62 inches.

Included with this soil in mapping are small areas of Basher silt loam. Also included are small areas of soils that are similar to the Linden soil that have stratified silt, sand, and gravel at a depth of less than 40 inches. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately rapid, and available water capacity is high. Runoff is slow. The hazard flooding is rare through common. Unless limed, this soil is extremely acid and medium acid. The hazard of erosion is slight.

This Linden soil is used mainly for cultivated crops. It has very good potential for cultivated crops, pasture, and trees and poor potential for most nonfarm uses.

This soil is well suited to cultivated crops, but it is subject to flooding. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth.

This soil is suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are

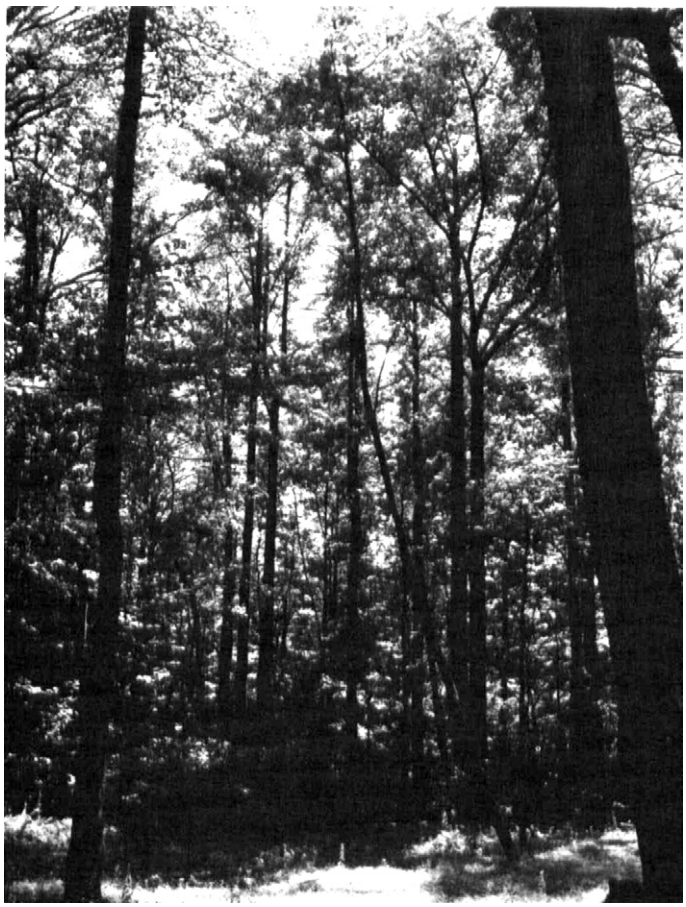


Figure 10.—Trees on Linden silt loam grow well and produce excellent stands of timber.

chief management needs. Applications of plant nutrients are needed to maintain fertility for optimum production.

The soil is well suited to trees (fig. 10) and productivity is very high. Management problems are few. Removal of undesirable trees help increase production. Machine planting is practical on large areas.

This Linden soil has limitations for most nonfarm uses. Flooding is a serious limitation for onsite waste disposal and buildings.

This soil is in capability class I and woodland group 1o.

MeB—Meckesville loam, 3 to 8 percent slopes. This gently sloping, deep, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 800 feet long. Areas are fan-shaped or rectangular and are mainly 4 to 30 acres.

Typically, the surface layer is dark reddish brown loam about 2 inches thick. The subsurface layer is reddish brown loam about 5 inches thick. The subsoil is about 63 inches thick. It is reddish brown light clay loam and heavy loam in the upper 16 inches; dusky red gravelly heavy loam in the next 8 inches; and mottled, weak red gravelly light clay loam that has a gravelly heavy loam fragipan in the lower 39 inches. The substratum is weak red gravelly heavy loam to a depth of 96 inches.

Included with this soil in mapping are small areas of Kedron silt loam, Leck Kill channery silt loam, and Meckesville very stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 42 inches during wet periods. Unless limed, this soil is extremely acid and strongly acid. The hazard of erosion is moderate.

This Meckesville soil is used mainly for cultivated crops and pasture. A few small areas are used for woodland and urban land. This soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, no tillage, contour stripcropping, diversions, and the use of cover crops and grasses and legumes in the cropping system reduce runoff and help control erosion.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is well suited to trees, and a small acreage is used for woodland. Productivity is high. Removal of undesirable trees helps increase production. Machine planting is practical on large areas.

This Meckesville soil has limitations for most nonfarm uses. Moderately slow permeability and a seasonal high water table are serious limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass IIe and woodland group 2o.

MeC—Meckesville loam, 8 to 15 percent slopes. This sloping, deep, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 300 to 800 feet long. Areas are fan-shaped or rectangular and are mainly 8 to 25 acres.

Typically, the surface layer is dark reddish brown loam about 2 inches thick. The subsurface layer is reddish brown loam about 5 inches thick. The subsoil is about 63 inches thick. It is reddish brown light clay loam and heavy loam in the upper 16 inches; dusky red gravelly

heavy loam in the next 8 inches; and mottled, weak red gravelly light clay loam that has a gravelly heavy loam fragipan in the lower 39 inches. The substratum is weak red gravelly heavy loam to a depth of 96 inches.

Included with this soil is mapping are small areas of Kedron silt loam, Leck Kill channery silt loam, and Meckesville very stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 42 inches during wet periods. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is severe.

This Meckesville soil is used mainly for cultivated crops and pasture. A few small areas are used for woodland and urban land. This soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, no tillage, contour stripcropping, diversions, and the use of cover crops and grasses and legumes in the cropping system reduce runoff and help control erosion.

This soil is suited to pasture (fig. 11). Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is well suited to trees, and a small acreage is used for woodland. Productivity is high. Removal of undesirable trees helps increase production. Machine planting is practical on the large areas.

This Meckesville soil has limitations for most nonfarm uses. Moderately slow permeability and a seasonal high water table are serious limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass IIIe and woodland group 2o.

MeD—Meckesville loam, 15 to 25 percent slopes. This moderately steep, deep, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 300 to 600 feet long. Areas are fan-shaped or rectangular and are mainly 4 to 20 acres.

Typically, the surface layer is dark reddish brown loam about 2 inches thick. The subsurface layer is reddish brown loam about 5 inches thick. The subsoil is about 63 inches thick. It is reddish brown light clay loam and heavy loam in the upper 16 inches; dusky red gravelly heavy loam in the next 8 inches; and mottled, weak red gravelly light clay loam that has a gravelly heavy loam fragipan in the lower 39 inches. The substratum is weak red gravelly heavy loam to a depth of 96 inches or more.

Included with this in mapping are small areas of Kedron silt loam, Leck Kill channery silt loam, and Meckesville very stony loam. The included soils make up as much as 15 percent of this map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 42 inches during wet periods. Unless limed, this soil is extremely acid to strongly acid. The hazard of erosion is very severe.

This Meckesville soil is used mainly for cultivated crops and pasture. A few small areas are used for woodland. This soil has fair potential for cultivated crops and pasture, good potential for trees, and poor potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, no tillage, contour stripcropping, diversions, and the use of cover crops and grasses and legumes in the cropping system reduce runoff and help control erosion.

This soil is suited to pasture. Overgrazing and grazing of pasture when this soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is well suited to trees, and a small acreage is used for woodland. Productivity is high. Removal of undesirable trees helps increase production. Machine planting is practical on large areas.

This Meckesville soil has limitations for most nonfarm uses. Moderately slow permeability, a seasonal high water table, and slope are serious limitations for onsite waste disposal. The seasonal high water table is a potential hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass IVe and woodland group 2r.

MkB—Meckesville very stony loam, 3 to 8 percent slopes. This gently sloping, deep, very stony, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 300 to 800 feet long. Areas are fan-shaped or rectangular and are mainly 12 to 40 acres.

Typically, the surface layer is dark reddish brown loam about 2 inches thick. Large stones and boulders cover 3 to 15 percent of the surface. The subsurface layer is reddish brown loam about 5 inches thick. The subsoil is about 63 inches thick. It is reddish brown light clay loam and heavy loam in the upper 16 inches; dusky red gravelly heavy loam in the next 8 inches; and mottled, weak red gravelly light clay loam that has a gravelly heavy

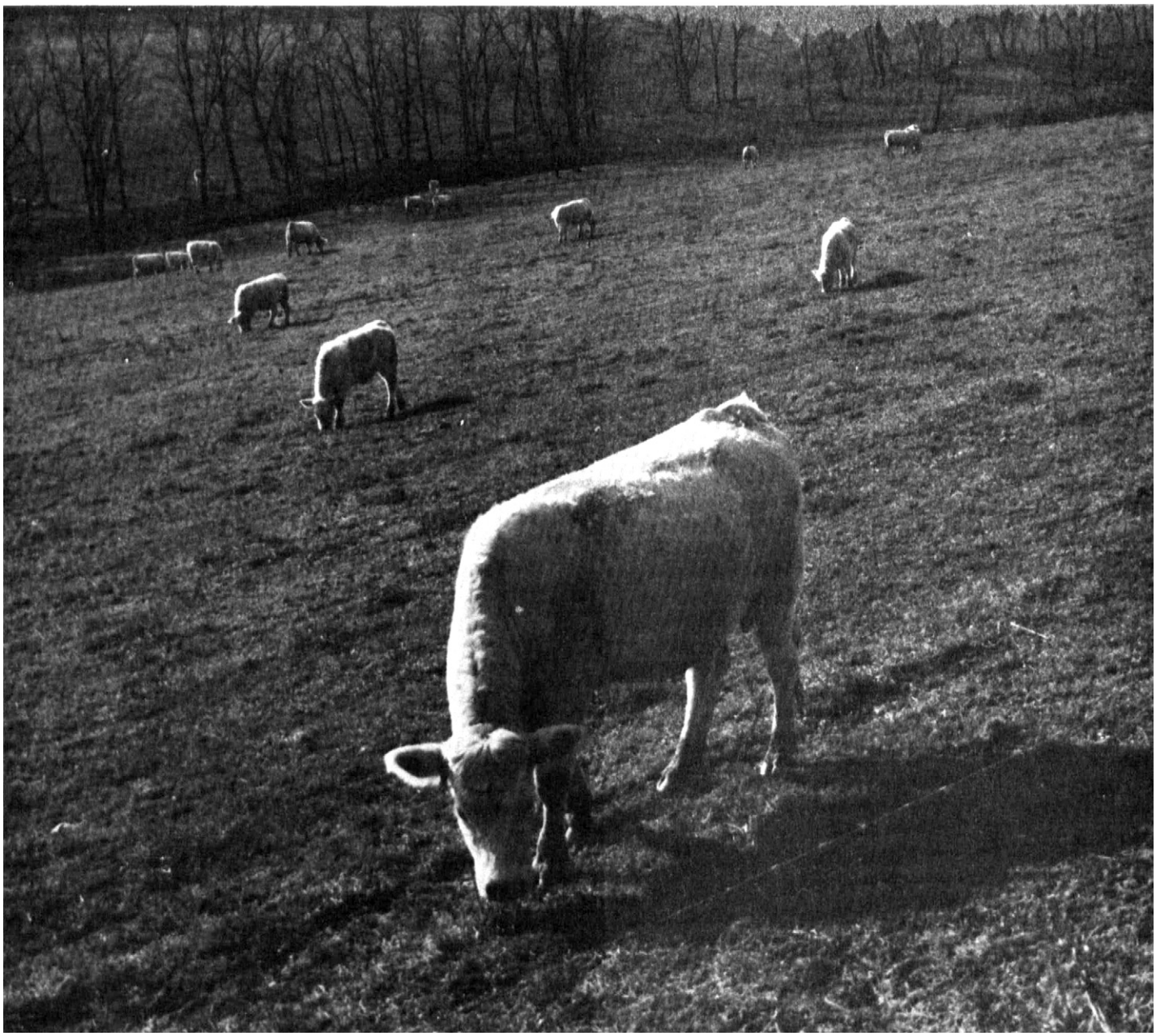


Figure 11.—Good quality pasture on Meckesville loam, 8 to 15 percent slopes.

loam fragipan in the lower 39 inches. The substratum is weak red gravelly heavy loam to a depth of 96 inches.

Included with this soil in mapping are small areas of Kedron very stony silt loam and Meckesville loam. Also included are small areas of soils similar to the Meckesville soils that do not have a fragipan. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 42 inches during wet periods. Unless limed, this soil is extremely acid to strongly acid. Numerous large stones are on the surface.

This Meckesville soil is used mainly for woodland. A few small areas are used for pasture. This soil has poor

potential for cultivated crops and pasture, good potential for trees, and poor potential for most nonfarm uses.

Because of the numerous stones on the surface, this soil is poorly suited to cultivated crops and pasture.

This soil is well suited to trees, and most areas are used for woodland. Productivity is high. Removal of undesirable trees helps increase production.

This Meckesville soil has limitations for most nonfarm uses because of moderately slow permeability, a seasonal high water table, and many large stones on the surface. The moderately slow permeability and numerous large stones on the surface are limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIs and woodland group 2o.

MkC—Meckesville very stony loam, 8 to 25 percent slopes. This sloping and moderately steep, deep, very stony, well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 300 to 900 feet long. Areas are fan-shaped or rectangular and are mainly 20 to 60 acres.

Typically, the surface layer is dark reddish brown loam about 2 inches thick. Large stones and boulders cover 3 to 15 percent of the surface. The subsurface layer is reddish brown loam about 5 inches thick. The subsoil is about 63 inches thick. It is reddish brown light clay loam and heavy loam in the upper 16 inches; dusky red gravelly heavy loam in the next 8 inches; and mottled, weak red gravelly light clay loam that has a gravelly heavy loam fragipan in the lower 39 inches. The substratum is weak red gravelly heavy loam to a depth of 96 inches.

Included with this soil in mapping are small areas of Kedron very stony silt loam and Meckesville loam. Also included are small areas of soils that are similar to the Meckesville soil that do not have a fragipan. The included soils make up as much as 15 percent of the map unit.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a very firm and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 30 to 42 inches during wet periods. Unless limed, the soil is extremely acid to strongly acid. Numerous large stones are on the surface.

This Meckesville soil is used mainly for woodland. A few small areas are used for pasture. This soil has poor potential for cultivated crops and pasture, good potential for trees, and poor potential for most nonfarm uses.

Because of the numerous large stones and boulders on the surface, this soil is poorly suited to crops and pasture.

This soil is well suited to trees, and most areas are used for woodland. Productivity is high. Removal of undesirable trees helps increase production. Slope interferes with the use of equipment and with machine planting.

This Meckesville soil has limitations for most nonfarm uses because of moderately slow permeability, a seasonal high water table, numerous large stones on the surface, and slope. Moderately slow permeability, slope, and large stones are limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIs and woodland group 2r.

Ph—Philo silt loam. This nearly level, deep, moderately well drained soil is on flood plains. Slopes are slightly concave and about 150 to 400 feet long. Slopes range from 0 to 3 percent. Areas are narrow and are mainly 4 to 20 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is about 23 inches thick. It is yellowish brown silt loam in the upper 9 inches and mottled, yellowish brown silt loam in the lower 14 inches. The substratum, is mottled to a depth of 60 inches. It is fine sandy loam in the upper 18 inches and stratified sand, silt, and gravel in the lower part.

Included with this soil in mapping are small areas of Pope silt loam and Atkins silt loam. Also included are areas of Philo soils that are not subject to flooding and areas that have thin deposits of coal sediment on the surface. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate and moderately slow, and available water capacity is high. Runoff is slow and very slow. Rooting depth is restricted by a seasonal high water table which is within a depth of 18 to 36 inches during wet periods. This soil is subject to flooding. Unless limed, these soils are very strongly acid to medium acid. The hazard of erosion is slight.

This Philo soil is used mainly for cultivated crops, pasture, and trees, and it has very good potential for these uses. It has poor potential for most nonfarm uses.

Although this soil is subject to flooding and has a seasonal high water table, it is well suited to cultivated crops. Use of cover crops, crop residue, and grasses and legumes in the cropping system help maintain the content of organic matter and good tilth. Surface and subsurface drains help remove excess water and permit timely tillage. Crops can be damaged by flooding.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is well suited to trees, and some areas are used for woodland. Productivity is very high. Removal of undesirable trees helps increase production. Because of the seasonal high water table, the use of equipment is restricted during wet periods. Machine planting is practical on large areas.

This Philo soil has many limitations for most nonfarm uses. Flooding and the seasonal high water table are serious limitations for onsite waste disposal. Flooding is a serious hazard for buildings.

This soil is is capability subclass IIw and woodland group 1w.

Po—Pope silt loam. This nearly level, deep, well drained soil is on flood plains. Slopes are slightly convex and about 150 to 400 feet long. Slopes range from 0 to 3 percent. Areas are narrow and are about 8 to 20 acres.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is about 30 inches thick. It is brown silt loam in the upper 12 inches and strong brown fine sandy loam in the lower 18 inches. The substratum is strong brown gravelly sandy loam to a depth of 62 inches.

Included with this soil in mapping are small areas of Philo silt loam. Also included are small areas of Pope soil that are not subject to flooding. The included soils make up as much as 15 percent of the map unit.

Permeability is moderate and moderately rapid, and available water capacity is moderate. Runoff is slow. There is occasional flooding. Unless limed, this soil is strongly acid to extremely acid. The hazard of erosion is slight.

This Pope soil is used mainly for cultivated crops. It has very good potential for cultivated crops, pasture, and trees and poor potential for many nonfarm uses.

Although this soil is subject to flooding, it is well suited to cultivated crops. Use of cover crops, crop residue, and hay in the cropping system help maintain content of organic matter and good tilth.

This soil is well suited to pasture. Proper stocking rates to maintain key plant species and rotation of pasture are chief management needs. Applications of plant nutrients to maintain fertility are needed for optimum production.

The soil is well suited to trees, and productivity is high. Management problems are few. Machine planting is practical on large areas.

This Pope soil has limitations for most nonfarm uses. Flooding is a serious limitation for onsite waste disposal and for buildings.

This soil is in capability class I and woodland group 2o.

ShA—Shelmadine silt loam, 0 to 3 percent slopes. This nearly level, deep, poorly drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 500 feet long. Areas are fan-shaped or rectangular and are mainly 4 to 16 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 38 inches thick. It is mottled, light brownish gray silty clay loam in the upper 11 inches; mottled, light brownish gray channery clay loam in the next 13 inches; and mottled, light brownish gray channery loam in the lower 14 inches. The substratum is mottled, brown channery loam to a depth of 60 inches.

Included with this soil in mapping are small areas of Buchanan gravelly loam, Kedron silt loam, and Andover gravelly loam. Also included are small areas of soils that are similar to the Shelmadine soil that are very poorly drained (fig. 12). The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is slow. The lower part of the subsoil has a very firm and brittle fragipan. A high water table is within a depth of 0 to 6 inches for long periods during wet seasons. The rooting depth is restricted by the high water table and the fragipan. Unless limed, this soil is extremely acid and very strongly acid. The hazard of erosion is slight.

This Shelmadine soil is used mainly for pasture. A few small areas are used for woodland. This soil has fair potential for cultivated crops and pasture, good potential for water-tolerant trees, and poor potential for most nonfarm uses.

This soil is fairly suited to cultivated crops. It warms slowly in spring because of the high water table. Crops can be damaged by ponding. Keeping natural drainageways open helps drain excess surface water. Surface and subsurface drains help improve drainage.

This soil is fairly suited to pasture. Overgrazing and grazing of pasture when this soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs. Subsurface and surface drains help to improve drainage.

This soil is suited to water-tolerant trees and some areas are wooded. Although the rooting depth is restricted by the high water table, productivity is moderately high. Use of equipment is restricted for most of the year because of the high water table. Machine planting is practical on large areas.

This Shelmadine soil has limitations for most nonfarm uses. The high water table and slow permeability are serious limitations for onsite waste disposal.

This soil is in capability subclass IVw and woodland group 3w.

ShB—Shelmadine silt loam, 3 to 8 percent slopes. This gently sloping, deep, poorly drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 500 feet long. Areas are fan-shaped or rectangular and are mainly 8 to 20 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 38 inches thick. It is mottled, light brownish gray silty clay loam in the upper 11 inches; mottled, light brownish gray

Figure 12.—This included soil in Shelmadine silt loam is very poorly drained. It has poor potential for most uses.

channery clay loam in the next 13 inches; and mottled, light brownish gray channery loam in the lower 14 inches. The substratum is mottled, brown channery loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Buchanan gravelly loam, Kedron silt loam, and Andover gravelly loam. Also included are small areas of soils that are similar to this Shelmadine soil that are very poorly drained. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is slow. The lower part of the subsoil has a very firm and brittle fragipan. A high water table is within a depth of 0 to 6 inches for long periods during wet seasons. The rooting depth is restricted by the high water table and the fragipan. Unless limed, this soil is extremely acid and very strongly acid. The hazard of erosion is moderate.

This Shelmadine soil is used mainly for pasture. A few small areas are used for woodland. This soil has fair potential for cultivated crops and pasture, good potential for water-tolerant trees, and poor potential for most nonfarm uses.

This soil is fairly suited to cultivated crops. It warms slowly in spring because of the high water table. Crops can be damaged by ponding. Keeping natural drainageways open helps to drain excess surface water. Surface and subsurface drains help improve drainage.

This soil is fairly suited to pasture. Overgrazing and grazing of pasture when this soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs. Surface and subsurface drains help improve drainage.

This soil is suited to water-tolerant trees, and some areas of the soil are wooded. Although the rooting depth is restricted by a high water table, productivity is moderately high. Use of equipment is restricted for most of the year because of the high water table. Machine planting is practical on large areas.

This Shelmadine soil has limitations for most nonfarm uses. A high water table and slow permeability are serious limitations for onsite waste disposal.

This soil is in capability subclass IVw and woodland group 3w.

SmB—Shelmadine very stony silt loam, 0 to 8 percent slopes. This nearly level and gently sloping, deep, very stony, poorly drained soil is on toe slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 500 feet long. Areas are fan-shaped or rectangular and are mainly 10 to 25 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. Large stones and boulders cover 3 to 15 percent of the surface. The subsoil is about 38 inches thick. It is mottled, light brownish gray silty clay loam in the upper 11 inches; mottled, light brownish gray channery clay loam in the next 13 inches; and mottled, light brownish gray channery loam in the lower 14 inches. The substratum is mottled, brown channery loam to a depth of 60 inches or more.

Included with this soil is mapping are small areas of Shelmadine silt loam, Buchanan extremely stony loam, Kedron very stony silt loam, and Andover extremely stony loam. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is slow. The lower part of the subsoil has a very firm and brittle fragipan. A high water table is within a depth of 0 to 6 inches for long periods during wet seasons. The rooting depth is restricted by the high water table and the fragipan. Unless limed, this soil is extremely acid and very strongly acid. Numerous large stones and boulders are on the surface.

This Shelmadine soil is used mainly for woodland. It has poor potential for cultivated crops and pasture, good potential for water-tolerant trees, and poor potential for most nonfarm uses.

Because of the high water table and many large stones on the surface, this soil is not suited to crops and pasture. It is not feasible to remove the stones.

This soil is suited to trees, and most areas are wooded. Productivity for water-tolerant trees is moderately high. Removal of undesirable trees helps increase production. The high water table interferes with use of equipment and with machine planting.

This Shelmadine soil has limitations for most nonfarm uses because of the high water table, slow permeability, and numerous large stones on the surface. The high water table and slow permeability are serious limitations for onsite waste disposal. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass VIIs and woodland group 3w.

UD—Udifluvents, coal overwash. These nearly level, deep, well drained soils are on flood plains. Slopes are smooth and range from 0 to 3 percent. Areas are long and narrow and are mainly 8 to 30 acres.

Figure 13.—Typical area of Udifluvents, coal overwash, showing fine coal deposits along streambank. This land type is unsuitable for most uses.

Udifluvents, coal overwash, consist mainly of sediment of silt-size coal that was deposited along the banks of streams and rivers (fig. 13).

Included with these soils in mapping are a few small areas of Philo silt loam, Basher silt loam, and Atkins silt loam. Also included are soils that are similar to Udifluvents, coal overwash, that have up to 20 inches of overlying coal deposits. The included soils make up as much as 15 percent of the map unit.

Permeability is rapid, and available water capacity is very low. Runoff is slow, and flooding is frequent. These soils have low fertility. Unless limed, they are strongly acid to extremely acid. The hazard of erosion is slight.

Most areas of these Udifluvents soils are idle. Some areas are used as woodland. These soils have poor potential for cultivated crops, pasture, and trees and for most nonfarm uses.

These soils are poorly suited to cultivated crops, pasture, and trees. They have low available water capacity and low fertility and are acid. Cultivated crops, pasture grasses, and trees grow very poorly on these soils.

Udifluvents, coal overwash, have limitations for most urban uses because of flooding. Flooding is a serious limitation for onsite waste disposal.

These soil are not assigned to a capability class or woodland group.

UF—Udifluvents, gravelly. These nearly level and gently sloping, deep, well drained and moderately well drained soils are on flood plains and in colluvial fans. Slopes are smooth and range from 0 to 8 percent. Areas are long and narrow and are mainly 8 to 20 acres.

Udifluvents, gravelly, soils consist mainly of sediment of gravel, sand, and silt. The surface layer is about 2 to 7 inches thick. Bedrock is at a depth of 60 inches or more. Coarse fragments range from 0 to 85 percent.

Included with these soils in mapping are areas of Udifluvents, gravelly, soils that have numerous large and small stones on the surface. The included areas make up as much as 15 percent of the map unit.

Permeability is rapid, and available water capacity is very low. Runoff is slow. A seasonal high water table is within a depth of 18 to 36 inches during wet periods. Unless limed, these soils are extremely acid to strongly acid.

These Udifluvents soils are used mainly for woodland. They have poor potential for cultivated crops and pasture, good potential for trees, and poor potential for most nonfarm uses.

These soils are poorly suited to cultivated crops and pasture because they are gravelly and rapidly permeable, and have low fertility. In addition, there is a hazard of flooding.

These soils are suited to trees and are used mainly for woodland. Productivity is moderate to very high. Removal of undesirable trees helps increase production. Machine planting is limited because of the gravelly surface layer. Flooding restricts the use of equipment briefly during wet periods.

Udifluvents, gravelly, soils have limitations for most nonfarm uses because of rapid permeability, a high content of gravel, flooding, and a seasonal high water table.

These soils are not assigned to a capability class or woodland group.

UM—Udorthents, strip mine. These gently sloping to very steep, deep, well drained soils are on mountains and in valleys. Slopes vary in shape and length. Areas are rectangular and are 100 to several hundred acres.

Udorthents, strip mine, soils consist mainly of materials derived from residual and colluvial soils and underlying quartzite, conglomerate, slate, and shale. Bedrock is below a depth of 60 inches. Coarse fragments range from 25 to 90 percent.

Included with these soils in mapping are a few small areas of Dumps, mine, and Dumps, coal waste. Also included are areas of undisturbed soils. These soils are so intricately mixed that it was not practical to separate them from Udorthents, strip mine soils. The included soils make up as much as 20 percent of the map unit.

Figure 14.—Typical area of Udorthents, strip mine. The gray birch and quaking aspen are of natural regeneration.

Figure 15.—Typical area of Udorthents, strip mine, that is being restored. Serecia lespedeza and rush lespedeza were planted during attempts at revegetation.

Permeability is slow to rapid, and available water capacity is very low to moderate. Runoff is moderate to very rapid. Unless limed, these soils are strongly acid to extremely acid. The hazard of erosion is severe to very severe.

Most areas of these Udifluvents soils are idle (fig. 14). Some of the restored backfilled areas (fig. 15) are used for recreation, industrial sites, and homesites. These soil have poor potential for crops, pasture, and trees because of slope, stones on the surface, and very low available water capacity. They have variable potential for nonfarm uses, and onsite investigation is needed to determine suitability.

These soils are not assigned to a capability subclass or woodland group.

UU—Urban land-Udults complex. This complex consists of Urban land and Udults soils on foot slopes and the tops and sides of hills and mountains. Urban land consists of buildings, streets, parking lots, and other structures. Udults are gently sloping to moderately steep, deep, well drained to somewhat poorly drained soils that have been modified by building activities. Urban land and Udults soils are so intricately mixed that it was not practical to separate them in mapping. Composition of this complex is more variable than most other map units in the survey area, but mapping was controlled well enough for the expected uses of the unit. Urban land makes up about 50 percent of this map unit; Udults, 35 percent; and other soils, 15 percent. Slopes are 3 to 25 percent. Areas are mainly 20 to 500 acres.

The Udults soils in this complex vary in soil features and characteristics. Bedrock is at a depth of 42 to 60 inches or more. Coarse fragments range from 5 to 50 percent.

Included with this complex in mapping are areas of Weikert, Klinesville, Calvin, Berks, and Hazleton soils on uplands and areas of Linden, Basher, Pope, Philo, and Atkins soils on flood plains. They make up as much as 15 percent of the complex. Individual areas are about 10 acres.

Permeability is slow to rapid. Runoff is rapid on Urban land and moderate to rapid on the Udults soils. Unless limed, the Udults soils are extremely acid to medium acid. The hazard of erosion is variable.

The soils in this complex are used for parking lots, homesites, industrial sites, shopping centers, lawns, playgrounds, parks, and cemeteries. They have poor potential for cultivated crops, pasture, and trees and variable potential for nonfarm uses.

These soils are poorly suited to cultivated crops, pasture, and trees. Large areas are covered by buildings, asphalt, and concrete. Proper water management and conservation practices are needed in urban areas to help control erosion and prevent the accumulation of sediment.

This Urban land-Udults complex has variable limitations for most nonfarm uses because of a wide range in soil properties and characteristics. Onsite investigation is needed to determine uses and limitations.

This complex is not assigned to a capability subclass or woodland group.

WaB—Watson silt loam, 3 to 8 percent slopes. This gently sloping, deep, moderately well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 200 to 800 feet long. Areas are fan-shaped or rectangular and are mainly 4 to 20 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is about 52 inches thick. It is strong brown gravelly silt loam in the upper 9 inches; reddish yellow gravelly silty clay loam in the next 11 inches; and light brown, mottled, and very firm, firm, and brittle gravelly clay loam in the lower 32 inches.

Included with this soil in mapping are small areas of Allenwood gravelly silt loam, Alvira silt loam, and Urban land. Also included are areas of Watson silt loam that are nearly level. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is medium. The lower part of the subsoil has a firm, very firm, and brittle fragipan which restricts the rooting depth. A seasonal high water table is within a depth of 18 to 36 inches during wet periods. Unless limed, the soil is very strongly acid and strongly acid. The hazard of erosion is moderate.

This Watson soil is used mainly for cultivated crops. Some areas are used for woodland. This soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, no tillage, contour stripcropping, and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. Surface and subsurface drains help remove excess water and permit timely tillage.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees, and some areas of this soil are used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Because of a seasonal high water table, the use of equipment can be restricted for short periods during wet seasons. Machine planting is practical on large areas.

This Watson soil has limitations for most nonfarm uses. Slow permeability and a seasonal high water table are limitations for onsite waste disposal. The seasonal high water table is a hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass IIw and woodland group 3o.

WaC—Watson silt loam, 8 to 15 percent slopes. This sloping, deep, moderately well drained soil is on foot slopes, along drainageways, and in depressional areas. Slopes are concave and about 300 to 700 feet long. Areas are fan-shaped or rectangular and are mainly 8 to 25 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is about 52 inches thick. It is strong brown gravelly silt loam in the upper 9 inches; reddish yellow gravelly silty clay loam in the next 11 inches; and mottled, light brown, firm and brittle gravelly clay loam in the lower 32 inches.

Included with this soil in mapping are small areas of Allenwood gravelly silt loam, Alvira silt loam, and Urban land. The included soils make up as much as 15 percent of the map unit.

Permeability is slow, and available water capacity is moderate. Runoff is rapid. The lower part of the subsoil has a firm, very firm, and brittle fragipan which restricts rooting depth. A seasonal high water table is within a depth of 18 to 36 inches during wet periods. Unless limed, this soil is very strongly acid and strongly acid. The hazard of erosion is severe.

This Watson soil is used mainly for cultivated crops. Some areas are used for woodland. Other areas are in nonfarm use. This soil has good potential for cultivated crops, pasture, and trees. It has limited potential for most nonfarm uses.

This soil is suited to cultivated crops. Minimum tillage, no tillage, contour stripcropping, and the use of cover crops and grasses and legumes in the cropping system reduce runoff and help control erosion. Surface and subsurface drains help to remove excess water and permit timely tillage.

This soil is suited to pasture. Overgrazing and grazing of pasture when the soil is wet are main concerns of management. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Proper stocking rates to maintain key plant species, rotation of pasture, deferment of grazing, and restricted grazing during wet periods are chief management needs.

This soil is suited to trees, and some areas are used for woodland. Productivity is moderately high. Removal of undesirable trees helps increase production. Because of a seasonal high water table, the use of equipment can be restricted for short periods during wet seasons. Machine planting is practical on large areas.

This Watson soil has limitations for most nonfarm

uses. Slow permeability and a seasonal high water are limitations for onsite waste disposal. The seasonal high water table is a hazard for buildings with basements. Buildings with basements constructed on this soil need foundation drains with proper outlets to remove water from the basement area.

This soil is in capability subclass IIIw and woodland group 3o.

WKF—Weikert and Klinesville shaly silt loams, steep. These steep and very steep, shallow, well drained soils are on hillsides. They are mapped together because they are dominantly influenced by steep slopes and their expected use and management are similar. Composition of this map unit is more variable than most map units in the survey area, but mapping was controlled well enough for the expected uses of these soils. Individual areas of the map unit may contain all Weikert soils, all Klinesville soils, or a combination of the two. Weikert soils make up about 45 percent of the acreage of this map unit; Klinesville soils, 40 percent; and other soils, 15 percent. Slopes are mainly 25 to 75 percent and about 100 to 500 feet long. Areas are long and rectangular and are mainly 10 to 50 acres.

Typically, the surface layer of the Weikert soils is dark brown shaly silt loam about 5 inches thick. The subsoil is yellowish brown shaly silt loam about 8 inches thick. The substratum is yellowish brown very shaly silt loam about 5 inches thick. Fractured, olive gray shale bedrock is at a depth of 18 inches.

Typically, the surface layer of the Klinesville soils is dusky red shaly silt loam about 6 inches thick. The subsoil is reddish brown very shaly silt loam about 8 inches thick. The substratum is weak red very shaly silt loam about 5 inches thick. Fractured, weak red shale bedrock is at a depth of 19 inches.

Included with these soil in mapping are a few small stony areas of Weikert and Klinesville soils and rock outcrop. Also included are some areas of Berks shaly silt loam and Calvin shaly silt loam. The included areas make up 15 percent of the map unit. Individual areas are about 10 acres.

Permeability is moderately rapid in these soils, and available water capacity is very low. Runoff is very rapid. Rooting depth is restricted by the shallow depth to bedrock. Unless limed, these soils are very strongly acid to medium acid. The hazard of erosion is very severe.

These Weikert and Klinesville soils are used mainly for woodland and wildlife habitat. They have poor potential for cultivated crops and pasture, fair potential for trees, and poor potential for most nonfarm uses.

These soils are poorly suited to cultivated crops and pasture because of steep and very steep slopes and shallow depth to bedrock. Erosion results in loss of soil and soil nutrients and a decrease in available water capacity.

These soils are moderately suited to trees. The steep and very steep slopes and shallow depth to bedrock are limitations for use as woodland. Removal of undesirable trees helps improve production. Construction of logging roads on the contour helps reduce erosion.

These Weikert and Klinesville soils have limitations for most nonfarm uses because of the steep and very steep slopes and shallow depth to bedrock.

These soils are in capability subclass VIIe and woodland group 4d.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, for woodland, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

John C. Spitzer, conservation agronomist, Soil Conservation Service, assisted in preparing this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops and pasture plants best suited to the soil, including some plants not commonly grown in the survey area, are listed; the system of land capability classification (*13*) used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are shown for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section 'Soil maps for detailed planning. Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Farming is a major land use in Schuylkill County. According to the Conservation Needs Inventory, 80,672 acres were used for crops and pasture in 1975. Of this total acreage, 4,301 acres were used for permanent pasture. According to the 1975 Pennsylvania Crop and Livestock Annual Summary, 14,900 acres were used for corn; 16,500 acres, for small grain; 16,500 acres, for alfalfa and other hay; approximately 1,130 acres, for orchards; and 3,463 acres for vegetables. The remaining acreage was used for cropland, pasture, or conservation, or was idle cropland.

Many of the soils in Schuylkill County are too stony to be used for cropland. However, the soils that have few or no stones on the surface have good potential for cultivated crops. About 61, 838 acres of potentially good cropland is currently used as woodland, and about 8,500 acres is used for pasture and hay or is temporarily idle cropland. The potential of these soils for the production of food can be increased considerably by using the latest crop production technology. This soil survey can provide information for the application of such technology.

Erosion is the major management concern on most of the soils used for cultivated crops and pasture. Allenwood, Hazleton, Leck Kill, and Meckesville soils are among the most productive soils in the county, but they are highly susceptible to erosion. Good conservation practices are needed to reduce the hazard of erosion on these soils and to increase production.

Erosion results in reduced production. Soils that are shallow or moderately deep to bedrock, soils that have a fragipan, and soils that have low available water capacity are especially affected by loss of topsoil. Berks, Calvin, Dekalb, Lehew, Weikert, and Klinesville soils are shallow and moderately deep and have low available water capacity. Buchanan, Meckesville, Watson, and Kedron soils have a fragipan. In addition, soil erosion can result in the deposition of sediment in streams and reservoirs and in the pollution of streams. If this occurs, the quality of water for all uses can be impaired. Preparing a good seedbed and tilling are difficult on channery and shaly soils if the fields are sloping. On such soils, the surface has eroded, and a large number of coarse fragments are left. Areas of such soils are common on Hartleton channery silt loam and Berks shaly silt loam.

Good conservation and erosion control practices provide a protective cover, reduce surface water runoff and sedimentation, and increase infiltration. Cropping systems that maintain plant cover add to the productivity of the soils. On pasture and hayland, deferred grazing and proper grazing and the use of grasses and legumes help to reduce erosion, provide nitrogen, and improve tilth. Contour farming and terraces, minimum tillage, and the use of cover crops and crop residue also help to increase infiltration and reduce the hazard of erosion. Except for those areas that have steep and irregular slopes which are not suitable for terraces, these conservation practices are adapted to most soils in the survey area.

Terraces and diversions reduce the surface water runoff and erosion by decreasing the length of slope. Such constructions are most practical on deep, well drained soils that have moderate but uniform slopes. Allenwood, Hartleton, Hazleton, Leck Kill, Laidig, and Meckesville soils are suitable for terraces and diversions. Other soils are less suitable because of steep or irregular slopes, excessive wetness, a clayey subsoil, or shallow depth to bedrock.

Contour farming and stripcropping are common erosion control practices in Schuylkill County. These practices are suited to soils that have uniform slopes, for example, Berks, Meckesville, Laidig, Hazleton, and Hartleton soils. Information and assistance for the design or installation of erosion control practices are available from the Schuylkill Conservation District and Schuylkill County Field Office of the Soil Conservation Service.

Soil drainage is a major management concern on many of the soils in the survey area. Some soils, for example, the poorly drained Shelmadine, Andover, and Atkins soils, are so wet that the production of crops is not practical or economically feasible without artificial drainage. These soils make up about 16,860 acres of the county. Somewhat poorly drained soils, such as the Alvira soils, are so wet that crops are damaged during most years unless artificial drainage is practiced. The Alvira soils make up approximately 2,520 acres of the county. A few small areas of wet soils are along drainageways and in swales. They are generally inclusions within the moderately well drained Watson, Kedron, and Buchanan soils. Although drainage could improve the management and productivity of most of these areas, it may not be economically feasible.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and subsurface drainage is needed for poorly drained soils that are intensively cropped, for ex-

ample, the Shelmadine, Atkins, and Andover soils. Drains should be closely spaced in these slowly permeable soils. However, adequate outlets for subsurface drainage systems are often difficult to find.

Fertility is naturally low in many of the soils in Schuylkill County. Many upland soils that are naturally strongly acid require applications of ground limestone to supply calcium and to raise the pH level sufficiently for good growth of alfalfa and other crops. Available phosphorous and magnesium levels are naturally low in most soils. The addition of soil amendments should be based on soil tests, requirements of the crop, and expected or desired yields. The Cooperative Extension Service can help in determining the kind and amount of fertilizers and lime to apply.

Soil tilth is an important factor in seed germination, plant growth, and infiltration of water. Soils that have good tilth are granular and porous. Pope, Allenwood, Hartleton, and Hazleton soils are examples.

Many soils used for crops in the survey area have relatively low content of organic matter. Such soils generally have weak structure, and intense rainfall causes the formation of a hard surface crust which is nearly impervious to water when it becomes dry. This crust commonly reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material help to improve soil structure and reduce crust formation. Fall plowing is generally inadvisable on light colored soils that have a silt loam surface layer because a crust commonly forms during winter and spring. If these soils are plowed in the fall, many of them are nearly as dense and hard at planting time as they were before they were plowed. In addition, sloping soils are subject to damaging erosion if they are plowed in the fall.

Corn is the main row crop, and grain sorghum and potatoes are also grown in Schuylkill County. Wheat, oats, and barley are common close growing crops. Deep, well drained soils have the best potential for crops, but many other soils produce good yields if adequate management is practiced. Apples, peaches, vegetables, and nursery plants are specialty crops. Deep soils that have good natural drainage and become warm early in spring are well suited to specialty crops. Good air drainage is needed to reduce frost damage to apples and peaches. Pope, Hartleton, Leck Kill, and Hazleton soils are best suited to tree fruits. Latest information and suggestions for growing specialty crops can be obtained from the Cooperative Extension Service and the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designat-

ed by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 6. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops and pasture may be in low-intensity use, for example, soils in capability classes I and II. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil mapping unit in the section "Soil maps for detailed planning."

Woodland management and productivity

Paxton G. Wolfe, woodland conservationist, Soil Conservation Service, assisted in preparing this section.

Schuylkill County has approximately 345,000 acres of woodland (*14*) or about 69 percent of the land area. Ownership of commercial woodland is 12 percent by farmers, 71 percent by private concerns, 1 percent by forest industries, and 16 percent by the State. Less than one percent of the woodland is classified as noncommercial.

The woodland is made up of stands of second and third growth trees. Principal forest cover types (*11*) and the extent of each, (*14*) according to the U. S. Forest Service, are given in the following paragraphs.

Oak-hickory makes up 50 percent of the woodland (*10*). It consists mainly of white oak, red oak, and hickory; however, in some places black oak and chestnut oak are predominant. Principal associates are yellow-poplar, black gum, white ash, red maple, sugar maple, and beech.

Aspen-birch makes up 20 percent of the woodland. Quaking aspen, bigtooth aspen, and gray birch are predominant. Principal associates are pin cherry, red maple, yellow birch, white pine, ash, and sugar maple.

White pine makes up 11 percent of the woodland. White pine grows in pure stands or is predominant. Principal associates are Virginia pine, pitch pine, ash, sugar maple, red maple, hemlock, red oak, white oak, quaking big tooth aspen, paper birch, yellow birch, and black birch.

Elm-ash-red maple makes up 9 percent of the woodland. White ash, American elm, and red maple are predominant. Associates are slippery elm, yellow birch, sycamore, and hemlock.

Maple-beech-birch makes up 4 percent of the woodland in Schuylkill County. Sugar maple, beech, and yellow birch are component species in this cover type. Associated species are varying mixtures of basswood, red maple, hemlock, red oak, white ash, white pine, black birch, black cherry, yellow-poplar, and cucumber tree.

Virginia pine-pitch pine makes up 4 percent of the woodland. Virginia pine and pitch pine predominate. Principal associates are red oak, black oak, scarlet oak, chestnut oak, and hickory.

Chestnut oak is on 2 percent of the woodland. Chestnut oak grows in pure stands or is predominant. Common associates are red oak, white oak, black oak, scarlet oak, pitch pine, black gum, and red maple.

In Schuylkill County, 72 percent of the woodland is in soils that have very high, high, and moderately high potential productivity; 23 percent is in soils that have moderate productivity, and 5 percent or less is in soils that have low productivity. Generally, the soils are capable of supporting good stands of red oak, sugar maple, yellow-poplar, ash, and white pine. Trees grow more slowly on poorly drained soils that are shallow to bedrock than on deeper, well drained soils.

Sawtimber makes up approximately 22 percent of the acreage in commercial forests; poletimber, 32 percent; seedlings and saplings, 42 percent; and the remaining 4 percent are classified as nonstocked, or forest land that is less than 10 percent stocked with desirable trees.

Table 7 contains information useful to woodland owners or forest managers planning use of soils for

wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, d, f, and r.

In table 7 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate*, that some trees are blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. The site index is listed for trees that woodland managers generally favor to grow for wood crop production. They are the most important tree species in regard to rate, quality, value, and marketability. Other tree species that commonly occur on the soil are also listed, regardless of potential value and growth potential.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

A woodland owner can encourage the growth of desirable kinds of trees by using good woodland management on areas where the soils are rated very high, high, and moderately high for potential productivity. The local service forester or a private consulting forester can assist in planning a woodland improvement program. The soils rated low for potential productivity generally will not economically justify any kind of management program to increase yields of wood crops. Soils that are rated moderate are the most difficult to appraise for management of wood crops. A thorough inventory of the growing stock and the quality of this stock on the site is needed. The market potential for these species and whether or not the soils rated moderate are mixed with larger areas of more productive soils needs to be investigated to determine if woodland management is economically feasible.

The woodland in Schuylkill County protects watersheds, affords recreation, and has esthetic value as well as providing a source of income for woodland owners.

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope sta-

bility, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 8 shows, for each kind of soil, the degree and kind of limitations for building site development; table 9, for sanitary facilities; and table 11, for water management. Table 10 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 8. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 8 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 8 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the

soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Lawns and landscaping require soils that are suitable for the establishment and maintenance of turf for lawns and ornamental trees and shrubs for landscaping. The best soils are firm after rains, are not dusty when dry, and absorb water readily and hold sufficient moisture for plant growth. The surface layer should be free of stones. If shaping is required, the soils should be thick enough over bedrock or hardpan to allow for necessary grading. In rating the soils, the availability of water for sprinkling is assumed.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 9 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 9 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey

soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 10 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 14 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 10 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 14.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 11 the soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 11 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 12 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 9, and interpretations for dwellings without basements and for local roads and streets, given in table 8.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They should have a surface that is free of stones and boulders and

have moderate slopes. Suitability of the soil for traps, tees, or greens was not considered in rating the soils. Irrigation is an assumed management practice.

Wildlife habitat

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 13, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and ragweed.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, and rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed

crops, grasses and legumes, and wild herbaceous plants.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features.

Engineering properties

Table 14 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 14 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 14 in the standard terms used by the U.S. Department of Agriculture (*12*). These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 14. Also in table 14 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil

classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 15 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 16 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding,

nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*15*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 17, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons;

soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Fluvaquents (*Fluv*, meaning water deposited, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example. is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, acid, mesic, Typic Fluvaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*12*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Allenwood series

Soils of the Allenwood series are fine-loamy, mixed, mesic Typic Hapludults. These soils are deep and well drained and have moderate to slow permeability. They formed in residual soil material and are on the tops and sides of hills. Slopes range from 3 to 15 percent.

The Allenwood soils are near the deep, well drained Hartleton soils; the moderately deep, well drained Berks soils; the deep, moderately well drained Watson soils; and the deep, somewhat poorly drained Alvira soils. Allenwood soils contain less coarse fragments throughout their profile than the skeletal Hartleton soils.

Typical pedon of Allenwood gravelly silt loam, 8 to 15 percent slopes, in cropland, West Brunswick Township, 2-1/4 miles east of Orwigsburg, 1 mile southwest of Frisbie, and 1 mile north of Route PA 61:

Ap—0 to 9 inches; dark brown (10YR 3/3) gravelly silt loam; weak fine granular structure; friable, nonsticky, slightly plastic; many small and medium roots; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

B21t—9 to 16 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin continuous clay films; few small roots; 10 percent coarse fragments; medium acid; clear smooth boundary.

B22t—16 to 38 inches; red (2.5YR 5/8) gravelly silty clay loam; moderate medium and coarse angular blocky structure; firm, sticky, plastic; thick continuous clay films; few small roots; 15 percent coarse fragments; medium acid; gradual smooth boundary.

B23t—38 to 52 inches; red (2.5YR 5/8) gravelly silty clay loam; moderate medium and coarse angular blocky structure; firm, sticky, plastic; thin continuous clay films on small peds, thick continuous clay films on large peds; few small roots; 15 percent coarse fragments; strongly acid; gradual wavy boundary.

B3—52 to 64 inches; yellowish red (5YR 5/6) gravelly clay loam; weak fine and medium angular blocky structure; firm, slightly sticky, plastic; 20 percent coarse fragments; strongly acid.

The solum ranges from 40 to 75 inches in thickness. Depth to bedrock is 60 inches or more. Coarse fragments range from 15 to 25 percent in the A horizon, from 5 to 40 percent in the B horizon, and from 10 to 50 percent in the C horizon. Reaction is strongly acid through extremely acid.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3.

The B horizon has hue of 2.5YR and 5YR, value of 4 through 6, and chroma of 6 through 8. The fine earth texture is mainly silty clay loam but ranges to clay loam, heavy silt loam, heavy loam, and thin subhorizons of silty clay and clay.

The C horizon has hue of 2.5YR and 5YR, value of 4 and 5, and chroma of 6 through 8. The fine earth texture is silty clay loam or clay loam.

Alvira series

Soils of the Alvira series are fine-loamy, mixed, mesic Aeric Fragiaquults. They are deep and somewhat poorly drained and have slow permeability. These soils formed in colluvial soil material and are on toe slopes, along drainageways, and in depressional areas. Slopes range from 0 to 8 percent slopes.

Alvira soils are near the deep, well drained Hartleton and Allenwood soils; the moderately deep, well drained Berks soils; the deep, moderately well drained Watson soils; and the deep, poorly drained Shelmadine soils.

Typical pedon of Alvira silt loam, 0 to 3 percent slopes, in cropland, Wayne Township, 2/3 mile north of Friedensburg, and about 300 yards from the east side of Route T588:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many small roots; 10 percent coarse fragments; medium acid; abrupt smooth boundary.

B2t—9 to 20 inches; yellowish brown (10YR 5/6) silt loam; faces of peds are gray (10YR 5/1); common medium faint dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; thick continuous clay films on peds; 10 percent coarse fragments; medium acid; clear smooth boundary.

Bx1—20 to 29 inches; yellowish brown (10YR 5/6) clay loam; faces of prisms are light gray (10YR 6/1); common medium distinct reddish brown (5YR 4/4) and common fine distinct light brownish gray (10YR 6/2) mottles; strong very coarse prismatic structure parting to strong coarse angular blocky; very firm and brittle, sticky, plastic; thick continuous clay films on prisms and peds; common medium distinct black (10YR 2/1) oxide concretions; 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bx2—29 to 60 inches; yellowish brown (10YR 5/4) shaly clay loam; faces of prisms are light gray (10YR 6/1); common medium distinct gray (10YR 5/1) and common coarse distinct dark yellowish brown (10YR 4/4) mottles; strong very coarse prismatic structure parting to strong coarse angular blocky; very firm and brittle, sticky, plastic; thick continuous clay films on prisms and peds; moderate coarse distinct black (10YR 2/1) oxide concretions; 20 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx3—60 to 70 inches; yellowish brown (10YR 5/4) shaly loam; faces of prisms are light gray (10YR 6/1); common medium distinct gray (10YR 5/1) and dark brown (7.5YR 4/4) mottles; weak very coarse prismatic structure parting to weak thick platy; firm and brittle, slightly sticky, slightly plastic; thin continuous clay films on prisms; 35 percent coarse fragments; strongly acid.

The solum ranges from 40 to 80 inches in thickness. Depth to the fragipan ranges from 16 to 28 inches, and depth to bedrock is 60 inches or more. Coarse fragments range from 5 to 15 percent in the A horizon, from 5 to 30 percent in the Bt horizon, and from 5 to 50 percent in the Bx horizon. Reaction of the solum is strongly acid to extremely acid.

The Ap horizon has hue of 7.5YR and 10YR, value of 3 or 4, and chroma of 2 through 4.

The Bt horizon has hue of 7.5YR and 10YR, value of 5 through 7, and chroma of 1 through 6 and dominant chroma of 2 or less in coatings on faces of peds. The Bx horizon has hue of 10YR and 7.5YR, value of 5, and chroma of 2 through 6. The dominant chroma is 2 or less in coatings on the faces of prisms. The fine earth texture is clay loam, silty clay loam, or loam.

Andover series

Soils of the Andover series are fine-loamy, mixed, mesic Typic Fragiaquults. These soils are deep and poorly drained and have slow permeability. They formed in colluvial soil material and are on toe slopes, along drainageways, and in swales. Slopes range from 0 to 8 percent.

Andover soils are near the deep, well drained Laidig, Hazleton, and Clymer soils; the deep, moderately well drained and somewhat poorly drained Buchanan soils; and the moderately deep, well drained Dekalb soils.

Typical pedon of Andover gravelly loam in an area of Andover extremely stony loam, 0 to 8 percent slopes, in woodland, Tremont Township, 3/4 mile southeast of Tremont, and 300 feet from the south side of Swatara Creek:

O1—3 to 2 inches; leaf litter.

O2—2 inches to 0; black (10YR 2/1) partially decomposed organic matter.

A1—0 to 5 inches; very dark grayish brown (2.5Y 3/2) gravelly loam; weak fine granular structure; friable, nonsticky, nonplastic; many large and medium roots; 30 percent coarse fragments; strongly acid; abrupt smooth boundary.

B2tg—5 to 20 inches; grayish brown (10YR 5/2) gravelly clay loam; common coarse distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few medium roots; thin continuous clay films on peds; 25 percent coarse fragments; strongly acid; clear wavy boundary.

Bx1g—20 to 30 inches; yellowish brown (10YR 5/4) gravelly clay loam; faces of prisms are light brownish gray (10YR 6/2); many coarse distinct brownish yellow (10YR 6/6) and brown (7.5YR 5/4) mottles; weak very coarse prismatic structure parting to weak

medium subangular blocky; very firm and brittle, slightly sticky, slightly plastic; thick continuous clay films on prism faces and thin on peds; 30 percent coarse fragments; strongly acid; clear wavy boundary.

Bx2g—30 to 46 inches; brown (10YR 5/3) gravelly sandy clay loam; faces of prisms are gray (10YR 6/1); many coarse distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to weak medium subangular blocky; very firm and brittle, slightly sticky, slightly plastic; thin continuous clay films on prisms and peds; 30 percent coarse fragments; strongly acid; clear wavy boundary.

C—46 to 62 inches; brown (10YR 5/3) gravelly sandy loam; many coarse distinct gray (10YR 6/1) and brown (10YR 5/4) mottles; massive; firm, nonsticky, slightly plastic; 40 percent coarse fragments; strongly acid.

The solum ranges from 40 to 55 inches in thickness. Depth to bedrock is 60 inches or more. Depth to the fragipan is 16 to 28 inches. Coarse fragments range from 10 to 40 percent in the solum and from 10 to 50 percent in the C horizon. Reaction is strongly acid and very strongly acid.

The A1 horizon has hue of 10YR and 2.5Y, value of 2 and 3, and chroma of 1 and 2. The A2 horizon, if present, has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 2. The Ap horizon has hue of 10YR and 2.5Y, value of 4 and 5, and chroma of 2 and 3.

The B1 and B2t horizons have hue of 10YR and 2.5Y, value of 4 through 6, and chroma of 1 and 2. The fine earth texture is loam, clay loam, or sandy clay loam. The Bx horizon is neutral or has hue of 10YR and 2.5Y, value of 4 through 6, and chroma of 0 through 4. The fine earth texture is loam, clay loam, or sandy clay loam.

The C horizon is neutral or has hue of 5YR through 5Y, value of 4 through 6, and chroma of 0 through 3. The fine earth texture is sandy clay loam, loam, or sandy loam.

Atkins series

Soils of the Atkins series are fine-loamy, mixed, acid, mesic Typic Fluvaquents. These soils are deep and poorly drained, and have moderate to slow permeability. They formed in alluvial soil material and are along streams and rivers. Slopes range from 0 to 3 percent.

Atkins soils are near the deep, moderately well drained Philo soils and the deep, well drained Pope soils.

Typical profile of Atkins silt loam, in woodland, Blythe Township, 200 yards southeast of New Philadelphia, 250 feet south of the Schuylkill River, and 1,000 feet southeast of Route 53098:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; nonsticky, nonplastic; many roots; 5 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B1g—4 to 16 inches; olive gray (5Y 4/2) silt loam; few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, nonsticky, nonplastic; few roots; 5 percent coarse fragments; strongly acid; clear smooth boundary.

B2g—16 to 38 inches; olive gray (5Y 5/2) loam; many medium prominent yellowish red (5YR 5/8) mottles; weak coarse and medium subangular blocky structure; friable, nonsticky, nonplastic; few roots; 10 percent coarse fragments; strongly acid; gradual smooth boundary.

Cg—38 to 62 inches; light olive gray (5Y 6/2) gravelly sandy loam; common coarse prominent yellowish red (5YR 5/8) mottles; massive; friable, nonsticky, nonplastic; 20 percent coarse fragments; strongly acid.

The solum ranges from 30 to 50 inches in thickness. Depth to bedrock is 60 inches or more. Coarse fragments range from 0 to 20 percent in the solum and from 0 to 30 percent or more in the C horizon. Reaction is very strongly acid and strongly acid.

The A horizon has hue of 10YR, value of 4 through 7, and chroma of 1 and 2.

The B horizon is neutral or has hue of 10YR through 5Y, value of 4 through 7, and chroma of 0 through 2. The fine earth texture is silty clay loam, loam, clay loam, or silt loam.

The C horizon is neutral or has hue of 10YR through 5Y, value of 5 and 6, and chroma of 0 through 8. The fine earth texture is silty clay loam, loam, silt loam, or sandy loam. Some pedons have a IIC horizon of sand and gravel.

Basher series

Soils of the Basher series are coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. These soils are deep, moderately well drained and somewhat poorly drained and have moderate permeability. They formed in alluvial soil material and are along streams and rivers. Slopes range from 0 to 3 percent.

Basher soils are near the deep, well drained Linden soils and the deep, poorly drained Atkins soils.

Typical pedon of Basher silt loam, in cropland, South Manheim Township, 1/2 mile east of the intersection of Routes T657 and 53007, along the south side of Route T657, 50 feet south of Red Creek:

Ap—0 to 10 inches; dark reddish brown (5YR 3/3) silt loam; weak fine and medium granular structure; friable, nonsticky, nonplastic; many small and medium roots; 5 percent coarse fragments; very strongly acid; clear smooth boundary.

B21—10 to 21 inches; reddish brown (5YR 4/3) silt loam; weak coarse subangular blocky structure; fri-

able, nonsticky, slightly plastic; few medium roots; 5 percent coarse fragments; strongly acid; clear smooth boundary.

B22—21 to 39 inches; reddish brown (5YR 4/3) fine sandy loam; many coarse distinct light gray (10YR 6/1) mottles; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; few small roots; 5 percent coarse fragments; strongly acid; clear wavy boundary.

C1—39 to 43 inches; reddish brown (5YR 4/3) gravelly fine sandy loam; common coarse distinct gray (5YR 5/1) and reddish yellow (5YR 6/8) mottles; massive; friable; 15 percent coarse fragments; strongly acid; clear wavy boundary.

C2—43 to 60 inches; brown (7.5YR 5/2) gravelly sandy loam; many coarse distinct gray (5YR 5/1) mottles; massive; friable; 25 percent coarse fragments; strongly acid.

The solum ranges from 16 to 40 inches in thickness. Depth to bedrock or strongly contrasting material is more than 40 inches. Coarse fragments range from 0 to 20 percent in the solum and from 0 to 50 percent in the C horizon. Reaction is extremely acid to medium acid in the solum and very strongly acid to slightly acid in the C horizon.

The Ap horizon has hue of 2.5YR through 10YR, value of 3 and 4, and chroma of 2 through 4. The fine earth texture is mainly silt loam but is loam or fine sandy loam in some areas.

The B horizon has hue of 2.5YR through 7.5YR, value of 3 through 5, and chroma of 3 through 6. It has mottles with chroma of 2 or less within a depth of 24 inches. The fine earth texture is loam, silt loam, or fine sandy loam.

The C horizon has hue of 5YR through 2.5Y, value of 3 through 5, and chroma of 1 through 4. The fine earth texture is loam or silt loam to fine sandy loam in the upper part of the horizon and sand in the lower part.

Berks series

Soils of the Berks series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These soils are moderately deep and well drained and have moderate and moderately rapid permeability. They formed in residual soil material and are on the tops and sides of hills. Slopes range from 3 to 25 percent.

Berks soils are near the deep, well drained Hartleton and Allenwood soils and the shallow, well drained Weikert soils.

Typical profile of Berks shaly silt loam, 8 to 15 percent slopes, in a hayfield, West Brunswick Township, 1-1/4 miles south of Orwigsburg, 2,000 feet south of Route PA 61, and 5,000 feet southwest of Zion Church:

Ap—0 to 8 inches; dark brown (10YR 4/3) shaly silt loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine and medium roots; 35 percent coarse fragments; medium acid; abrupt smooth boundary.

B21—8 to 14 inches; strong brown (7.5YR 5/6) shaly silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; 35 percent coarse fragments; strongly acid; clear wavy boundary.

B22—14 to 22 inches; strong brown (7.5YR 5/6) very shaly silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; 50 percent coarse fragments; strongly acid; clear wavy boundary.

B3—22 to 31 inches; yellowish red (5YR 4/6) very shaly silt loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; 70 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—31 to 39 inches; brown (7.5YR 4/4) very shaly loam; massive; friable, nonsticky, nonplastic; 80 percent coarse fragments; very strongly acid.

R—39 inches; grayish brown (10YR 5/2) and weak red (5YR 5/2) shale; rippable.

The solum ranges from 18 to 36 inches in thickness. Depth to bedrock ranges from 20 to 40 inches. Coarse fragments range from 15 to 50 percent in the A horizon, from 15 to 75 percent in the individual B horizons, and from 40 to 80 percent in the C horizon. The weighted average content of coarse fragments in the control section ranges from 35 to 75 percent. Reaction is extremely acid to strongly acid in the solum and extremely acid to medium acid in the C horizon.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 3. The fine earth texture is mainly silt loam, but it is loam in some areas.

The B horizon has hue of 10YR and 7.5YR and ranges through 5YR in the lower part. It has value of 4 through 6 and chroma of 3 through 6. The fine earth texture is silt loam or loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is mainly loam.

Buchanan series

Soils of the Buchanan series are fine-loamy, mixed, mesic Aquic Fragiudults. These soils are deep and moderately well drained and somewhat poorly drained and have slow permeability. They formed in colluvium and are on foot slopes, along drainageways, and in depressional areas. Slopes range from 3 to 25 percent.

Buchanan soils are near the deep, well drained Laidig soils and the deep, poorly drained Andover soils.

Typical pedon of Buchanan gravelly loam in an area of Buchanan extremely stony loam, 3 to 8 percent slopes, in woodland, New Castle Township, 1-1/3 miles northwest of New Castle, 1-1/2 miles northeast of Coal Castle:

O1—3 to 2 inches; leaf litter.
O2—2 inches to 0; black (10YR 2/1) decomposed organic matter.
A1—0 to 3 inches; dark gray (10YR 4/1) gravelly loam; weak fine granular structure; very friable, nonsticky, nonplastic; many roots; 30 percent coarse fragments; very strongly acid; abrupt smooth boundary.
A2—3 to 8 inches; brown (10YR 5/3) gravelly loam; weak fine and medium granular structure; friable, nonsticky, nonplastic; many roots; 30 percent coarse fragments; very strongly acid; abrupt smooth boundary.
B1—8 to 15 inches; yellowish brown (10YR 5/4) gravelly loam; weak fine and medium subangular blocky structure; friable, nonsticky, nonplastic; common roots; 25 percent coarse fragments; very strongly acid; clear smooth boundary.
B21t—15 to 20 inches; yellowish brown (10YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few roots; thin continuous clay films on peds; 20 percent coarse fragments; very strongly acid; clear smooth boundary.
B22t—20 to 29 inches; yellowish brown (10YR 5/6) gravelly clay loam; common coarse distinct grayish brown (10YR 5/2) and reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few roots; thin continuous clay films on peds; 25 percent coarse fragments; very strongly acid; clear wavy boundary.
Bx1—29 to 38 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam; common coarse distinct gray (10YR 6/1) brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to weak thick platy; very firm, brittle, slightly sticky, slightly plastic; thick continuous clay films on prisms and thin continuous clay films on plates; 25 percent coarse fragments; very strongly acid; clear wavy boundary.
Bx2—38 to 54 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam; many coarse distinct gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to weak thick platy; firm, brittle, slightly sticky, slightly plastic; thin continuous clay films on prisms and plates; 40 percent coarse fragments; very strongly acid; gradual wavy boundary.
C—54 to 72 inches; yellowish brown (10YR 5/4) gravelly loam; common coarse distinct gray (10YR 6/1) and yellowish red (5YR 5/6) mottles; massive; friable; 45 percent coarse fragments; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock ranges from 60 to 120 inches or more. Depth to the fragipan ranges from 20 to 36 inches. Coarse fragments range from 5 to 40 percent in the individual horizons above the fragipan and from 10 to 60 percent in the fragipan and the C horizon. Reaction is extremely acid through strongly acid.

The A horizon has hue of 10YR and 7.5YR, value of 3 through 6, and chroma of 1 through 4.

The B horizon above the fragipan has hue of 10YR and 7.5YR, value of 5 and 6, and chroma of 3 through 6. The fine earth texture ranges from silt loam to sandy clay loam. The Bx horizon has hue of 10YR through 5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is silt loam, loam, clay loam, or sandy clay loam.

The C horizon has hue of 10YR and 7.5YR, value of 5 and 6, and chroma of 3 through 6. The fine earth texture ranges from silt loam to sandy clay loam.

Calvin series

Soils of the Calvin series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These soils are moderately deep and well drained and have moderately rapid permeability. They formed in residual soil material and are on the tops and sides of hills. Slopes range from 3 to 25 percent.

Calvin soils are near the deep, well drained Leck Kill soils; the shallow, well drained Weikert soils; the deep, well drained Meckesville soils; and the deep, somewhat poorly drained and moderately well drained Kedron soils.

Typical pedon of Calvin shaly silt loam, 8 to 15 percent slopes, in a hayfield, Hegins Township, 1 mile north of Hegins, along the west side of PA Route 125, 100 feet from road:

Ap—0 to 7 inches; reddish brown (5YR 4/3) shaly silt loam; weak fine granular structure; friable, slightly sticky, nonplastic; many roots; 20 percent coarse fragments; medium acid; abrupt smooth boundary.
B2—7 to 17 inches; weak red (10R 4/3) shaly silt loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; 40 percent coarse fragments; strongly acid; clear smooth boundary.
B3—17 to 27 inches; weak red (10R 4/3) very shaly silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; 55 percent coarse fragments; strongly acid; clear smooth boundary.
C—27 to 39 inches; weak red (10R 4/3) very shaly silt loam; massive; friable, slightly sticky, nonplastic; 70 percent coarse fragments; very strongly acid.
R—39 inches; weak red (10R 4/3) and dusky red (10R 3/3) shale bedrock.

The solum ranges from 20 to 35 inches in thickness. Depth to bedrock ranges from 20 to 40 inches. Coarse fragments range from 5 to 25 percent in the A horizon, from 25 to 55 percent in the B horizon, and from 40 to 80 percent in the C horizon. The weighted average content of coarse fragments is 35 percent or more in the

control section. Reaction is medium acid to very strongly acid.

The Ap horizon has hue of 7.5YR and 5YR, value of 3 and 4, and chroma 3 and 4.

The B horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 3 and 4. The fine earth texture is silt loam, loam, clay loam, or silty clay loam.

The C horizon has hue of 10R, value of 3 and 4, and chroma of 3 and 4. The fine earth texture is loam or silt loam.

Clymer series

Soils of the Clymer series are fine-loamy, mixed, mesic Typic Hapludults. These soils are deep and well drained, and have moderate permeability. They formed in residual soil material and are on the tops and sides of hills and mountains. Slopes range from 3 to 25 percent.

Clymer soils are near the deep, well drained Laidig and Hazleton soils; the moderately deep, well drained Dekalb soils; the deep, moderately well drained and somewhat poorly drained Buchanan soils; and the deep, poorly drained Andover soils. Clymer soils do not have a fragipan and are fine-loamy, Laidig soils have a fragipan, and Hazleton soils are loamy-skeletal.

Typical pedon of Clymer gravelly sandy loam in an area of Hazleton-Clymer association, gently sloping, in shrubs, Foster Township, 1-1/2 miles north of Mount Pleasant, along Old Airport Road and 100 feet north of north side of road:

O1—3 to 2 inches; leaf litter.

O2—2 inches to 0; black (N 2/0) decomposed organic matter; extremely acid; abrupt smooth boundary.

A1—0 to 2 inches; very dark brown (10YR 2/2) gravelly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many roots; 25 percent coarse fragments; extremely acid; abrupt smooth boundary.

A2—2 to 8 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; few roots; 40 percent coarse fragments; extremely acid; abrupt wavy boundary.

B21t—8 to 15 inches; yellowish brown (10YR 5/6) gravelly sandy loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; common thin clay films on faces of peds and lining pores; 25 percent coarse fragments; extremely acid; clear wavy boundary.

B22t—15 to 26 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; common thin clay films on peds; 30 percent coarse fragments; extremely acid; clear wavy boundary.

B23t—26 to 40 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; few thin clay films on peds; 40 percent coarse fragments; extremely acid; gradual wavy boundary.

C—40 to 64 inches; strong brown (7.5YR 5/6) very gravelly sandy loam; massive; very friable, nonsticky, nonplastic; 80 percent coarse fragments; extremely acid.

R—64 inches; gray and brown conglomerate and quartzite bedrock.

The solum ranges from 24 to 40 inches in thickness. Depth to bedrock ranges from 42 to 84 inches. Coarse fragments range from 10 to 50 percent in the solum and from 20 to 80 percent in the C horizon. The weighted average content of coarse fragments is less than 35 percent in the control section. Reaction is extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 2, and chroma of 1 and 2. The A2 horizon has hue of 10YR, value of 5, and chroma of 1 through 4.

The B horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. The fine earth texture is loam, sandy loam, sandy clay loam, or clay loam.

The C horizon has hue of 10YR or 7.5YR and value and chroma of 4 through 6. The fine earth texture is loam or sandy loam.

Dekalb series

Soils of the Dekalb series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These soils are moderately deep and well drained and have rapid permeability. They formed in residual soil material and are on the tops and sides of hills and mountains. Slopes range from 3 to 70 percent.

Dekalb soils are near the deep, well drained Laidig, Hazleton, and Clymer soils; the deep, moderately well drained and somewhat poorly drained Buchanan soils; and the deep, poorly drained Andover soils.

Typical pedon of Dekalb channery sandy loam in an area of Dekalb extremely stony sandy loam, 8 to 25 percent slopes, in woodland, New Castle Township, along the power line northwest of Mud Run Reservoir, 70 feet southeast of Pennsylvania Power and Light Pole Number F-F16-11:

O1—3 to 2 inches; leaf litter; abrupt smooth boundary.

O2—2 inches to 0; black (10YR 2/1) organic matter; extremely acid; abrupt smooth boundary.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) channery sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many roots; 25 percent coarse fragments; very strongly acid; abrupt smooth boundary.

A2—3 to 7 inches; pale brown (10YR 6/3) channery sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many roots; 20 percent

coarse fragments; very strongly acid; abrupt smooth boundary.

B1—7 to 12 inches; yellowish brown (10YR 5/4) channery sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; few roots; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

B2—12 to 22 inches; reddish yellow (7.5YR 6/6) channery sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; 50 percent coarse fragments; very strongly acid; clear wavy boundary.

B3—22 to 32 inches; reddish yellow (7.5YR 6/6) very channery sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; 60 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—32 to 39 inches; yellowish brown (10YR 5/4) very channery loamy sand; massive; very friable, nonsticky, nonplastic; 75 percent coarse fragments; very strongly acid; clear wavy boundary.

R—39 inches; hard sandstone and conglomerate bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. Coarse fragments range from 15 to 60 percent in the individual horizons of the solum and from 50 to 90 percent in the C horizon. Weighted average content of coarse fragments ranges from 35 to 75 percent in the control section. Reaction is extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 2 and 3, and chroma of 1 and 2. The A2 horizon has hue of 10YR, value of 5 and 6, and chroma of 1 through 4. The Ap horizon has hue of 10YR, value of 4, and chroma of 2 through 4.

The B horizon has hue of 7.5YR and 10YR, value of 5 and 6, and chroma of 4 through 6. The fine earth texture is loam or sandy loam.

The C horizon has hue of 10YR and 7.5YR, value of 5, and chroma of 4 and 5. The fine earth texture is sandy loam or loamy sand.

Hartleton series

Soils of the Hartleton series are loamy-skeletal, mixed, mesic Typic Hapludults. These soils are deep and well drained, and have moderate and moderately rapid permeability. They formed in residual soil material and are on the tops and sides of hills. Slopes range from 3 to 25 percent.

Hartleton soils are near the deep, well drained Allenwood soils; the moderately deep, well drained Berks soils; and the shallow, well drained Weikert soils.

Typical pedon of Hartleton channery silt loam, 3 to 8 percent slopes, in a cultivated field, Eldred Township, 1-1/2 miles southeast of Pitman, 300 yards east of the intersection of Routes T399 and 53047:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) channery silt loam; weak fine granular structure; friable, nonsticky, slightly plastic; many roots; 35 percent coarse fragments; medium acid; abrupt smooth boundary.

B21t—8 to 15 inches; yellowish brown (10YR 5/6) channery heavy silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; thin continuous clay films on faces of peds; 40 percent coarse fragments; medium acid; clear wavy boundary.

B22t—15 to 26 inches; yellowish brown (10YR 5/6) very channery silt loam; moderate medium and fine subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; thin continuous clay films on faces of peds; 50 percent coarse fragments; strongly acid; clear wavy boundary.

B3—26 to 33 inches; yellowish brown (10YR 5/4) very channery loam; weak fine and medium subangular blocky structure; friable, nonsticky, slightly plastic; few fine roots; 60 percent coarse fragments; strongly acid; gradual wavy boundary.

C—33 to 46 inches; brown (7.5YR 5/4) very channery loam; massive; friable, nonsticky, nonplastic; common black oxide coatings on coarse fragments; 75 percent coarse fragments; strongly acid; clear wavy boundary.

R—46 inches; brown (7.5YR 4/4) sandstone bedrock.

The solum ranges from 30 to 40 inches in thickness. Depth to bedrock ranges from 42 to 60 inches or more. The argillic horizon ranges from 12 to 24 inches in thickness. Coarse fragments range from 15 to 40 percent in the A horizon, from 25 to 70 percent in the B horizon, and from 50 to 90 percent in the C horizon. Reaction is strongly acid and very strongly acid.

The Ap horizon has hue of 10YR and 7.5YR, value of 3 and 4, and chroma of 2 through 4.

The B horizon has hue of 10YR and 7.5YR and ranges to 5YR in the lower part. It has value of 5 and 6 and chroma of 4 through 6. The fine earth texture ranges from loam to silty clay loam.

The C horizon has hue of 10YR through 5YR, value of 5 and 6, and chroma of 4 through 6. The fine earth texture is silt loam or loam.

Hazleton series

Soils of the Hazleton series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These soils are deep and well drained, and have moderately rapid and rapid permeability. They formed in residual soil material and are on the tops and sides of hills and mountains. Slopes range from 3 to 25 percent.

Hazleton soils are near the deep, well drained Clymer soils and the moderately deep, well drained Dekalb and Lehew soils. Hazleton soils are loamy-skeletal, and Clymer soils are fine-loamy.

Typical pedon of Hazleton channery fine sandy loam in an area of Hazleton extremely stony fine sandy loam, 3 to 8 percent slopes, in woodland, Upper Mahantango Township, on the top of Mahantango Mountain, 100 feet west of Route T488:

O1—2 inches to 1 inch; leaf litter.
O2—1 inch to 0; black (10YR 2/1) decomposed organic matter.
A2—0 to 5 inches; brown (10YR 5/3) channery fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many medium and small roots; 25 percent coarse fragments; very strongly acid; abrupt smooth boundary.
B21—5 to 12 inches; yellowish brown (10YR 5/4) channery sandy loam; weak fine subangular blocky structure; friable, nonsticky, nonplastic; few roots; 35 percent coarse fragments; very strongly acid; clear smooth boundary.
B22—12 to 22 inches; yellowish brown (10YR 5/6) channery sandy loam; weak medium subangular blocky structure; friable, nonsticky, slightly plastic; few roots; 40 percent coarse fragments; very strongly acid; gradual wavy boundary.
B23—22 to 35 inches; yellowish brown (10YR 5/6) very channery sandy loam; weak medium subangular blocky structure; friable, nonsticky, slightly plastic; few roots; 55 percent coarse fragments; very strongly acid; clear wavy boundary.
C—35 to 49 inches; brownish yellow (10YR 6/6) very channery loamy sand; massive; very friable, nonsticky, nonplastic; 65 percent coarse fragments; extremely acid; abrupt smooth boundary.
R—49 inches; brownish yellow (10YR 6/6) stained with reddish brown (5YR 5/4), sandstone bedrock.

The solum ranges from 25 to 50 inches in thickness. Depth to bedrock ranges from 42 to 60 inches. Coarse fragments range from 10 to 70 percent in the individual horizons of the solum and from 35 to 80 percent in the C horizon. Reaction is extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 2 and 3, and chroma of 1 and 2. The A2 horizon has hue of 10YR, value of 4 and 5, and chroma of 1 through 4. The Ap horizon has hue of 10YR, value of 3 and 4, and chroma of 2 and 3.

The B horizon has hue of 10YR through 5YR, value of 3 through 6, and chroma of 3 through 8. The 5YR hue is limited to incipient Bhir or Bir horizons. The fine earth texture is loam and sandy loam, and the B3 horizon includes loamy sand.

The C horizon has hue of 2.5Y through 5YR, value of 3 through 6, and chroma of 3 through 6. The fine earth texture ranges from loam to loamy sand.

Kedron series

Soils of the Kedron series are fine-loamy, mixed, mesic Aquic Fragiudults. These soils are deep, somewhat poorly drained and moderately well drained, and have slow permeability. They formed in colluvium and are on toe slopes, along drainageways, and in depressional areas. Slopes range from 3 to 25 percent.

Kedron soils are near the deep, well drained Meckesville and Leck Kill soils and the deep, poorly drained Shelmadine soils.

Typical pedon of Kedron silt loam, 3 to 8 percent slopes, in a cultivated field, Upper Mahantango Township, 2 miles east of Pitman, 200 feet north of Route T723:

Ap—0 to 9 inches; reddish brown (5YR 4/3) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; 5 percent coarse fragments; slightly acid; abrupt smooth boundary.
B21t—9 to 17 inches; reddish brown (2.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin continuous clay films on peds; 5 percent coarse fragments; strongly acid; clear wavy boundary.
B22t—17 to 27 inches; reddish brown (2.5YR 4/4) silty clay loam; common medium distinct pinkish gray (5YR 6/2) mottles; moderate coarse subangular blocky structure; firm, sticky, slightly plastic; thin continuous clay films on peds; 5 percent coarse fragments; strongly acid; clear wavy boundary.
Bx1—27 to 35 inches; reddish brown (2.5YR 4/4) channery clay loam; faces of prisms are pinkish gray (5YR 6/2); many coarse distinct yellowish red (5YR 5/8) and reddish gray (5YR 5/2) mottles; moderate very coarse prismatic structure parting to moderate medium platy; firm, brittle, sticky, slightly plastic; thick continuous clay films on prism faces and thin continuous clay films on peds; 15 percent coarse fragments; strongly acid; clear smooth boundary.
Bx2—35 to 58 inches; reddish brown (5YR 4/3) channery loam; faces of prisms are pinkish gray (5YR 6/2); common medium distinct yellowish red (5YR 5/6) and reddish gray (5YR 5/2) mottles; moderate very coarse prismatic structure parting to moderate thick platy; firm, brittle, slightly sticky, slightly plastic; thin continuous clay films on prism faces and peds; 20 percent coarse fragments; strongly acid; gradual wavy boundary.
C—58 to 80 inches; reddish brown (5YR 4/4) channery loam; common medium distinct pinkish gray (5YR 6/2) and yellowish red (5YR 5/8) mottles; massive; firm, slightly sticky, nonplastic; 25 percent coarse fragments; strongly acid.

The solum ranges from 40 to 65 inches or more in thickness. Depth to bedrock ranges from 60 to 96 inches or more. Depth to the fragipan ranges from 20 to 32 inches. Coarse fragments range from 5 to 30 percent in the A and Bt horizons and from 15 to 50 percent in the Bx horizon. Depth to mottles that have chroma of 2 or less ranges from 12 to 30 inches. Reaction is extremely acid to strongly acid.

The Bt horizon has hue of 2.5YR and 5YR, value of 4 and 5, and chroma of 3 through 6. The fine earth texture ranges from silt loam to clay loam. The Bx horizon has hue of 10R through 5YR, value of 4 and 5, and chroma of 2 through 6. The fine earth texture ranges from loam to silty clay loam.

The C horizon has hues of 10R through 5YR, value of 4 and 5, and chroma of 2 through 6. The fine earth texture ranges from loam to silty clay loam.

Klinesville series

Soils of the Klinesville series are loamy-skeletal, mixed, mesic Lithic Dystrocrepts. These soils are shallow and well drained, and have moderately rapid permeability. They formed in residual soil material and are on hillsides. Slopes range from 25 to 75 percent.

Klinesville soils are near the deep, well drained Leck Kill soils; the moderately deep, well drained Calvin soils; and the shallow, well drained Weikert soils. Klinesville soils are of redder hue than the Weikert soils.

Typical profile of Klinesville shaly silt loam in an area of Weikert and Klinesville shaly silt loams, steep, in pastureland, Hegins Township, 1/2 mile north of Hegins, 300 feet north of Deep Creek, between Routes T478 and T480, and 1/4 mile south of Route T879:

Ap—0 to 6 inches; dusky red (2.5YR 3/2) shaly silt loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine and medium roots; 40 percent coarse fragments; strongly acid; abrupt smooth boundary.

B2—6 to 14; reddish brown (2.5YR 4/4) very shaly silt loam; weak medium and fine subangular blocky structure; friable, slightly sticky, slightly plastic; many medium roots; 60 percent coarse fragments; very strongly acid; clear wavy boundary.

C—14 to 19 inches; weak red (10YR 4/3) very shaly silt loam; massive; friable; few roots; 80 percent coarse fragments; very strongly acid; clear wavy boundary.

R—19 inches; weak red (10YR 4/2) shale bedrock.

The solum thickness and depth to bedrock range from 10 to 20 inches. Coarse fragments range from 25 to 60 percent in the A horizon, from 25 to 75 percent in the B horizon, and from 45 to 90 percent in the C horizon. Reaction is very strongly acid to medium acid.

The A horizon has hue of 5YR through 10R, value of 2 through 4, and chroma of 2 through 4.

The B horizon has hue of 5YR through 10R, value of 3 and 4, and chroma of 3 through 6. The fine earth texture is silt loam or loam.

The C horizon has hue of 5YR through 10R, value of 3 and 4, and chroma of 3 through 6. The fine earth texture is silt loam or loam.

Laidig series

Soils of the Laidig series are fine-loamy, mixed, mesic Typic Fragiudults. These soils are deep and well drained and have moderately slow permeability. They formed in colluvium and are on foot slopes, along drainageways, and in depressional areas. Slopes range from 3 to 25 percent.

Laidig soils are near the deep, moderately well drained and somewhat poorly drained Buchanan soils; the poorly drained Andover soils; the moderately deep, well drained Dekalb soils; and the deep, well drained Hazleton and Clymer soils. Laidig soils have a fragipan; Hazleton and Clymer soils do not have a fragipan.

Typical pedon of Laidig gravelly loam in an area of Laidig extremely stony loam, 8 to 25 percent slopes, in woodland, Eldred Township, 1 mile southeast of Helfenstein, 50 feet north of Route 53057, State forestland:

O1—2 inches to 1 inch; leaf litter.

O2—1 inch to 0; black (10YR 2/1) decomposed organic matter.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine and medium roots; 35 percent coarse fragments; extremely acid; abrupt smooth boundary.

B1—4 to 10 inches; yellowish brown (10YR 5/6); gravelly heavy loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; many fine and medium roots; 30 percent coarse fragments; extremely acid; clear wavy boundary.

B21t—10 to 20 inches; strong brown (7.5YR 5/6) channery sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; thin continuous clay films on peds; 30 percent coarse fragments; extremely acid; gradual wavy boundary.

B22t—20 to 42 inches; strong brown (7.5YR 5/6) channery sandy clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few roots; thin continuous clay films on peds; 35 percent coarse fragments; extremely acid; clear wavy boundary.

Bx—42 to 74 inches; strong brown (7.5YR 5/4) channery heavy sandy loam; few medium distinct light brownish gray (10YR 6/2) and common medium distinct very pale brown (10YR 7/3) mottles; weak very coarse prismatic structure parting to weak coarse and medium subangular blocky; very firm, brittle, slightly sticky, nonplastic; thin continuous clay films on peds; 40 percent coarse fragments; extremely acid.

The solum ranges from 60 to 80 inches or more in thickness. Depth to bedrock is 96 inches or more. Depth to the fragipan ranges from 30 to 50 inches. Coarse fragments range from 15 to 35 percent in the A horizon

and Bt horizon and from 15 to 70 percent in the Bx horizon. Reaction is extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 2 through 5, and chroma of 1 through 4. The A2 horizon has hue of 7.5YR and 10YR, value of 5 and 6, and chroma of 1 through 6. The Ap horizon has hue of 7.5YR and 10YR, value of 3 through 5, and chroma of 2 through 8.

The B2 horizon has hue of 10YR and 7.5YR, value of 4 through 6, chroma of 4 through 8, and mottles that have chroma of 2 or higher below a depth of 30 inches in some pedons. The fine earth texture is sandy clay loam, heavy loam, silt loam, or heavy sandy loam. The Bx horizon has hue of 5YR through 10YR, value of 4 and 5, and chroma of 3 through 8.

Leck Kill series

Soils of the Leck Kill series are fine-loamy, mixed, mesic Typic Hapludults. These soils are deep and well drained and have moderate and moderately rapid permeability. They formed in residual soil material and are on the tops and sides of hills and knolls. Slopes range from 3 to 15 percent.

Leck Kill soils are near the moderately deep, well drained Calvin soils; the shallow, well drained Klinesville soils; the deep, well drained Meckesville soils; and the deep, moderately well drained and somewhat poorly drained Kedron soils. The Leck Kill soils do not have a fragipan; Meckesville soils have a fragipan.

Typical pedon of Leck Kill channery silt loam, 3 to 8 percent slopes, in a cultivated field, Rush Township, 1-1/2 miles southeast of Barnesville and the intersection of Routes PA 54 and 53097, in State gameland Number 227:

Ap—0 to 8 inches; dusky red (2.5YR 3/2) channery silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many roots; 20 percent coarse fragments; neutral; abrupt smooth boundary.

B1—8 to 14 inches; weak red (10R 4/4) channery silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; 25 percent coarse fragments; slightly acid; clear wavy boundary.

B21—14 to 25 inches; weak red (10YR 4/4) channery silt loam; weak medium subangular blocky structure; friable, sticky, plastic; few roots; thin continuous clay films on peds; 20 percent coarse fragments; slightly acid; clear wavy boundary.

B22t—25 to 38 inches; weak red (10R 4/4) channery silt loam; weak medium subangular blocky structure; friable, sticky, plastic; few roots; thin continuous clay films on ped faces; 35 percent coarse fragments; medium acid; gradual wavy boundary.

C1—38 to 48 inches; dark red (10R 3/6) very channery loam; massive; friable, slightly sticky, slightly plastic; common oxide concretions; 60 percent coarse fragments; strongly acid; clear wavy boundary.

C2—48 to 62 inches; dark red (10R 3/6) very channery loam; massive; friable; common black oxide concretions; 85 percent coarse fragments; strongly acid; clear wavy boundary.

R—62 inches; dark reddish brown (2.5YR 3/4) shale bedrock.

The solum ranges from 24 to 48 inches in thickness. Depth to bedrock ranges from 42 to 72 inches. Coarse fragments range from 15 to 25 percent in the A horizon, from 10 to 40 percent in the B horizon, and from 60 to 90 percent in the C horizon. Reaction is medium acid to very strongly acid.

The Ap horizon has hue of 2.5YR through 7.5YR, value of 3 and 4, and chroma of 2 through 4.

The B horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 4 through 6. The fine earth texture is silt loam, loam, silty clay loam, or clay loam.

The C horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 4 through 6. The fine earth texture is silt loam, loam, or clay loam.

Lehew series

Soils of the Lehew series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These soils are moderately deep and well drained and have moderate to rapid permeability. They formed in residual soil material and are on the tops and sides of hills and mountains. Slopes range from 3 to 70 percent.

Lehew soils are near the moderately deep, well drained Dekalb soils and the deep, well drained Hazleton and Meckesville soils. Lehew soils are of redder hue than the Dekalb soils.

Typical pedon of Lehew channery loam in an area of Lehew extremely stony loam, 8 to 25 percent slopes, in woodland, Upper Mahantango Township, about 2-1/2 miles north of Sacramento, 100 feet from the west side of Route T448:

O1—2 inches to 1 inch; leaf litter.

O2—1 inch to 0; black (10YR 2/1) decomposed organic matter; abrupt smooth boundary; extremely acid.

A1—0 to 3 inches; dark brown (7.5YR 3/2) channery loam; weak fine granular structure; very friable, nonsticky, nonplastic; many roots; 25 percent coarse fragments; very strongly acid; abrupt smooth boundary.

A2—3 to 8 inches; reddish brown (5YR 5/3) channery loam; weak medium granular structure; very friable; nonsticky, nonplastic; many roots; 20 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B1—8 to 14 inches; reddish brown (2.5YR 4/4) channery sandy loam; weak fine and medium subangular blocky structure; friable, slightly sticky, nonplastic; few roots; 35 percent coarse fragments; very strongly acid; clear wavy boundary.

B2—14 to 27 inches; reddish brown (2.5YR 4/4) very channery sandy loam; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; few roots; 50 percent coarse fragments; very strongly acid; gradual wavy boundary.
C—27 to 37 inches; reddish brown (2.5YR 4/4) very channery sandy loam; massive; friable; few roots; 65 percent coarse fragments; very strongly acid.
R—37 inches; dark reddish brown (2.5YR 3/4) sandstone bedrock.

The solum ranges from 15 to 30 inches in thickness. Depth to bedrock ranges from 20 to 40 inches. Coarse fragments range from 15 to 40 percent in the A horizon, from 30 to 60 percent in the B horizon, and from 50 to 90 percent in the C horizon. Weighted average content of coarse fragments is 35 percent or more in the control section. Reaction is very strongly acid and strongly acid.

The A1 horizon has hue of 10YR and 7.5YR, value of 3 and 4, and chroma of 1 and 2. The A2 horizon has hue of 7.5YR and 10YR, value of 3 through 5, and chroma of 3 and 4. The Ap horizon has hue of 5YR through 10YR, value of 3 and 4, and chroma of 2 through 4.

The B horizon has hue of 2.5YR and 5YR, value of 4 and 5, and chroma of 4 through 6. The fine earth texture is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 2.5YR and 5YR, value of 4 and 5, and chroma of 2 through 4. The fine earth texture is loamy sand, sandy loam, or fine sandy loam.

Linden series

Soils of the Linden series are coarse-loamy, mixed, mesic Fluventic Dystrochrepts. These soils are deep and well drained and have moderately rapid permeability. They formed in alluvium and are along streams and rivers. Slopes range from 0 to 3 percent.

Linden soils are near the deep, moderately well drained and somewhat poorly drained Basher soils; the deep, poorly drained Atkins soils; and the deep, well drained Meckesville soils.

Typical pedon of Linden silt loam, in cropland, Pine Grove Township, 1 mile south of Pine Grove, 1/4 mile south of the intersection of Routes PA 443 and PA 501:

Ap—0 to 10 inches; dark reddish brown (5YR 3/2) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; many small roots; 5 percent coarse fragments; medium acid; clear smooth boundary.
B1—10 to 18 inches; reddish brown (5YR 4/3) silt loam; weak medium subangular blocky structure; friable, nonsticky, slightly plastic; few small roots; 5 percent coarse fragments; medium acid; clear smooth boundary.
B2—18 to 35 inches; reddish brown (5YR 5/4) loam; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; few small roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.
B3—35 to 45 inches; reddish brown (5YR 5/4) gravelly loam; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; few roots; 15 percent coarse fragments; strongly acid; abrupt smooth boundary.
C—45 to 62 inches; reddish brown (5YR 5/3) gravelly sandy loam; massive; very friable, nonsticky, nonplastic; 30 percent coarse fragments; strongly acid.

The solum ranges from 24 to 50 inches in thickness. Depth to bedrock is more than 72 inches. Coarse fragments range from 0 to 25 percent in the solum and from 3 to 70 percent in the C horizon. Reaction is extremely acid to medium acid.

The Ap horizon has hue of 5YR through 10YR, value of 3 and 4, and chroma of 2 through 4. The fine earth texture is silt loam, loam, or fine sandy loam.

The B horizon has hue of 2.5YR and 5YR, value of 3 through 5, and chroma 3 and 4. Some pedons have individual horizons that have hue of 7.5YR. The fine earth texture is silt loam, loam, fine sandy loam, or sandy loam.

The C horizon has hue of 2.5YR through 10YR, value of 3 through 5, and chroma of 3 and 4. The fine earth texture is loam, sandy loam, or sand.

Meckesville series

Soils of the Meckesville series are fine-loamy, mixed, mesic Typic Fragiudults. These soils are deep and well drained and have moderately slow permeability. They formed in colluvial soil material and are on foot slopes, along drainageways, and in depressional areas. Slopes range from 3 to 25 percent.

Meckesville soils are near the deep, somewhat poorly drained and moderately well drained Kedron soils; the deep, poorly drained Shelmadine soils; and the deep, well drained Leck Kill soils. Meckesville soils have a fragipan and Leck Kill soils do not have a fragipan.

Typical pedon of Meckesville loam, 3 to 8 percent slopes, in woodland, Hegin Township, 1.4 miles south on Route T487 from its intersection with Route PA 25, in Valley View:

O1—2 inches to 1 inch; brown (7.5YR 5/4) leaf litter; extremely acid.
O2—1 inches to 0; black (N2/) fibrous organic mat; extremely acid.
A1—0 to 2 inches; dark reddish brown (5YR 3/2) loam; weak fine granular structure; very friable, slightly sticky, nonplastic; 5 percent coarse fragments; extremely acid; clear wavy boundary.
A2—2 to 7 inches; reddish brown (5YR 4/3) loam; weak medium subangular blocky structure parting to weak medium granular; very friable, slightly sticky, slightly plastic; 10 percent coarse fragments; very strongly acid; clear wavy boundary.
B21t—7 to 14 inches; reddish brown (5YR 4/3) light clay loam; moderate medium subangular blocky struc-

ture; friable, slightly sticky, slightly plastic; thin discontinuous clay films on peds; 10 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22t—14 to 23 inches; reddish brown (2.5YR 4/4) heavy loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin continuous clay films on ped surfaces; 10 percent coarse fragments; extremely acid; gradual wavy boundary.

B23t—23 to 31 inches; dusky red (10R 3/4) gravelly heavy loam; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin discontinuous clay films on peds, continuous clay films in pores; few black oxide coatings on peds; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx1—31 to 42 inches; weak red (10R 4/4) gravelly heavy loam; weak very coarse prismatic structure parting to weak medium and thin platy; very firm, brittle, slightly sticky, slightly plastic; continuous clay films in pores and on upper surfaces of plates; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.

Bx2—42 to 55 inches; weak red (10R 4/3) gravelly light clay loam; few medium distinct pale red (2.5YR 6/2) and red (2.5YR 4/6) mottles; weak very coarse prismatic structure parting to moderate medium platy; very firm, brittle, slightly sticky, slightly plastic; thin clay films on plates, moderately thick in pores; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx3—55 to 70 inches; weak red (10R 4/4) gravelly heavy loam; few medium distinct pale red (2.5YR 6/2) and red (2.5YR 4/6) mottles; weak very coarse prismatic structure parting to moderate medium angular blocky; very firm, brittle, slightly sticky, plastic; thin clay films in pores and on peds; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—70 to 96 inches; weak red (10R 4/4) gravelly heavy loam; weak thick platy structure; firm, slightly sticky, slightly plastic; 30 percent coarse fragments; very strongly acid.

The solum ranges from 40 to 80 inches in thickness. Depth to bedrock is 60 inches or more. Depth to the fragipan ranges from 25 to 48 inches. Coarse fragments range from 5 to 15 percent in the A horizon, from 5 to 40 percent in the B horizon above the fragipan, from 10 to 50 percent in the Bx horizon, and from 10 to 70 percent in the C horizon. Reaction is extremely acid to strongly acid.

The A horizon has hue of 5YR and 7.5YR, value of 2 through 5, and chroma of 2 through 4.

The Bt horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 3 through 6. The fine earth texture is heavy loam, heavy silt loam, silty clay loam, or light clay loam. The Bx horizon has hue of 10R through 5YR, value of 3 and 4, and chroma of 3 and 4. Mottles, where present, are below a depth of 30 inches and have a hue of 2.5YR through 7.5YR, value of 4 through 7, and chroma of 1 through 6. The fine earth texture is heavy loam or silty clay loam.

The C horizon has hue of 10R through 5YR, value of 3 and 4, and chroma of 3 and 4. Mottles have hue of 5YR and 7.5YR, value of 5 through 7, and chroma of 1 through 6. The fine earth texture is heavy loam, heavy silt loam, or clay loam.

Philo series

Soils of the Philo series are coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. These soils are deep and moderately well drained, and have moderate and moderately slow permeability. They formed in alluvial soil material and are along streams and rivers. Slopes range from 0 to 3 percent.

Philo soils are near the deep, well drained Pope soils and the deep, poorly drained Atkins soils.

Typical pedon of Philo silt loam, in pastureland, North Manheim Township, 1 mile southwest of Orwigsburg, on the south side of Route 53011 and 1/4 mile south of the intersection of Routes PA 61 and 53011, 200 feet north of Mahannon Creek:

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; many roots; 5 percent coarse fragments; medium acid; abrupt smooth boundary.

B1—10 to 19 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable, nonsticky, nonplastic; common roots; 5 percent coarse fragments; medium acid; clear smooth boundary.

B2—19 to 33 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) and few medium distinct brown (7.5YR 5/4) mottles; weak fine subangular blocky structure; friable, nonsticky, slightly plastic; few roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.

C1—33 to 51 inches; gray (10YR 5/1) fine sandy loam; many coarse distinct strong brown (7.5YR 5/6) mottles; massive; very friable, nonsticky, nonplastic; 12 percent coarse fragments; very strongly acid; gradual smooth boundary.

IIC2—51 to 60 inches; stratified sand, silt, and gravel.

The solum ranges from 20 to 48 inches in thickness. Depth to bedrock ranges from 60 to 144 inches or more. Depth to mottles that have chroma of 2 or less is 12 to 24 inches. Coarse fragments range from 0 to 15 percent in the A horizon, from 0 to 20 percent in the B horizon, and from 5 to 50 percent in the C horizon. Reaction is very strongly acid to medium acid.

The A horizon has hue of 10YR and 7.5YR, value of 3 and 4, and chroma of 2 and 3.

The B horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture ranges from silt loam to sandy loam.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 0 through 2. The fine earth texture ranges from silt loam to sandy loam.

Pope series

Soils of Pope series are coarse-loamy, mixed, mesic Fluventic Dystrocrepts. These soils are deep and well drained and have moderate and moderately rapid permeability. They formed in alluvial soil material and are along streams and rivers. Slopes range from 0 to 3 percent.

Pope soils are near the deep, moderately well drained Philo soils and the deep, poorly drained Atkins soils.

Typical pedon of Pope silt loam, in cropland, Pine Grove Township, 500 yards southeast of the intersection of Routes I-81 and PA 443, 200 yards south of abandoned railroad crossing, and 125 yards north of Swatara Creek:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable, nonsticky, nonplastic; many roots; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.

B1—10 to 22 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; few roots; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B2—22 to 40 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; few roots; 10 percent coarse fragments; strongly acid; gradual wavy boundary.

C—40 to 62 inches; strong brown (7.5YR 5/6) gravelly sandy loam; massive; very friable, nonsticky, nonplastic; few roots; 25 percent coarse fragments; strongly acid.

The solum ranges from 30 to 50 inches in thickness. Depth to bedrock is 60 inches or more. In some pedons mottles have chroma of 2 or less below a depth of 24 inches. Coarse fragments range from 0 to 30 percent in the solum and from 0 to 40 percent in the C horizon. Reaction is extremely acid to strongly acid.

The Ap horizon has hue of 10YR, value of 4 and 5, and chroma of 2 through 4.

The B horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is loamy sand, sandy loam, loam, sandy clay loam, or stratified layers of any of these.

Shelmadine series

Soils of the Shelmadine series are fine-loamy, mixed, mesic Typic Fragiaquults. These soils are deep and poorly drained and have slow permeability. They formed in colluvial soil material and are on toe slopes, along drainageways, and in depressional areas. Slopes range from 0 to 8 percent.

Shelmadine soils are near the deep, somewhat poorly drained Alvira soils and the deep, moderately well drained Watson soils.

Typical pedon of Shelmadine silt loam, 0 to 3 percent slopes, in a cultivated field, South Manheim Township, 300 yards south of the Jefferson Hotel, 300 yards west of Route T662:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many roots; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

B2tg—8 to 19 inches; light brownish gray (10YR 6/2) silty clay loam; common coarse distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; firm, sticky, slightly plastic; thin continuous clay films on prisms and blocks; few roots; 10 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx1g—19 to 32 inches; light brownish gray (2.5Y 6/2) channery clay loam; faces on prisms are gray (10YR 5/1); common coarse distinct yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate thick platy; very firm, brittle, slightly sticky, slightly plastic; thick continuous clay films on prisms and thin on plates; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.

Bx2g—32 to 46 inches; light brownish gray (2.5Y 6/2) channery loam; faces of prisms are gray (10YR 5/1); common coarse distinct brown (10YR 5/3) and strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to weak thick platy; very firm and brittle, slightly sticky, slightly plastic; thick continuous clay films on prisms and thin discontinuous on plates; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

C—46 to 60 inches; brown (10YR 5/3) channery loam; many coarse distinct gray (10YR 5/1) and strong brown (7.5YR 5/6) mottles; massive; firm, slightly sticky, slightly plastic; 40 percent coarse fragments; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to the fragipan ranges from 18 to 30 inches. Depth to bedrock is 60 inches or more. Coarse fragments range from 5 to 25 percent in the solum and from 15 to 70 percent in the C horizon. Reaction is very strongly acid and extremely acid.

The Ap horizon has hue of 10YR and 2.5Y, value of 3 through 5, and chroma of 1 and 2. In some pedons, the A1 horizon is neutral or has hue of 10YR and 2.5Y, value of 2, and chroma of 0 and 1. In some pedons, the A2 horizon is neutral or has hue of 10YR and 2.5Y, value of 5 and 6, and chroma of 0 and 1.

The Bt horizon has hue of 10YR and 2.5Y, value of 5 and 6, and chroma 1 through 4. Faces of prisms and peds are neutral or have hue of 10YR and 2.5Y, value of 5 through 7, and chroma of 0 through 2. The fine earth texture is silt loam or silty clay loam. The Bx horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 2 through 4. Faces of prisms and plates are neutral or have hue of 10YR and 2.5Y, value of 5 through 7, and chroma of 0 through 2. The fine earth texture is silt loam, loam, clay loam, or silty clay loam.

The C horizon is neutral or has hue of 7.5YR through 2.5Y, value of 5, and chroma of 0 through 3. The fine earth texture is silt loam or loam.

Udifluvents

Udifluvents are deep, well drained and moderately well drained soils that have rapid permeability. They formed in stratified fine coal sediment of fluvial origin and stratified gravel, sand, and silt sediment of fluvial and fluvial-colluvial origin along the banks of streams and rivers. Slopes range from 0 to 8 percent.

Udifluvents are near the Pope, Linden, Philo, Basher, and Atkins soils.

Udifluvents do not have distinct horizons. Depth to bedrock is 60 inches or more. Coarse fragments range from 0 to 85 percent. Reaction is extremely acid to strongly acid.

The A horizon, where present, has hue of 10YR through 7.5YR, value of 2 through 5, and chroma of 0 through 3. The fine earth texture is silt loam, sandy loam, or loam. The A horizon is 2 to 7 inches thick.

The C horizon has hue of 10YR through 5YR, value of 2 through 6, and chorma of 3 through 8. The fine earth texture is silt, loam, sandy loam, or loamy sand. In some places, Udifluvents have chroma of 2 or less below a depth of 16 inches.

Udorthents

Udorthents are deep, well drained soils that have slow to rapid permeability. These soils are on the tops and sides of mountains and in valleys. Slopes range from 3 to 80 percent.

Udorthents are near the Dekalb, Hazleton, Edgemont, Laidig, and Buchanan soils.

Udorthents do not have distinct horizons. Bedrock is below a depth of 60 inches. Coarse fragments range from 25 to 90 percent. These soils are strongly acid to extremely acid.

Udorthents have hue of 10YR through 5YR, value of 3 through 6, and chroma of 1 through 3. The fine earth texture is mostly sandy loam, loamy sand, sandy clay loam, or loam.

Udults

Udults are deep, somewhat poorly drained to well drained soils that have slow to moderately rapid permeability. They formed in residual and colluvial soil material. These soils are on foot slopes and on the tops and sides of hills and mountains. Slopes range from 3 to 25 percent.

Udults are small areas of Allenwood, Leck Kill, Hartleton, Clymer, Laidig, Buchanan, Meckesville, Watson, and Kedron soils. They are adjacent to Urban land.

Some Udults soils have a fragipan. Depth to bedrock ranges from 42 to 60 inches or more. Coarse fragments range from 5 to 50 percent. Reaction is extremely acid to medium acid.

The A horizon has hue of 10YR through 7.5YR, value of 3 through 5, and chroma of 2 through 4. The fine earth texture ranges from silt loam to loam.

The B horizon has hue of 10YR through 2.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture ranges from silt loam to clay loam.

The C horizon has hue of 10YR through 2.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture ranges from silt loam to clay loam.

Watson series

Soils of the Watson series are fine-loamy, mixed, mesic Typic Fragiudults. These soils are deep and moderately well drained and have slow permeability. They formed in colluvial soil material and are on foot slopes, along drainageways, and in depressional areas. Slopes range from 3 to 15 percent.

Watson soils are near the deep, somewhat poorly drained Alvira soils and the deep, poorly drained Shelmadine soils.

Typical pedon of Watson silt loam, 3 to 8 percent slopes, in cropland, East Brunswick Township, 300 yards east of Orwigsburg Borough limits, 150 feet north of Route PA 443:

Ap—0 to 8 inches; dark brown (7.5YR 4/2) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many roots; 10 percent coarse fragments; medium acid; abrupt smooth boundary.

B21t—8 to 17 inches; strong brown (7.5YR 5/6) gravelly silt loam; weak medium angular blocky structure; firm, slightly sticky, slightly plastic; few roots; thin continuous clay films on peds; 15 percent coarse fragments; strongly acid; clear wavy boundary.

B22t—17 to 28 inches; reddish yellow (7.5YR 6/6) gravelly silty clay loam; moderate medium blocky structure; firm, slightly sticky, plastic; few roots; thin continuous clay films on peds; 20 percent coarse fragments; strongly acid; clear wavy boundary.

Bx1—28 to 43 inches; light brown (7.5YR 6/4) gravelly clay loam; common medium distinct light brownish gray (10YR 6/2) and pinkish gray (7.5YR 7/2) mottles; weak very coarse prismatic structure parting to weak very thick platy; very firm, brittle, slightly sticky, plastic; thin continuous clay films on prisms and peds; 25 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx2—43 to 60 inches; light brown (7.5YR 6/4) gravelly clay loam; common medium distinct light brownish gray (10YR 6/2) and pinkish gray (7.5YR 7/2) mottles; weak very coarse prismatic structure; firm, brittle, slightly sticky, slightly plastic; thin discontinuous clay films on prisms; 35 percent coarse fragments; strongly acid.

The solum ranges from 40 to 72 inches in thickness. Depth to bedrock is 60 inches or more. Depth to fragipan ranges from 18 to 32 inches. Mottles that have chroma of 2 or less are within a depth of 30 inches. They are 10 inches below the top of the Bt horizon. Coarse fragments range from 5 to 20 percent in the A horizon, from 10 to 40 percent in the Bx horizon, and to 40 percent or more in the C horizon. Reaction is very strongly acid and strongly acid.

The Ap horizon has hue of 10YR through 5YR, value of 3 and 4, and chroma of 2 through 4.

The Bt horizon has hue of 2.5YR through 7.5YR and value and chroma of 4 through 6. Mottles have hue of 2.5YR through 10YR, value of 5 through 7, and chroma of 1 through 3. The fine earth texture is silt loam, silty clay loam, loam, or clay loam. The Bx horizon has hue of 2.5YR through 7.5YR and value and chroma of 4 through 6. Mottles have hue of 2.5YR through 10YR, value of 5 through 7, and chroma of 1 through 3. The fine earth texture is silt loam, silty clay loam, loam, or clay loam.

The C horizon has hue of 10YR through 2.5YR, value of 5 and 6, and chroma of 3 through 6. The fine earth texture ranges from silt loam to sandy loam.

Weikert series

Soils of the Weikert series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. These soils are shallow and well drained and have moderately rapid permeability. They formed in residual soil material and are on hillsides. Slopes range from 25 to 75 percent.

Weikert soils are near the deep, well drained Hartleton soils; the moderately deep, well drained Calvin soils; and the shallow, well drained Klinesville soils.

Typical profile of Weikert shaly silt loam in an area of Weikert and Klinesville shaly silt loams, steep, in native grassland, East Brunswick Township, 3 miles east of New Ringgold, 300 feet north of Route PA 895 and 1/3 mile east of Route T898:

Ap—0 to 5 inches; dark brown (10YR 4/3) shaly silt loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine and medium roots; 40 percent coarse fragments; strongly acid; abrupt smooth boundary.

B2—5 to 13 inches; yellowish brown (10YR 5/4) very shaly silt loam; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; many fine and medium roots; 55 percent coarse fragments; strongly acid; gradual wavy boundary.

C—13 to 18 inches; yellowish brown (10YR 5/4) very shaly silt loam; massive; friable; 80 percent coarse fragments; strongly acid; clear wavy boundary.

R—18 inches; olive gray (5Y 5/2) shale; fractured.

The solum ranges from 8 to 20 inches in thickness. Depth to bedrock ranges from 10 to 20 inches. Coarse fragments range from 20 to 50 percent in the A horizon, from 30 to 65 percent in the B horizon, and from 60 to 85 percent in the C horizon. Reaction is very strongly acid to medium acid.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 and 3. In some pedons the A2 horizon is yellowish brown.

The B horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is silt loam or loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine earth texture is silt loam or loam.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult. Includes strip mine spoil.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Channery soil. A soil, that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized.

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action. Freezing and thawing of soil moisture. Frost action can damage structures and plant roots.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction be-

cause it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower

in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.
Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.
Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.
Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-74 at Port Clinton, Pennsylvania]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	36.7	15.8	26.3	62	-8	14	3.16	1.77	4.29	6	8.2
February---	38.7	16.9	27.8	61	-5	11	3.23	2.02	4.31	7	8.9
March------	47.6	24.9	36.3	75	6	42	3.97	3.02	4.85	8	5.6
April------	60.7	34.7	47.8	87	19	245	4.25	2.73	5.62	8	.5
May--------	70.9	43.1	57.0	91	26	527	4.00	2.19	5.47	9	.0
June-------	80.4	52.8	66.6	96	36	798	4.23	2.44	5.69	8	.0
July-------	85.2	56.9	71.1	98	41	964	4.48	2.01	6.48	7	.0
August-----	83.1	55.1	69.1	96	39	902	4.36	2.33	6.01	7	.0
September--	76.1	48.0	62.1	94	27	663	4.43	2.57	5.93	7	.0
October----	65.8	36.3	48.9	85	18	506	3.17	1.59	4.45	5	.0
November---	52.2	28.7	38.8	74	11	250	4.27	2.62	5.75	8	1.3
December---	40.0	20.0	30.0	63	0	17	4.23	2.01	6.03	7	7.7
Year-----	61.5	36.1	48.5	99	-12	4,939	47.78	41.36	53.97	87	32.2

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-74 at Port Clinton, Pennsylvania]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 3	May 21	June 2
2 years in 10 later than--	April 26	May 14	May 26
5 years in 10 later than--	April 14	May 1	May 14
First freezing temperature in fall:			
1 year in 10 earlier than--	October 6	September 20	September 12
2 years in 10 earlier than--	October 13	September 28	September 18
5 years in 10 earlier than--	October 26	October 12	October 1

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1951-74 at Port Clinton, Pennsylvania]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	160	128	106
8 years in 10	172	140	118
5 years in 10	194	163	139
2 years in 10	216	186	161
1 year in 10	227	199	172

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AeB	Allenwood gravelly silt loam, 3 to 8 percent slopes	2,380	0.5
AeC	Allenwood gravelly silt loam, 8 to 15 percent slopes	1,750	0.4
AgA	Alvira silt loam, 0 to 3 percent slopes	1,450	0.3
AgB	Alvira silt loam, 3 to 8 percent slopes	1,070	0.2
AnA	Andover gravelly loam, 0 to 3 percent slopes	250	0.1
AnB	Andover gravelly loam, 3 to 8 percent slopes	310	0.1
ArB	Andover extremely stony loam, 0 to 8 percent slopes	4,160	0.8
At	Atkins silt loam	7,990	1.6
Ba	Basher silt loam	5,730	1.1
BeB	Berks shaly silt loam, 3 to 8 percent slopes	7,530	1.5
BeC	Berks shaly silt loam, 8 to 15 percent slopes	10,740	2.1
BeD	Berks shaly silt loam, 15 to 25 percent slopes	8,900	1.8
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	3,220	0.6
BuC	Buchanan gravelly loam, 8 to 15 percent slopes	390	0.1
BxB	Buchanan extremely stony loam, 3 to 8 percent slopes	20,600	4.1
BxD	Buchanan extremely stony loam, 8 to 25 percent slopes	11,090	2.2
CaB	Calvin shaly silt loam, 3 to 8 percent slopes	6,010	1.2
CaC	Calvin shaly silt loam, 8 to 15 percent slopes	9,970	2.0
CaD	Calvin shaly silt loam, 15 to 25 percent slopes	14,650	2.9
DeB	Dekalb channery sandy loam, 3 to 8 percent slopes	570	0.1
DeC	Dekalb channery sandy loam, 8 to 15 percent slopes	590	0.1
DeD	Dekalb channery sandy loam, 15 to 25 percent slopes	720	0.1
DkB	Dekalb extremely stony sandy loam, 3 to 8 percent slopes	6,700	1.3
DkC	Dekalb extremely stony sandy loam, 8 to 25 percent slopes	19,360	3.9
DMF	Dekalb and Lehew extremely stony soils, steep	63,160	12.6
DR	Dekalb-Rubble land association	4,910	1.0
Ds	Dumps, coal waste	1,400	0.3
Du	Dumps, mine	7,590	1.5
HaB	Hartleton channery silt loam, 3 to 8 percent slopes	8,720	1.7
HaC	Hartleton channery silt loam, 8 to 15 percent slopes	10,230	2.0
HaD	Hartleton channery silt loam, 15 to 25 percent slopes	3,080	0.6
HeB	Hazleton channery fine sandy loam, 3 to 8 percent slopes	1,080	0.2
HeC	Hazleton channery fine sandy loam, 8 to 15 percent slopes	820	0.2
HeD	Hazleton channery fine sandy loam, 15 to 25 percent slopes	550	0.1
HfB	Hazleton extremely stony fine sandy loam, 3 to 8 percent slopes	2,440	0.5
HfC	Hazleton extremely stony fine sandy loam, 8 to 25 percent slopes	5,050	1.0
HGB	Hazleton-Clymer association, gently sloping	16,200	3.2
HGC	Hazleton-Clymer association, sloping	15,950	3.2
KeB	Kedron silt loam, 3 to 8 percent slopes	9,690	1.9
KeC	Kedron silt loam, 8 to 15 percent slopes	630	0.1
KvB	Kedron very stony silt loam, 3 to 8 percent slopes	2,920	0.6
KvC	Kedron very stony silt loam, 8 to 25 percent slopes	2,300	0.5
LaB	Laidig gravelly loam, 3 to 8 percent slopes	2,160	0.4
LaC	Laidig gravelly loam, 8 to 15 percent slopes	1,690	0.3
LdB	Laidig extremely stony loam, 3 to 8 percent slopes	1,860	0.4
LdC	Laidig extremely stony loam, 8 to 25 percent slopes	12,740	2.5
LeB	Leck Kill channery silt loam, 3 to 8 percent slopes	19,140	3.8
LeC	Leck Kill channery silt loam, 8 to 15 percent slopes	18,730	3.7
LgB	Lehew channery loam, 3 to 8 percent slopes	770	0.2
LgC	Lehew channery loam, 8 to 15 percent slopes	830	0.2
LgD	Lehew channery loam, 15 to 25 percent slopes	660	0.1
LhB	Lehew extremely stony loam, 3 to 8 percent slopes	1,680	0.3
LhC	Lehew extremely stony loam, 8 to 25 percent slopes	7,750	1.5
Ln	Linden silt loam	510	0.1
MeB	Meckesville loam, 3 to 8 percent slopes	12,970	2.6
MeC	Meckesville loam, 8 to 15 percent slopes	6,000	1.2
MeD	Meckesville loam, 15 to 25 percent slopes	600	0.1
MkB	Meckesville very stony loam, 3 to 8 percent slopes	2,410	0.5
MkC	Meckesville very stony loam, 8 to 25 percent slopes	12,320	2.5
Ph	Philo silt loam	1,310	0.3
Po	Pope silt loam	190	*
ShA	Shelmadine silt loam, 0 to 3 percent slopes	1,680	0.3
ShB	Shelmadine silt loam, 3 to 8 percent slopes	880	0.2
SmB	Shelmadine very stony silt loam, 0 to 8 percent slopes	1,600	0.3
UD	Udifluvents, coal overwash	3,420	0.7
UF	Udifluvents, gravelly	1,480	0.3
UM	Udorthents, strip mine	37,420	7.5
UU	Urban land-Udults complex	9,390	1.9
WaB	Watson silt loam, 3 to 8 percent slopes	5,890	1.2
WaC	Watson silt loam, 8 to 15 percent slopes	1,390	0.3

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
WKF	Weikert and Klinesville shaly silt loams, steep	29,900	6.0
	Water	1,540	0.3
	Total	501,760	100.0

* Less than 0.05 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield figure indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
AeB---- Allenwood	135	27	80	50	5.5	3.5	10.5
AeC---- Allenwood	125	25	75	45	5.0	3.5	9.5
AgA, AgB---- Alvira	95	19	60	---	---	3.0	6.0
AnA, AnB---- Andover	85	17	60	---	---	2.5	5.0
ArB---- Andover	---	---	---	---	---	---	---
At---- Atkins	100	20	60	---	---	3.0	5.5
Ba---- Basher	120	24	80	45	4.5	3.5	8.5
BeB---- Berks	80	16	60	35	3.5	3.0	6.5
BeC---- Berks	75	15	55	35	3.0	2.5	5.5
BeD---- Berks	70	14	50	30	3.0	2.5	5.5
BuB---- Buchanan	100	20	65	40	3.5	3.0	6.0
BuC---- Buchanan	90	18	60	35	3.5	3.0	5.5
BxB, BxD---- Buchanan	---	---	---	---	---	---	---
CaB---- Calvin	80	16	60	35	3.5	3.0	6.5
CaC---- Calvin	75	15	35	35	3.0	2.5	6.0
CaD---- Calvin	70	14	50	30	3.0	2.0	6.0
DeB---- Dekalb	80	16	60	35	3.5	3.0	6.5
DeC---- Dekalb	75	15	55	35	3.0	2.5	5.5
DeD---- Dekalb	70	14	50	30	3.0	2.0	5.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
DkB, DkC---- Dekalb	---	---	---	---	---	---	---
DMF**: Dekalb----	---	---	---	---	---	---	
Lehew----	---	---	---	---	---	---	---
DR**: Dekalb----	---	---	---	---	---	---	---
Rubble land.							
Ds**, Du**. Dumps							
HaB---- Hartleton	100	20	70	40	3.5	3.0	6.5
HaC---- Hartleton	95	15	65	40	3.0	2.5	6.0
HaD---- Hartleton	90	18	60	35	3.0	2.0	6.0
HeB---- Hazleton	100	20	70	40	3.5	3.0	6.5
HeC---- Hazleton	95	19	65	40	3.0	2.5	6.0
HeD---- Hazleton	90	18	60	35	3.0	2.5	6.0
HfB, HfC---- Hazleton	---	---	---	---	---	---	---
HGB**, HGC**: Hazleton----	---	---	---	---	---	---	---
Clymer----	---	---	---	---	---	---	---
KeB---- Kedron	100	20	70	---	---	3.0	7.0
KeC---- Kedron	90	18	65	---	---	3.0	7.0
KvB---- Kedron	---	---	---	---	---	---	4.0
KvC---- Kedron	---	---	---	---	---	---	3.5
LaB---- Laidig	100	20	70	40	4.0	3.0	7.5
LaC---- Laidig	95	19	65	35	4.0	3.0	7.5
LdB, LdC---- Laidig	---	---	---	---	---	---	---
LeB---- Leck Kill	125	25	80	50	4.5	3.0	5.0
LeC---- Leck Kill	120	24	75	50	4.0	3.0	4.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
LgB---------- Lehew	80	16	60	35	3.5	3.0	6.5
LgC---------- Lehew	75	15	55	35	3.0	2.5	5.5
LgD---------- Lehew	70	14	50	30	3.0	2.0	5.5
LhB, LhC---------- Lehew	---	---	---	---	---	---	---
Ln---------- Linden	120	24	80	45	4.5	3.5	---
MeB---------- Meckesville	100	20	70	40	---	4.0	7.5
MeC---------- Meckesville	95	19	65	35	---	4.0	7.5
MeD---------- Meckesville	85	17	60	30	---	3.5	6.5
MkB, MkC---------- Meckesville	---	---	---	---	---	---	---
Ph---------- Philo	130	26	80	45	4.5	3.5	8.5
Po---------- Pope	130	26	80	45	5.0	---	8.5
ShA, ShB---------- Shelmadine	85	17	60	---	---	2.5	5.0
SmB---------- Shelmadine	---	---	---	---	---	---	---
UD**, UF**. Udifluvents							
UM**. Udorthents							
UU**:							
Urban land----------	---	---	---	---	---	---	---
Udults----------	---	---	---	---	---	---	---
WaB---------- Watson	100	20	70	40	3.5	3.0	6.5
WaC---------- Watson	90	18	65	40	3.5	3.0	6.5
WKF**:							
Weikert----------	---	---	---	---	---	---	---
Klinesville----------	---	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.

** See description of the map unit for composition and behavior characteristics of the soils.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	700	---	---	---
II	87,170	74,240	12,930	---
III	74,270	62,370	11,900	---
IV	32,280	29,160	3,120	---
V	---	---	---	---
VI	77,700	---	---	77,700
VII	165,927	29,900	---	136,027
VIII	1,473	---	---	1,473

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AeB, AeC---- Allenwood	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Eastern white pine, Japanese larch, yellow-poplar, Norway spruce, Virginia pine.
						Yellow-poplar-------	75	
AgA, AgB---- Alvira	3w	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch, white spruce.
						Yellow-poplar-------	75	
AnA, AnB---- Andover	3w	Slight	Severe	Severe	Moderate	Northern red oak----	75	Eastern white pine, red maple, Norway spruce.
						Yellow-poplar-------	83	
ArB---- Andover	3x	Slight	Severe	Severe	Moderate	Northern red oak----	70	Eastern white pine, red maple, Norway spruce.
						Yellow-poplar-------	75	
At---- Atkins	1w	Slight	Severe	Severe	Moderate	Pin oak----------	100	Eastern white pine, white spruce, sweetgum.
						Sweetgum----------	95	
Ba---- Basher	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, black walnut, Norway spruce, Japanese larch.
						Northern red oak----	80	
BeB, BeC---- Berks	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	
BeD---- Berks	3f	Slight	Moderate	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Norway spruce, red pine.
						Black oak----------	70	
						Virginia pine-------	70	
BuB, BuC---- Buchanan	3o	Slight	Slight	Slight	Slight	Northern red oak----	66	Northern red oak, yellow-poplar, sugar maple, eastern white pine, Japanese larch, Norway spruce.
						Yellow-poplar-------	---	
BxB---- Buchanan	3x	Slight	Moderate	Slight	Slight	Northern red oak----	66	Northern red oak, yellow-poplar, sugar maple, eastern white pine, Japanese larch, Norway spruce.
						Yellow-poplar-------	91	
BxD---- Buchanan	3r	Moderate	Moderate	Slight	Slight	Northern red oak----	66	Northern red oak, yellow-poplar, sugar maple, eastern white pine, Japanese larch, Norway spruce.
						Yellow-poplar-------	91	
CaB, CaC---- Calvin	2f	Slight	Slight	Moderate	Slight	Yellow-poplar-------	80	Eastern white pine, red pine, Virginia pine.
						Northern red oak----	77	

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
CaD---------- Calvin	2f	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	80	Eastern white pine, red pine, Virginia pine.
						Northern red oak----	77	
DeB, DeC---------- Dekalb	4f	Slight	Slight	Moderate	Slight	Northern red oak----	57	Eastern white pine, Virginia pine.
DeD---------- Dekalb	4f	Slight	Moderate	Moderate	Slight	Northern red oak----	62	Eastern white pine, Virginia pine.
DkB, DkC---------- Dekalb	4x	Slight	Moderate	Moderate	Slight	Northern red oak----	57	Eastern white pine, red pine.
DMF*:								
Dekalb----------	3r	Moderate	Severe	Moderate	Moderate	Northern red oak----	62	Eastern white pine, Virginia pine.
Lehew----------	3r	Moderate	Severe	Slight	Slight	Northern red oak----	67	Eastern white pine, Virginia pine, red pine.
						Virginia pine-------	60	
DR*:								
Dekalb----------	4x	Slight	Moderate	Moderate	Moderate	Northern red oak----	62	Eastern white pine, Virginia pine.
Rubble land.								
HaB, HaC---------- Hartleton	3f	Slight	Slight	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Chestnut oak--------	70	
						Eastern white pine--	70	
						Virginia pine-------	70	
HaD---------- Hartleton	3r	Moderate	Moderate	Moderate	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanses larch, Norway spruce, red pine.
						Chestnut oak--------	70	
						Eastern white pine--	70	
						Virginia pine-------	70	
HeB, HeC---------- Hazleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HeD---------- Hazleton	3r	Moderate	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
HfB, HfC---------- Hazleton	3x	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
HGB*, HGC*:								
Hazleton	3x	Slight	Moderate	Slight	Slight	Northern red oak	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar	80	
Clymer	2x	Slight	Moderate	Slight	Slight	Northern red oak	77	Eastern white pine, Virginia pine, black cherry, yellow-poplar.
						Yellow-poplar	90	
						Eastern white pine	90	
KeB Kedron	3o	Slight	Slight	Slight	Slight	Northern red oak	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash	70	
						Sugar maple	70	
						Red maple	70	
						Yellow-poplar	80	
KeC Kedron	3r	Moderate	Slight	Slight	Slight	Northern red oak	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash	70	
						Sugar maple	70	
						Red maple	70	
						Yellow-poplar	80	
KvB Kedron	3o	Slight	Slight	Slight	Slight	Northern red oak	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash	70	
						Sugar maple	70	
						Red maple	70	
						Yellow-poplar	80	
KvC Kedron	3r	Severe	Moderate	Slight	Slight	Northern red oak	70	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
						White ash	70	
						Sugar maple	70	
						Red maple	70	
						Yellow-poplar	80	
LaB, LaC Laidig	3o	Slight	Slight	Slight	Slight	Northern red oak	69	Eastern white pine, yellow-poplar, black walnut, Virginia pine, Japanese larch, Norway spruce.
						Yellow-poplar	85	
						Eastern white pine	80	
						Virginia pine	70	
LdB, LdC Laidig	3x	Slight	Moderate	Slight	Slight	Northern red oak	69	Eastern white pine, yellow-poplar, black walnut, Virginia pine, Japanese larch, Norway spruce.
						Yellow-poplar	75	
						Eastern white pine	80	
						Virginia pine	70	
LeB, LeC Leck Kill	3o	Slight	Slight	Slight	Slight	Northern red oak	67	Eastern white pine, Virginia pine.
LgB, LgC Lehew	3o	Slight	Slight	Slight	Slight	Northern red oak	67	Eastern white pine, Virginia pine, red pine.
						Virginia pine	57	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
LgD---- Lehew	3r	Slight	Moderate	Slight	Slight	Northern red oak----	67	Eastern white pine,
						Virginia pine-------	70	Virginia pine,
								red pine.
LhB---- Lehew	3x	Slight	Moderate	Slight	Slight	Northern red oak----	67	Eastern white pine,
						Virginia pine-------	57	Virginia pine,
								red pine.
LhC---- Lehew	3x	Slight	Moderate	Slight	Slight	Northern red oak----	67	Eastern white pine,
						Virginia pine-------	60	Virginia pine,
								red pine.
Ln---- Linden	1o	Slight	Slight	Slight	Slight	Northern red oak----	90	Yellow-poplar,
						White ash----------	90	black walnut,
						Sugar maple---------	90	black cherry,
						Black cherry--------	90	red pine,
						Black walnut--------	90	Japanese larch,
						Eastern white pine--	90	Norway spruce,
						Yellow-poplar-------	100	eastern white pine.
MeB, MeC---- Meckesville	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine,
						Yellow-poplar-------	90	Japanese larch,
								yellow-poplar,
								black cherry,
								Norway spruce.
MeD---- Meckesville	2r	Slight	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine,
						Yellow-poplar-------	90	Japanese larch,
								yellow-poplar,
								black cherry,
								Norway spruce.
MkB---- Meckesville	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine,
						Yellow-poplar-------	90	Japanese larch,
								yellow-poplar,
								black cherry,
								Norway spruce.
MkC---- Meckesville	2r	Slight	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine,
						Yellow-poplar-------	90	Japanese larch,
								yellow-poplar,
								black cherry,
								Norway spruce.
Ph---- Philo	1w	Slight	Moderate	Slight	Slight	Virginia pine-------	74	Eastern white pine,
						Northern red oak----	85	yellow-poplar.
						Yellow-poplar-------	102	
						Sweetgum------------	90	
Po---- Pope	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine,
						Yellow-poplar-------	102	yellow-poplar,
						Eastern white pine--	89	black walnut,
						Virginia pine-------	74	black cherry,
								Norway spruce,
								Japanese larch.
ShA, ShB---- Shelmadine	3w	Slight	Severe	Severe	Moderate	Northern red oak----	70	Eastern white pine,
						Black cherry--------	70	red maple,
								Norway spruce.
SmB---- Shelmadine	3w	Slight	Severe	Severe	Severe	Northern red oak----	70	Eastern white pine,
						Black cherry--------	70	red maple,
								Norway spruce.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
WaB, WaC---------- Watson	3o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- Yellow-poplar--------	70 70 80	Eastern white pine, yellow-poplar, Japanese larch, Norway spruce, black cherry.
WKF*: Weikert----------	4d	Moderate	Severe	Severe	Moderate	Northern red oak---- Virginia pine-------	64 60	Eastern white pine, shortleaf pine, Virginia pine.
Klinesville-------	4d	Moderate	Severe	Moderate	Slight	Northern red oak---- Virginia pine-------	60 60	Virginia pine, eastern white pine, red pine, pitch pine.

* See description of the map unit for composition and behavior characteristics of the soils.

TABLE 8.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AeB--- Allenwood	Slight	Moderate: frost action.	Slight	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
AeC--- Allenwood	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
AgA, AgB--- Alvira	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
AnA, AnB--- Andover	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
ArB--- Andover	Severe: large stones, wetness.	Severe: large stones, wetness, frost action.	Severe: large stones.	Severe: large stones, wetness, frost action.	Severe: wetness, frost action.	Severe: large stones, wetness.
At--- Atkins	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.
Ba--- Basher	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Moderate: floods, frost action.	Moderate: floods.
BeB--- Berks	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Severe: small stones.
BeC--- Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
BeD--- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
BuB--- Buchanan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: small stones, wetness.
BuC--- Buchanan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Moderate: slope, wetness, frost action.	Moderate: small stones, wetness.
BxB--- Buchanan	Severe: wetness, large stones.	Severe: wetness, large stones.	Severe: wetness, large stones.	Severe: wetness, large stones.	Moderate: wetness, frost action.	Severe: large stones.
BxD--- Buchanan	Severe: slope, wetness, large stones.	Severe: slope, wetness, large stones.	Severe: slope, wetness, large stones.	Severe: slope, wetness, large stones.	Severe: slope.	Severe: slope, large stones.
CaB--- Calvin	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Moderate: depth to rock.
CaC--- Calvin	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope, depth to rock.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CaD---------- Calvin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DeB---------- Dekalb	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: small stones.
DeC---------- Dekalb	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Severe: small stones.
DeD---------- Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
DkB---------- Dekalb	Severe: depth to rock, large stones.	Severe: large stones.	Severe: depth to rock, large stones.	Severe: large stones.	Moderate: depth to rock large stones.	Severe: small stones, large stones.
DkC---------- Dekalb	Severe: depth to rock, large stones, slope.	Severe: large stones, slope.	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Moderate: slope, depth to rock, large stones.	Severe: slope, small stones, large stones.
DMF*: Dekalb----------	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones, small stones.
Lehew----------	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones, small stones.
DR*: Dekalb----------	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones, small stones.
Rubble land.						
Ds*, Du*. Dumps						
HaB---------- Hartleton	Slight---------	Moderate: frost action.	Slight---------	Moderate: slope, frost action.	Moderate: frost action.	Severe: small stones.
HaC---------- Hartleton	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Severe: small stones.
HaD---------- Hartleton	Severe: slope,	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope. small stones.
HeB---------- Hazleton	Moderate: depth to rock.	Moderate: frost action.	Moderate: depth to rock.	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
HeC---------- Hazleton	Moderate: slope, depth to rock.	Moderate: slope, frost action.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
HeD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HfB---- Hazleton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: frost action, large stones.	Severe: large stones.
HfC---- Hazleton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.
HGB*:						
Hazleton----	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: frost action, large stones.	Severe: large stones.
Clymer----	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: frost action, large stones.	Severe: large stones.
HGC*:						
Hazleton----	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Moderate: slope, large stones.	Severe: large stones.
Clymer----	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Moderate: slope, frost action.	Severe: large stones.
KeB---- Kedron	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness.
KeC---- Kedron	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Moderate: slope, wetness, frost action.	Moderate: slope, wetness.
KvB---- Kedron	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, large stones.
KvC---- Kedron	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope.	Severe: slope.
LaB---- Laidig	Moderate: wetness, small stones.	Moderate: frost action.	Moderate: wetness.	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
LaC---- Laidig	Moderate: small stones, wetness, slope.	Moderate: slope, frost action.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
LdB---- Laidig	Moderate: large stones, wetness.	Moderate: large stones, frost action.	Severe: large stones.	Severe: large stones.	Moderate: large stones, frost action.	Severe: large stones.
LdC---- Laidig	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.
LeB---- Leck Kill	Slight----	Moderate: frost action.	Slight----	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
LeC---- Leck Kill	Moderate: slope.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LgB---- Lehew	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: small stones.
LgC---- Lehew	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Severe: small stones.
LgD---- Lehew	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
LhB---- Lehew	Severe: depth to rock, large stones.	Severe: large stones.	Severe: depth to rock, large stones.	Moderate: slope, depth to rock, large stones.	Moderate: depth to rock, large stones.	Severe: small stones, large stones.
LhC---- Lehew	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.
Ln---- Linden	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, frost action.	Moderate: floods.
MeB---- Meckesville	Moderate: wetness.	Moderate: frost action.	Moderate: wetness.	Moderate: slope, frost action.	Moderate: frost action.	Slight.
MeC---- Meckesville	Moderate: slope, wetness.	Moderate: slope, frost action.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
MeD---- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MkB---- Meckesville	Moderate: wetness, large stones.	Moderate: frost action. large stones.	Moderate: wetness, large stones.	Moderate: slope, large stones.	Moderate: low strength, frost action.	Moderate: large stones.
MkC---- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ph---- Philo	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Moderate: floods.
Po---- Pope	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, frost action.	Moderate: floods.
ShA, ShB, SmB---- Shelmadine	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
UD*, UF*. Udifluvents						
UM*. Udorthents						
UU*: Urban land.						
Udults.						

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WaB---------- Watson	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: slope, wetness, frost action.	Moderate: frost action.	Slight.
WaC---------- Watson	Severe: wetness.	Moderate: slope, wetness, frost action.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
WKF*:						
Weikert----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Klinesville------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for the composition and behavior characteristics of the soils.

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," and "fair." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AeB Allenwood	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
AeC Allenwood	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
AgA Alvira	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Fair: thin layer.
AgB Alvira	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
AnA Andover	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
AnB Andover	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
ArB Andover	Severe: large stones, wetness, percs slowly.	Severe: large stones.	Severe: wetness, large stones.	Severe: wetness.	Poor: large stones, wetness.
At Atkins	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness.	Poor: wetness.
Ba Basher	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness.	Good.
BeB Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
BeC Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
BeD Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, slope.	Poor: small stones, slope.
BuB Buchanan	Severe: wetness, percs slowly.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: small stones, thin layer.
BuC Buchanan	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, small stones, thin layer.
BxB Buchanan	Severe: wetness, large stones, percs slowly.	Severe: large stones.	Severe: wetness, large stones.	Severe: wetness.	Poor: large stones.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BxD---------- Buchanan	Severe: slope, wetness, large stones.	Severe: slope, large stones.	Severe: wetness, large stones.	Severe: slope, wetness.	Poor: slope, large stones.
CaB---------- Calvin	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
CaC---------- Calvin	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
CaD---------- Calvin	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, slope.	Poor: small stones, slope.
DeB---------- Dekalb	Severe: depth to rock.	Severe: depth to rock, small stones, seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
DeC---------- Dekalb	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
DeD---------- Dekalb	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
DkB---------- Dekalb	Severe: large stones, depth to rock.	Severe: depth to rock, seepage, large stones.	Severe: depth to rock, seepage, large stones.	Severe: seepage.	Poor: large stones, small stones.
DkC---------- Dekalb	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, large stones.	Severe: seepage.	Poor: large stones, small stones.
DMF*: Dekalb----------	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, large stones, small stones.
Lehew----------	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, large stones, small stones.
DR*: Dekalb----------	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones, small stones.
Rubble land.					
Ds*, Du*. Dumps					
HaB---------- Hartleton	Moderate: depth to rock.	Severe: seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HaC---------- Hartleton	Moderate: slope, depth to rock.	Severe: slope, seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
HaD---------- Hartleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
HeB---------- Hazleton	Moderate: depth to rock.	Severe: seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
HeC---------- Hazleton	Moderate: slope, depth to rock.	Severe: slope, seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
HeD---------- Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
HfB---------- Hazleton	Severe: large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones, large stones.
HfC---------- Hazleton	Severe: slope, large stones.	Severe: slope, seepage, large stones.	Severe: seepage, large stones.	Severe: slope, seepage.	Poor: slope, small stones, large stones.
HGB*: Hazleton----------	Severe: large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones, large stones.
Clymer----------	Severe: large stones.	Severe: seepage, depth to rock.	Severe: depth to rock, large stones, seepage.	Severe: seepage.	Poor: large stones, small stones.
HGC*: Hazleton----------	Severe: large stones.	Severe: slope, seepage, large stones.	Severe: seepage, large stones, depth to rock.	Severe: seepage.	Poor: small stones, large stones.
Clymer----------	Severe: large stones.	Severe: slope, seepage, large stones.	Severe: depth to rock, large stones, seepage.	Severe: seepage.	Poor: large stones, small stones.
KeB---------- Kedron	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
KeC---------- Kedron	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, thin layer.
KvB---------- Kedron	Severe: percs slowly, wetness.	Moderate: large stones, slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer, large stones.
KvC---------- Kedron	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Poor: slope.
LaB---------- Laidig	Severe: percs slowly, wetness.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: small stones.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LaC---------- Laidig	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, small stones.
LdB---------- Laidig	Severe: percs slowly, wetness.	Severe: large stones.	Severe: wetness, large stones.	Severe: wetness.	Poor: large stones.
LdC---------- Laidig	Severe: slope, percs slowly, wetness.	Severe: slope, large stones.	Severe: wetness, large stones.	Severe: slope, wetness.	Poor: slope, large stones.
LeB---------- Leck Kill	Moderate: depth to rock.	Severe: seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: thin layer, small stones.
LeC---------- Leck Kill	Moderate: slope, depth to rock.	Severe: slope, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: slope, thin layer, small stones.
LgB---------- Lehew	Severe: depth to rock, large stones.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
LgC---------- Lehew	Severe: depth to rock, large stones.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
LgD---------- Lehew	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
LhB---------- Lehew	Severe: depth to rock, large stones.	Severe: depth to rock, seepage, large stones.	Severe: depth to rock, seepage, large stones.	Severe: seepage.	Poor: small stones, large stones.
LhC---------- Lehew	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, large stones.	Severe: slope, seepage.	Poor: slope, small stones, large stones.
Ln---------- Linden	Severe: wetness, floods.	Severe: floods, seepage.	Severe: wetness, seepage.	Severe: seepage, floods.	Good.
MeB---------- Meckesville	Severe: percs slowly, wetness.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: small stones.
MeC---------- Meckesville	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, small stones.
MeD---------- Meckesville	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Poor: slope.
MkB---------- Meckesville	Severe: percs slowly, wetness.	Moderate: slope, large stones.	Severe: wetness.	Severe: wetness.	Fair: large stones, small stones.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MkC---------- Meckesville	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: slope, wetness.	Severe: slope.
Ph---------- Philo	Severe: floods, wetness.	Severe: floods, seepage.	Severe: floods, seepage, wetness.	Severe: floods, wetness.	Good.
Po---------- Pope	Severe: floods.	Severe: floods, seepage.	Severe: seepage.	Severe: seepage.	Good.
ShA, ShB, SmB------- Shelmadine	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
UD*, UF*. Udifluvents					
UM*. Udorthents					
UU*: Urban land.					
Udults.					
WaB---------- Watson	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
WaC---------- Watson	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: slope, thin layer.
WKF*: Weikert----------	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer, small stones.
Klinesville-------- 	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer, seepage.

* See description of the map unit for the composition and behavior characteristics of the soils.

TABLE 10.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AeB, AeC---------- Allenwood	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
AgA, AgB---------- Alvira	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
AnA, AnB---------- Andover	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, small stones.
ArB---------- Andover	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines, large stones.	Poor: wetness, large stones.
At---------- Atkins	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Ba---------- Basher	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
BeB, BeC---------- Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
BeD---------- Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope.
BuB, BuC---------- Buchanan	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
BxB---------- Buchanan	Fair: wetness, large stones, frost action.	Unsuited: excess fines.	Unsuited: excess fines, large stones.	Poor: large stones.
BxD---------- Buchanan	Fair: slope, wetness, large stones.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
CaB, CaC---------- Calvin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
CaD---------- Calvin	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope.
DeB, DeC---------- Dekalb	Poor: thin layer.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
DeD---------- Dekalb	Poor: thin layer.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
DkB, DkC---------- Dekalb	Poor: thin layer.	Poor: excess fines, large stones.	Unsuited: large stones.	Poor: small stones, large stones, area reclaim.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
DMF*:				
Dekalb	Poor: slope, thin layer.	Poor: excess fines, large stones.	Unsuited: large stones.	Poor: slope, large stones, small stones.
Lehew	Poor: slope, thin layer.	Poor: excess fines.	Unsuited: large stones.	Poor: slope, large stones, small stones.
DR*:				
Dekalb	Poor: thin layer.	Poor: excess fines, large stones.	Unsuited: excess fines.	Poor: slope, large stones, small stones.
Rubble land.				
Ds*, Du*. Dumps				
HaB, HaC Hartleton	Fair: thin layer, frost action.	Unsuited: excess fines.	Poor: excess fines, thin layer.	Poor: small stones.
HaD Hartleton	Fair: slope, frost action, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
HeB, HeC Hazleton	Fair: thin layer, frost action.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
HeD Hazleton	Fair: slope, thin layer.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
HfB Hazleton	Fair: frost action, large stones.	Unsuited: large stones.	Unsuited: large stones.	Poor: large stones, small stones.
HfC Hazleton	Fair: slope, frost action, large stones.	Unsuited: large stones.	Unsuited: large stones.	Poor: slope, large stones, small stones.
HGB*, HGC*:				
Hazleton	Fair: frost action, large stones.	Unsuited: large stones.	Unsuited: large stones.	Poor: large stones, small stones.
Clymer	Fair: frost action, large stones.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
KeB Kedron	Fair: frost action, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
KeC Kedron	Fair: frost action, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
KvB Kedron	Fair: frost action, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
KvC---------- Kedron	Fair: slope, frost action, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
LaB, LaC---------- Laidig	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
LdB---------- Laidig	Fair: large stones, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
LdC---------- Laidig	Fair: slope, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
LeB, LeC---------- Leck Kill	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
LgB, LgC---------- Lehew	Poor: thin layer.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
LgD---------- Lehew	Poor: thin layer.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
LhB---------- Lehew	Poor: thin layer.	Poor: excess fines.	Unsuited: large stones.	Poor: large stones, small stones.
LhC---------- Lehew	Poor: thin layer.	Poor: excess fines.	Unsuited: large stones.	Poor: slope, large stones, small stones.
Ln---------- Linden	Fair: low strength, frost action.	Poor: excess fines.	Poor: excess fines.	Good.
MeB, MeC---------- Meckesville	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
MeD---------- Meckesville	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
MkB---------- Meckesville	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
MkC---------- Meckesville	Fair: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
Ph---------- Philo	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
Po---------- Pope	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ShA, ShB---------- Shelmadine	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
SmB---------- Shelmadine	Poor: wetness, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, large stones.
UD*, UF*. Udifluvents				
UM*. Udorthents				
UU*: Urban land.				
Udults.				
WaB---------- Watson	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
WaC---------- Watson	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
WKF*: Weikert----------	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
Klinesville----------	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.

* See description of the map unit for composition and behavior characteristics of the soil.

TABLE 11.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AeB, AeC---------- Allenwood	Seepage, slope.	Low strength, compressible, piping.	No water-------	Not needed-----	Slope----------	Slope.
AgA, AgB---------- Alvira	Slope----------	Low strength, compressible, piping.	Slow refill, slope.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, erodes easily, wetness.
AnA, AnB---------- Andover	Slope----------	Piping, low strength.	Favorable------	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Percs slowly, wetness, erodes easily.
ArB---------- Andover	Slope----------	Piping, low strength, large stones.	Large stones---	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Large stones, wetness, erodes easily.
At---------- Atkins	Seepage, wetness.	Piping, floods.	Favorable------	Floods, wetness.	Not needed-----	Wetness, floods.
Ba---------- Basher	Seepage--------	Piping, low strength.	Deep to water	Floods, wetness.	Not needed-----	Not needed.
BeB, BeC, BeD----- Berks	Depth to rock, seepage.	Piping---------	No water-------	Not needed-----	Depth to rock, slope.	Depth to rock, droughty.
BuB, BuC---------- Buchanan	Slope----------	Piping, low strength.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
BxB, BxD---------- Buchanan	Slope----------	Large stones, piping, low strength.	Deep to water, large stones.	Percs slowly, slope.	Slope, large stones, percs slowly.	Slope, large stones, percs slowly.
CaB, CaC, CaD----- Calvin	Depth to rock, seepage.	Piping---------	No water-------	Not needed-----	Depth to rock, slope.	Depth to rock, droughty.
DeB, DeC, DeD----- Dekalb	Depth to rock, seepage.	Piping, seepage.	No water-------	Not needed-----	Depth to rock, slope.	Droughty, rooting depth.
DkB, DkC---------- Dekalb	Depth to rock, seepage, slope.	Piping, seepage, large stones.	No water, large stones.	Not needed-----	Depth to rock, large stones.	Droughty, rooting depth, large stones.
DMF*: Dekalb----------	Depth to rock, seepage, slope.	Piping, seepage, large stones.	No water, large stones.	Not needed-----	Depth to rock, large stones.	Droughty, rooting depth, large stones.
Lehew----------	Depth to rock, seepage, slope.	Piping, seepage, large stones.	No water, large stones.	Not needed-----	Depth to rock, large stones.	Droughty, depth to rock, large stones.
DR*: Dekalb----------	Depth to rock, seepage, slope.	Piping, seepage, large stones.	No water, large stones.	Not needed-----	Depth to rock, large stones.	Droughty, rooting depth, large stones.
Rubble land.						
Ds*, Du*. Dumps						
HaB, HaC, HaD----- Hartleton	Slope, seepage, depth to rock.	Low strength---	No water, depth to rock.	Not needed-----	Slope, depth to rock.	Slope, droughty.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
HeB, HeC, HeD----- Hazleton	Slope, depth to rock, seepage.	Large stones, low strength, piping.	No water-------	Not needed-----	Slope, depth to rock.	Slope, depth to rock.
HfB, HfC---------- Hazleton	Slope, seepage, depth to rock.	Low strength, piping, large stones.	No water-------	Not needed-----	Slope, large stones, depth to rock.	Slope, large stones.
HGB*, HGC*: Hazleton---------	Slope, seepage, depth to rock.	Low strength, piping, large stones.	No water, large stones.	Not needed-----	Slope, large stones, depth to rock.	Slope, large stones.
Clymer----------	Depth to rock, slope.	Piping, large stones.	No water, large stones.	Not needed-----	Large stones, slope.	Large stones, slope.
KeB, KeC---------- Kedron	Slope----------	Piping, hard to pack.	Slow refill----	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, wetness, erodes easily.
KvB, KvC---------- Kedron	Slope----------	Piping, hard to pack.	Slow refill, large stones.	Percs slowly, wetness.	Percs slowly, wetness, large stones.	Wetness, erodes easily, large stones.
LaB, LaC---------- Laidig	Slope, seepage.	Favorable------	No water-------	Not needed-----	Slope, rooting depth.	Slope, rooting depth.
LdB, LdC---------- Laidig	Seepage, slope.	Large stones---	No water, large stones.	Not needed-----	Large stones, slope, rooting depth.	Large stones, slope, rooting depth.
LeB, LeC---------- Leck Kill	Seepage, depth to rock, slope.	Low strength, compressible, piping.	No water-------	Not needed-----	Slope, depth to rock.	Slope, depth to rock.
LgB, LgC, LgD----- Lehew	Depth to rock, seepage, slope.	Piping, seepage, thin layer.	No water-------	Not needed-----	Depth to rock, slope.	Droughty, depth to rock, slope.
LhB, LhC---------- Lehew	Depth to rock, seepage, slope.	Piping, seepage, large stones.	No water, large stones.	Not needed-----	Depth to rock, large stones.	Droughty, depth to rock, large stones.
Ln---------- Linden	Seepage--------	Seepage, piping.	Deep to water	Not needed-----	Not needed-----	Favorable.
MeB, MeC, MeD----- Meckesville	Slope----------	Piping---------	No water-------	Not needed-----	Slope----------	Slope.
MkB, MkC---------- Meckesville	Slope----------	Large stones, piping.	No water, large stones.	Not needed-----	Large stones, slope.	Slope, large stones.
Ph---------- Philo	Seepage--------	Piping---------	Deep to water	Floods, poor outlets.	Not needed-----	Not needed.
Po---------- Pope	Seepage--------	Piping---------	No water-------	Not needed-----	Not needed-----	Not needed.
ShA, ShB, SmB----- Shelmadine	Slope----------	Piping, low strength.	Favorable------	Wetness, percs slowly.	Percs slowly, erodes easily, wetness.	Percs slowly, erodes easily, wetness.
UD*, UF*. Udifluvents						
UM*. Udorthents						

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
UU*: Urban land. Udults.						
WaB, WaC---------- Watson	Slope----------	Piping, low strength.	Slope, deep to water.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, erodes easily.
WKF*: Weikert----------	Seepage, slope, depth to rock.	Thin layer, low strength, seepage.	No water, depth to rock.	Not needed-----	Depth to rock, rooting depth, slope.	Depth to rock, rooting depth, droughty.
Klinesville------	Seepage, slope, depth to rock.	Seepage, thin layer, seepage.	No water, depth to rock.	Not needed-----	Depth to rock, rooting depth, slope.	Depth to rock, rooting depth, droughty.

* See description of the map unit for composition and behavior characteristics of the soil.

TABLE 12.--RECREATIONAL DEVELOPMENT

[Some of the terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AeB Allenwood	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
AeC Allenwood	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: small stones, slope.
AgA, AgB Alvira	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
AnA, AnB Andover	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
ArB Andover	Severe: wetness, large stones.	Severe: wetness, large stones.	Severe: large stones, wetness.	Severe: wetness.	Severe: large stones, wetness.
At Atkins	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Ba Basher	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight	Moderate: floods.
BeB Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: depth to rock, small stones.
BeC Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Moderate: small stones.	Moderate: slope, depth to rock, small stones.
BeD Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, small stones.	Severe: slope.
BuB Buchanan	Moderate: wetness, small stones.	Moderate: wetness, small stones.	Severe: small stones.	Moderate: wetness, small stones.	Moderate: small stones, wetness.
BuC Buchanan	Moderate: slope, wetness, small stones.	Moderate: slope, wetness, small stones.	Severe: slope, small stones.	Moderate: wetness, small stones.	Moderate: small stones, wetness.
BxB Buchanan	Severe: large stones.	Moderate: wetness, large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
BxD Buchanan	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: large stones.	Severe: slope, large stones.
CaB Calvin	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: depth to rock.
CaC Calvin	Moderate: small stones.	Moderate: small stones.	Severe: small stones, slope.	Moderate: small stones.	Moderate: slope, depth to rock.
CaD Calvin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: small stones.	Severe: slope.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DeB---------- Dekalb	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
DeC---------- Dekalb	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope.	Moderate: small stones.	Severe: small stones.
DeD---------- Dekalb	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, small stones.	Severe: slope, small stones.
DkB---------- Dekalb	Severe: large stones.	Moderate: small stones, large stones.	Severe: small stones, large stones.	Severe: large stones.	Severe: large stones.
DkC---------- Dekalb	Severe: large stones, slope.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: large stones.	Severe: large stones.
DMF*: Dekalb----------	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Lehew----------	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
DR*: Dekalb----------	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: large stones.	Severe: slope, large stones.
Rubble land.					
Ds*, Du*. Dumps					
HaB---------- Hartleton	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
HaC---------- Hartleton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
HaD---------- Hartleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
HeB---------- Hazleton	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
HeC---------- Hazleton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
HeD---------- Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
HfB---------- Hazleton	Severe: large stones.	Moderate: large stones, small stones.	Severe: small stones, large stones.	Severe: large stones.	Severe: large stones.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HfC Hazleton	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: large stones.	Severe: slope, large stones.
HGB*: Hazleton	Severe: large stones.	Moderate: large stones, small stones.	Severe: small stones, large stones.	Severe: large stones.	Severe: large stones.
Clymer	Severe: large stones.	Moderate: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
HGC*: Hazleton	Severe: large stones.	Moderate: slope, large stones.	Severe: slope, small stones, large stones.	Severe: large stones.	Severe: large stones.
Clymer	Severe: large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
KeB Kedron	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
KeC Kedron	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: wetness, slope.	Moderate: wetness.	Moderate: slope, wetness.
KvB Kedron	Moderate: wetness, small stones, large stones.	Moderate: wetness, small stones.	Severe: wetness.	Moderate: wetness, small stones, large stones.	Moderate: wetness, large stones.
KvC Kedron	Severe: slope.	Severe: slope.	Severe: slope, wetness.	Moderate: slope, wetness, large stones.	Severe: slope.
LaB Laidig	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
LaC Laidig	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
LdB Laidig	Severe: large stones.	Moderate: small stones, large stones.	Severe: large stones.	Moderate: large stones, small stones.	Severe: large stones.
LdC Laidig	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Moderate: slope, large stones, small stones.	Severe: slope, large stones.
LeB Leck Kill	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
LeC Leck Kill	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
LgB Lehew	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LgC---------- Lehew	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
LgD---------- Lehew	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
LhB---------- Lehew	Severe: large stones.	Moderate: small stones, large stones.	Severe: small stones, large stones.	Severe: large stones.	Severe: large stones.
LhC---------- Lehew	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Moderate: large stones.	Severe: slope, large stones.
Ln---------- Linden	Moderate: floods.	Slight----------	Slight----------	Slight----------	Moderate: floods.
MeB---------- Meckesville	Moderate: percs slowly.	Slight----------	Moderate: slope, percs slowly.	Slight----------	Slight.
MeC---------- Meckesville	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
MeD---------- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MkB---------- Meckesville	Moderate: large stones, percs slowly.	Slight----------	Moderate: slope, large stones.	Moderate: large stones.	Moderate: large stones.
MkC---------- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, large stones.	Severe: slope.
Ph---------- Philo	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight----------	Moderate: floods.
Po---------- Pope	Severe: floods.	Slight----------	Slight----------	Slight----------	Slight.
ShA, ShB---------- Shelmadine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
SmB---------- Shelmadine	Severe: wetness.	Severe: wetness.	Severe: wetness, large stones.	Severe: wetness.	Severe: wetness.
UD*, UF*. Udifluvents					
UM*. Udorthents					
UU*: Urban land.					
Udults.					
WaB---------- Watson	Moderate: percs slowly.	Slight----------	Moderate: slope, percs slowly.	Slight----------	Slight.
WaC---------- Watson	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WKF*:					
Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
Klinesville	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the soil.

TABLE 13.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AeB---- Allenwood	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
AeC---- Allenwood	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
AgA---- Alvira	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AgB---- Alvira	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
AnA---- Andover	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
AnB---- Andover	Poor	Fair	Good	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor.
ArB---- Andover	Very poor	Very poor	Good	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
At---- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Ba---- Basher	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BeB---- Berks	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
BeC---- Berks	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
BeD---- Berks	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
BuB---- Buchanan	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
BuC---- Buchanan	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
BxB---- Buchanan	Very poor	Very poor	Good	Good	Good	Fair	Very poor	Poor	Fair	Poor.
BxD---- Buchanan	Very poor	Very poor	Good	Good	Good	Poor	Very poor	Poor	Fair	Very poor.
CaB---- Calvin	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
CaC---- Calvin	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
CaD---- Calvin	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
DeB---- Dekalb	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
DeC---- Dekalb	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
DeD---------- Dekalb	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
DkB, DkC---------- Dekalb	Very poor	Very poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
DMF*: Dekalb----------	Very poor	Very poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Lehew----------	Very poor	Very poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
DR*: Dekalb. Rubble land.	Very poor	Very poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Ds*, Du*. Dumps										
HaB---------- Hartleton	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
HaC---------- Hartleton	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
HaD---------- Hartleton	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
HeB---------- Hazleton	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
HeC---------- Hazleton	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
HeD---------- Hazleton	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
HfB---------- Hazleton	Very poor	Very poor	Good	Good	Good	Poor	Very poor	Poor	Fair	Very poor.
HfC---------- Hazleton	Very poor	Very poor	Good	Good	Good	Very poor	Very poor	Poor	Fair	Very poor.
HGB*: Hazleton----------	Very poor	Very poor	Fair	Poor	Poor	Poor	Very poor	Poor	Poor	Very poor.
Clymer----------	Very poor	Very poor	Good	Good	Good	Poor	Very poor	Poor	Fair	Very poor.
HGC*: Hazleton----------	Very poor	Very poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor.
Clymer----------	Very poor	Very poor	Good	Good	Good	Very poor	Very poor	Poor	Fair	Very poor.
KeB---------- Kedron	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
KeC---------- Kedron	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
KvB---------- Kedron	Very poor	Poor	Good	Good	Good	Poor	Very poor	Poor	Good	Very poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
KvC---- Kedron	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
LaB---- Laidig	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
LaC---- Laidig	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
LdB---- Laidig	Very poor	Very poor	Good	Good	Good	Poor	Very poor	Poor	Fair	Very poor.
LdC---- Laidig	Very poor	Very poor	Good	Good	Good	Very poor	Very poor	Poor	Fair	Very poor.
LeB---- Leck Kill	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
LeC---- Leck Kill	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
LgB---- Lehew	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
LgC---- Lehew	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
LgD---- Lehew	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
LhB---- Lehew	Very poor	Very poor	Good	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
LhC---- Lehew	Very poor	Very poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Ln---- Linden	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
MeB---- Meckesville	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
MeC---- Meckesville	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
MeD---- Meckesville	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
MkB---- Meckesville	Very poor	Poor	Good	Good	Good	Poor	Very poor	Fair	Good	Very poor.
MkC---- Meckesville	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Ph---- Philo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Po---- Pope	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
ShA---- Shelmadine	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
ShB---- Shelmadine	Poor	Fair	Good	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
SmB---------- Shelmadine	Very poor	Poor	Good	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
UD*, UF*. Udifluvents										
UM*. Udorthents										
UU*: Urban land.										
Udults.										
WaB---------- Watson	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
WaC---------- Watson	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
WKF*: Weikert----------	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Klinesville-------	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.

* See description of the map unit for composition and behavior characteristics of the soil.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AeB, AeC---------- Allenwood	0-9	Gravelly silt loam.	ML, CL, GM, SM	A-4, A-6	0-10	60-85	60-85	50-85	40-80	---	---
	9-52	Loam, gravelly clay, gravelly clay loam.	CL, GM, GC, MH	A-4, A-5, A-6, A-7	0-15	60-95	45-90	45-90	35-75	25-57	5-23
	52-64	Clay loam, very cherty silty clay loam.	CL, SM, GM, MH	A-1, A-2, A-4, A-7	0-20	25-100	25-80	20-80	15-75	5-55	NP-23
AgA, AgB---------- Alvira	0-9	Silt loam-------	ML	A-4	0-5	90-100	80-95	70-90	50-80	---	---
	9-20	Silt loam, silty clay loam, shaly loam.	CL, CL-ML, GM-GC, SM-SC	A-4, A-6	0-10	65-100	55-90	50-90	35-85	25-40	5-15
	20-70	Shaly silt loam, gravelly loam, silty clay loam.	CL, CL-ML, GM-GC, SM-SC	A-4, A-6, A-2	0-20	65-95	45-90	40-90	30-85	25-40	5-15
AnA, AnB---------- Andover	0-5	Gravelly loam---	SM, SC, ML, CL	A-4, A-2	0-5	65-75	65-75	60-70	30-60	---	---
	5-20	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, SC, ML, CL	A-4, A-2	0-25	80-95	65-85	60-85	30-60	20-35	4-10
	20-46	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, SC, ML, CL	A-2, A-4	0-25	80-95	65-85	60-85	30-60	20-35	2-10
	46-62	Gravelly sandy clay loam, cobbly loam, cobbly sandy loam.	SM, SC, ML, CL	A-2, A-4	5-30	70-85	55-80	50-75	25-60	20-35	2-10
ArB---------- Andover	0-5	Extremely stony loam.	ML, CL, SM, SC	A-4, A-2	5-15	70-100	65-95	60-90	30-85	---	---
	5-20	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, SC, ML, CL	A-4, A-2	0-25	80-95	65-85	60-80	30-60	20-35	4-10
	20-46	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, SC, ML, CL	A-4, A-2	0-25	80-95	65-85	60-85	30-60	20-35	2-9
	46-62	Gravelly sandy clay loam, cobbly loam, cobbly sandy loam.	SM, SC, ML, CL	A-2, A-4	5-30	70-85	55-80	50-75	25-60	20-35	2-9
At---------- Atkins	0-4	Silt loam-------	ML, CL	A-4, A-6	0	90-100	90-100	75-100	60-95	25-50	2-25
	4-38	Silty clay loam, loam, silt loam.	SM, SC, ML, CL	A-2, A-4, A-6 A-7	0-5	85-100	80-100	50-100	25-85	20-50	1-25
	38-62	Stratified silty clay loam to sandy loam.	SM, SC, GM, ML	A-2, A-1, A-4, A-6	0-15	60-100	60-100	50-95	15-85	20-45	1-15

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ba---------- Basher	0-10	Silt loam-------	ML, CL-ML	A-4	0-5	90-100	85-100	75-95	55-85	15-25	2-6
	10-39	Silt loam, loam, gravelly fine sandy loam.	SM, ML, CL-ML	A-4, A-2	0-5	75-100	70-95	50-95	30-85	10-20	2-6
	39-60	Silt loam, fine sandy loam, gravelly loam.	SM, ML, CL-ML	A-4, A-2	0-25	75-100	70-95	50-95	30-85	10-20	2-6
BeB, BeC, BeD------ Berks	0-8	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	8-31	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	31-39	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	39	Weathered bedrock.	---	---	---	---	---	---	---	---	---
BuB, BuC---------- Buchanan	0-8	Gravelly loam---	GM, ML, CL, SM	A-4, A-2	0-20	50-100	45-75	40-75	30-65	---	---
	8-29	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL	A-4, A-2, A-6, A-1	0-20	50-100	45-90	40-90	20-80	20-35	NP-11
	29-72	Gravelly loam, loam, channery clay loam.	GM, ML, CL-ML	A-4, A-1 A-2, A-6	0-20	50-100	30-80	30-75	20-60	18-35	NP-12
BxB, BxD---------- Buchanan	0-8	Extremely stony loam.	GM, ML, CL, SM	A-2, A-4	5-20	50-85	45-70	40-70	30-60	---	---
	8-29	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-2, A-1 A-4, A-6	0-20	50-100	45-90	40-90	20-80	20-35	NP-11
	29-72	Gravelly loam, loam, channery clay loam.	GM, ML, CL, SM	A-2, A-1 A-4, A-6	0-20	50-100	30-80	30-75	20-60	18-35	NP-12
CaB, CaC, CaD------ Calvin	0-7	Shaly silt loam	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	7-27	Shaly silt loam, channery loam, very shaly clay loam.	ML, GM SM	A-2, A-4, A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	27-39	Shaly silt loam, very shaly silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	30-65	15-60	15-40	23-39	3-13
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DeB, DeC, DeD------ Dekalb	0-7	Channery sandy loam.	SM, GM, ML-CL	A-2, A-4	0-30	50-90	45-80	40-75	20-55	10-32	NP-7
	7-32	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, SM-SC	A-2, A-4 A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-7
	32-39	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC-GM	A-2, A-4 A-1	10-50	45-85	35-75	25-65	15-40	15-32	NP-9
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
DkB, DkC---------- Dekalb	0-7	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4	10-30	50-90	45-80	40-75	20-55	10-32	NP-7
	7-32	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML,SM-SC	A-2, A-4 A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-7
	32-39	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC-GM	A-2, A-4 A-1	10-50	45-85	35-75	25-65	15-40	15-32	NP-9
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DMF*:											
Dekalb----------	0-7	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4	10-30	50-90	45-80	40-75	20-55	10-32	NP-7
	7-32	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML,SM-SC	A-2, A-4 A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-7
	32-39	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC-GM	A-2, A-4 A-1	10-50	45-85	35-75	25-65	15-40	15-32	NP-9
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lehew----------	0-8	Extremely stony loam.	SM, GM, ML, CL-ML	A-2, A-4	20-50	50-90	45-80	40-75	20-55	15-30	NP-7
	8-37	Channery sandy loam, channery fine sandy loam, channery loam.	SM, GM, GM-GC	A-2, A-4 A-1	10-50	45-60	30-50	20-45	10-40	15-30	NP-7
	37	Weathered bedrock.	---	---	---	---	---	---	---	---	---
DR*:											
Dekalb----------	0-7	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4	10-30	50-90	45-80	40-75	20-55	10-32	NP-7
	7-32	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML,SM-SC	A-2, A-4 A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-7
	32-39	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC-GM	A-2, A-4 A-1	10-50	45-85	35-75	25-65	15-40	15-32	NP-9
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rubble land.											
Ds*, Du*. Dumps											

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HaB, HaC, HaD---- Hartleton	0-8	Channery silt loam.	SM, ML	A-4	15-40	80-95	70-90	60-90	45-80	---	---
	8-33	Channery silt loam, very channery loam, channery silty clay loam.	GM, ML, GM-GC, SM-SC	A-2, A-4	15-65	60-90	45-80	40-80	30-75	20-30	NP-7
	33-46	Very channery loam, very shaly silt loam.	SM, GM, SM-SC, ML	A-1, A-2, A-4	55-85	40-80	25-70	20-70	15-60	20-30	NP-7
	46	Weathered bedrock.	---	---	---	---	---	---	---	---	---
HeB, HeC, HeD---- Hazleton	0-5	Channery sandy loam.	ML, GM, SM	A-2, A-4	0-25	60-85	60-80	60-75	35-55	---	---
	5-35	Channery sandy loam, loam, very channery loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-90	45-90	35-70	20-55	<30	NP-8
	35-49	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	0-60	60-80	35-75	25-65	15-50	<30	NP-8
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HfB, HfC---- Hazleton	0-5	Extremely stony sandy loam.	GM, SM, ML	A-4, A-2	15-50	60-85	50-80	50-70	35-55	---	---
	5-35	Channery sandy loam, channery loam, loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	35-49	Channery loam, very channery sandy loam, very channery loamy sand.	GM,SM SC, GC	A-2, A-1, A-4	5-60	55-80	35-75	25-65	15-50	<30	NP-8
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HGB*, HGC*: Hazleton----	0-5	Extremely stony sandy loam.	GM, SM, ML	A-4, A-2	15-50	60-85	50-80	50-70	35-55	---	---
	5-35	Channery sandy loam, channery loam, loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	35-49	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	5-60	55-80	35-75	25-65	15-50	<30	NP-8
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clymer----	0-8	Extremely stony sandy loam.	ML, SM, GM	A-4, A-2	5-30	60-100	50-95	45-90	30-85	---	---
	8-40	Sandy loam, gravelly loam, channery clay loam.	GM, SM-SC GC, ML	A-2, A-4	0-20	60-95	50-95	45-85	30-60	14-32	NP-9
	40-64	Channery loam, very gravelly loam, channery sandy loam.	GM, GC, SM, SM-SC	A-1, A-2, A-4	10-30	30-75	25-70	20-60	5-40	14-32	NP-9
	64	Unweathered bedrock.									

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
KeB, KeC---------- Kedron	0-9	Silt loam-------	ML, CL	A-4	0-10	90-100	85-95	70-95	55-85	---	---
	9-27	Channery silt loam, silty clay loam, loam.	ML, CL, SM, SC	A-4, A-6	0-30	80-100	65-95	55-95	40-90	25-39	3-15
	27-80	Channery silt loam, channery clay loam, channery loam.	CL, ML, SC, SM-SC	A-4, A-6	15-40	80-100	70-95	60-95	45-85	21-39	3-15
KvB, KvC---------- Kedron	0-9	Very stony silt loam.	ML, CL	A-4	5-15	75-100	70-95	55-95	55-85	---	---
	9-27	Channery silt loam, silty clay loam, loam.	ML, CL, SM, SC	A-4, A-6	0-30	80-100	65-95	55-95	40-90	25-39	3-15
	27-80	Channery silt loam, channery clay loam, channery loam.	CL, ML, SM, SM-SC	A-4, A-6	15-40	80-100	70-95	60-95	45-85	21-39	3-15
LaB, LaC---------- Laidig	0-4	Gravelly loam---	GM, SM, ML, CL	A-4	0-5	65-90	55-80	50-80	35-70	20-30	1-10
	4-42	Gravelly loam, channery sandy clay loam, channery sandy loam.	SM, SC, ML, CL	A-1, A-2, A-4, A-6	5-10	70-95	55-90	40-80	20-70	15-40	2-18
	42-74	Channery sandy clay loam, channery loam, channery sandy loam.	GC, SC, GM-GC, CL-ML	A-1, A-2, A-4, A-6	5-40	50-90	40-85	30-80	15-70	15-35	2-16
LdB, LdC---------- Laidig	0-4	Extremely stony loam.	GM-GC, SM, CL-ML, SM-SC	A-4	1-10	70-100	65-100	55-95	45-75	15-30	NP-10
	4-42	Gravelly loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL-ML, CL	A-2, A-4, A-6	0-30	65-100	60-95	50-90	30-60	15-40	2-18
	42-74	Channery sandy clay loam, channery loam, channery sandy loam.	SC, GM-GC, CL-ML, SM	A-1, A-2, A-4, A-6	0-40	40-100	35-100	25-95	20-60	20-40	2-16
LeB, LeC---------- Leck Kill	0-8	Channery silt loam.	SM, ML, GM	A-2, A-4	0-5	70-85	60-80	50-80	35-70	---	---
	8-38	Silt loam, channery loam, shaly silty clay loam.	GM, SC, GC, CL	A-4, A-2, A-6	0-10	60-90	50-85	40-80	30-70	23-40	2-17
	38-62	Very channery silt loam, very channery clay loam, very shaly loam.	SM, GM, SC	A-2, A-1	0-30	30-70	10-30	8-30	6-25	25-40	2-13
	62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LgB, LgC, LgD------ Lehew	0-8	Channery loam---	GM, ML, SM CL-ML	A-2, A-4	5-30	50-80	45-70	40-65	25-60	15-30	NP-7
	8-37	Channery sandy loam, channery fine sandy loam, channery loam.	SM, GM, GM-GC	A-2, A-4 A-1	10-50	45-60	30-50	20-45	10-40	15-30	NP-7
	37	Weathered bedrock.	---	---	---	---	---	---	---	---	---
LhB, LhC---------- Lehew	0-8	Extremely stony loam	SM, GM, ML, CL-ML	A-2, A-4	5-15	50-90	45-80	40-75	25-55	15-30	NP-7
	8-37	Channery sandy loam, channery fine sandy loam, channery loam.	SM, GM, GM-GC	A-2, A-4 A-1	10-50	45-60	30-50	20-45	10-40	15-30	NP-7
	37	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Ln---------- Linden	0-10	Silt loam-------	ML, SM	A-4	0	80-100	80-100	65-100	40-90	---	---
	10-45	Silt loam, gravelly loam, sandy loam.	ML, SM	A-4, A-2	0-5	80-100	65-100	40-95	25-90	<30	NP-3
	45-62	Loam, gravelly sandy loam, very gravelly sand.	SM, GM, GP, ML	A-2, A-1, A-3, A-4	0-20	40-100	30-100	15-90	5-75	<25	NP-5
MeB, MeC, MeD------ Meckesville	0-7	Loam----------	ML	A-4	0-10	90-100	85-95	70-85	55-70	---	---
	7-31	Loam, channery silt loam, gravelly silty clay loam.	ML, CL-ML CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	24-39	2-13
	31-70	Loam, channery silt loam, gravelly clay loam.	ML, CL-ML, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	23-30	2-9
	70-96	Loam, channery silt loam, gravelly clay loam.	ML, CL-ML, GM, SC	A-4, A-2	0-40	45-90	40-85	35-85	30-60	23-30	2-9
MkB, MkC---------- Meckesville	0-7	Very stony loam	ML	A-4	3-10	80-100	70-95	65-85	55-80	---	---
	7-31	Loam, channery silt loam, gravelly silty clay loam.	ML, CL-ML CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	24-39	2-13
	31-70	Loam, channery silt loam, gravelly clay loam.	ML, CL, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	23-30	2-9
	70-96	Loam, channery silt loam, gravelly clay loam.	ML, CL-ML GM, SC	A-4, A-2	0-40	45-90	40-85	35-85	30-60	23-30	2-9
Ph---------- Philo	0-51	Silt loam-------	ML, SM	A-4	0	95-100	80-100	70-90	45-80	20-40	1-10
	51-60	Stratified sand to silt loam.	GM, SM, ML	A-2, A-4	0-15	60-95	50-90	40-85	30-85	20-40	1-10

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Po Pope	0-40	Silt loam	ML, CL, SM	A-4	0-5	75-100	65-100	55-95	40-90	<30	NP-10
	40-62	Fine sandy loam, sandy loam, gravelly fine sandy loam.	SM, SM-SC, ML, GM	A-2, A-1, A-4	0-5	55-100	50-100	35-95	15-70	<30	NP-7
ShA, ShB Shelmadine	0-8	Silt loam	ML	A-4	0-5	80-100	75-95	70-90	65-85	---	---
	8-19	Silt loam, channery silty clay loam, shaly silt loam.	ML, CL	A-4, A-6	0-10	80-100	75-95	60-90	50-80	25-40	3-15
	19-46	Silt loam, channery clay loam, shaly silty clay loam.	ML, CL	A-4, A-6	0-15	80-100	75-95	60-90	50-80	25-40	3-15
	46-60	Channery silt loam, channery loam, shaly loam.	GM, ML, CL, SM	A-2, A-4, A-1	0-25	50-80	35-75	25-70	20-65	25-35	3-10
SmB Shelmadine	0-8	Very stony silt loam.	ML	A-4	3-10	70-100	65-95	60-90	50-85	---	---
	8-19	Silt loam, channery silty clay loam, shaly silt loam.	ML, CL	A-4, A-6	0-10	80-100	75-95	60-90	50-80	25-40	3-15
	19-46	Silt loam, channery clay loam, shaly silty clay loam.	ML, CL	A-4, A-6	0-10	80-100	75-95	60-90	50-80	25-40	3-15
	46-60	Channery silt loam, channery loam, shaly loam.	GM, GC, CL, SM	A-4, A-2, A-1	0-25	50-80	40-75	25-70	20-65	25-35	3-10
UD*, UF*. Udifluvents											
UM*. Udorthents											
UU*: Urban land.											
Udults.											
WaB, WaC Watson	0-8	Silt loam	ML, CL	A-4	0-5	80-100	80-100	65-95	60-95	---	---
	8-28	Gravelly silty clay loam, silt loam, gravelly loam.	CL, SC, GC	A-4, A-5, A-6, A-7	0-10	70-100	55-95	50-95	35-90	25-45	8-20
	28-60	Gravelly silty clay loam, silt loam, gravelly loam.	ML, CL, GC, GM	A-4, A-6, A-2	0-15	55-100	50-100	45-95	30-85	25-39	4-15

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WKF*:											
Weikert	0-5	Shaly silt loam	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	5-18	Shaly loam, very shaly silt loam, channery loam.	GM, GP, SM	A-1, A-2	0-20	15-60	10-45	5-35	5-35	28-36	3-9
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Klinesville	0-6	Shaly silt loam	GM, SM	A-2, A-4	0-10	30-85	25-60	10-50	6-40	---	---
	6-14	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1, A-4	0-10	25-75	15-55	10-50	4-40	20-35	NP-9
	14-19	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1	0-20	15-60	10-50	10-40	4-30	20-35	NP-7
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the soil.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
AeB, AeC--------- Allenwood	0-9 9-52 52-64	0.6-2.0 0.06-2.0 0.06-2.0	0.14-0.18 0.12-0.16 0.03-0.10	3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.24 0.17 0.17	4
AgA, AgB--------- Alvira	0-9 9-20 20-70	0.6-2.0 0.6-2.0 0.06-0.2	0.16-0.20 0.14-0.18 0.08-0.12	3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.32 0.43 0.28	3-2
AnA, AnB--------- Andover	0-5 5-20 20-46 46-62	0.6-2.0 0.6-2.0 0.06-0.2 0.06-0.6	0.08-0.18 0.08-0.12 0.06-0.10 0.08-0.12	4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low---------- Low----------	0.37 0.17 0.17 0.17	3-2
ArB-------------- Andover	0-5 5-20 20-46 46-62	0.6-2.0 0.6-2.0 0.06-0.2 0.06-0.6	0.08-0.20 0.08-0.12 0.06-0.10 0.08-0.12	4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low---------- Low----------	0.43 0.17 0.17 0.17	3-2
At--------------- Atkins	0-4 4-38 38-62	0.6-2.0 0.06-2.0 0.2-6.0	0.14-0.22 0.14-0.18 0.08-0.18	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	--- --- ---	4
Ba--------------- Basher	0-10 10-39 39-60	0.6-2.0 0.6-2.0 0.6-6.0	0.15-0.21 0.10-0.19 0.10-0.19	3.6-6.0 3.6-6.0 4.5-6.5	Low---------- Low---------- Low----------	0.49 0.64 0.64	4
BeB, BeC, BeD---- Berks	0-8 8-31 31-39 39	0.6-6.0 0.6-6.0 2.0-6.0 ---	0.08-0.12 0.04-0.08 0.04-0.06 ---	3.6-5.5 3.6-5.5 3.6-6.0 ---	Low---------- Low---------- Low---------- ----------	0.28 0.17 0.17 ---	3
BuB, BuC--------- Buchanan	0-8 8-29 29-72	0.6-2.0 0.6-2.0 0.06-0.2	0.12-0.18 0.10-0.16 0.06-0.10	3.6-5.5 3.6-5.5 3.6-5.5	Moderate------- Moderate------- Moderate-------	0.28 0.28 0.17	3-2
BxB, BxD--------- Buchanan	0-8 8-29 29-72	0.6-2.0 0.6-2.0 0.06-0.2	0.11-0.16 0.10-0.16 0.06-0.10	3.6-5.5 3.6-5.5 3.6-5.5	Moderate------- Moderate------- Moderate-------	0.28 0.28 0.17	3-2
CaB, CaC, CaD---- Calvin	0-7 7-27 27-39 39	2.0-6.0 2.0-6.0 2.0-6.0 ---	0.10-0.12 0.04-0.08 0.04-0.06 ---	4.5-6.0 4.5-6.0 4.5-6.0 ---	Low---------- Low---------- Low---------- ----------	0.24 0.28 0.28 ---	3-2
DeB, DeC, DeD, DkB, DkC-------- Dekalb	0-7 7-32 32-39 39	6.0-20 6.0-20 >6.0 ---	0.08-0.12 0.06-0.10 0.05-0.08 ---	3.6-6.5 3.6-5.5 3.6-5.5 ---	Low---------- Low---------- Low---------- ----------	0.24 0.17 0.17 ---	3
DMF*: Dekalb---------- 	0-7 7-32 32-39 39	6.0-20 6.0-20 >6.0 ---	0.08-0.12 0.06-0.10 0.05-0.08 ---	3.6-6.5 3.6-5.5 3.6-5.5 ---	Low---------- Low---------- Low---------- ----------	0.24 0.17 0.17 ---	3
Lehew----------- 	0-8 8-37 37	0.6-20 0.6-20 ---	0.08-0.12 0.06-0.08 ---	4.5-5.5 4.5-5.5 ---	Low---------- Low---------- ----------	0.24 0.17 ---	3

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
DR*:							
Dekalb	0-7	6.0-20	0.08-0.12	3.6-6.5	Low	0.24	3
	7-32	6.0-20	0.06-0.10	3.6-5.5	Low	0.17	
	32-39	>6.0	0.05-0.08	3.6-5.5	Low	0.17	
	39	---	---	---	---	---	
Rubble land.							
Ds*, Du*.							
Dumps							
HaB, HaC, HaD	0-8	0.6-6.0	0.10-0.14	4.5-5.5	Low	0.24	3-2
Hartleton	8-33	0.6-6.0	0.10-0.10	4.5-5.5	Low	0.17	
	33-46	0.6-6.0	0.06-0.08	4.5-5.5	Low	0.28	
	46	---	---	---	---	---	
HeB, HeC, HeD	0-5	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.24	3-2
Hazleton	5-35	2.0-20.0	0.08-0.10	3.6-5.5	Low	0.17	
	35-49	2.0-20.0	0.04-0.10	3.6-5.5	Low	0.17	
	49	---	---	---	---	---	
HfB, HfC	0-5	2.0-6.0	0.10-0.16	3.6-5.5	Low	0.24	3-2
Hazleton	5-35	2.0-20	0.08-0.10	3.6-5.5	Low	0.17	
	35-49	2.0-20	0.04-0.10	3.6-5.5	Low	0.17	
	49	---	---	---	---	---	
HGB*, HGC*:							
Hazleton	0-5	2.0-6.0	0.10-0.16	3.6-5.5	Low	0.24	3-2
	5-35	2.0-20	0.08-0.10	3.6-5.5	Low	0.17	
	35-49	2.0-20	0.04-0.10	3.6-5.5	Low	0.17	
	49	---	---	---	---	---	
Clymer	0-8	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	3
	8-40	0.6-2.0	0.08-0.14	3.6-5.5	Low	0.17	
	40-64	0.6-6.0	0.04-0.08	3.6-5.5	Low	0.17	
	64	---	---	---	---	---	
KeB, KeC	0-9	0.6-2.0	0.16-0.20	3.6-5.5	Low	0.43	3-2
Kedron	9-27	0.2-2.0	0.09-0.14	3.6-5.5	Low	0.28	
	27-80	0.06-0.2	0.06-0.10	3.6-5.5	Low	0.28	
KvB, KvC	0-9	0.6-2.0	0.14-0.20	3.6-5.5	Low	0.37	3
Kedron	9-27	0.2-2.0	0.09-0.14	3.6-5.5	Low	0.28	
	27-80	0.06-0.2	0.06-0.10	3.6-5.5	Low	0.28	
LaB, LaC	0-4	0.6-6.0	0.10-0.14	3.6-5.5	Low	0.28	4
Laidig	4-42	0.6-6.0	0.08-0.12	3.6-5.5	Low	0.28	
	42-74	0.2-0.6	0.06-0.10	3.6-5.5	Low	0.17	
LdB, LdC	0-4	0.6-6.0	0.08-0.12	4.5-5.5	Low	0.28	4
Laidig	4-42	0.6-6.0	0.08-0.12	4.5-5.5	Low	0.28	
	42-74	0.2-0.6	0.06-0.10	4.5-5.5	Low	0.17	
LeB, LeC	0-8	0.6-6.0	0.14-0.18	4.5-6.0	Low	0.20	3
Leck Kill	8-38	0.6-6.0	0.12-0.16	4.5-6.0	Low	0.17	
	38-62	0.6-6.0	0.04-0.08	4.5-6.0	Low	0.28	
	62	---	---	---	---	---	
LgB, LgC, LgD	0-8	0.6-20	0.08-0.12	4.5-5.5	Low	0.17	3
Lehew	8-37	0.6-20	0.06-0.08	4.5-5.5	Low	0.17	
	37	---	---	---	---	---	
LhB, LhC	0-8	0.6-20	0.08-0.12	4.5-5.5	Low	0.24	3
Lehew	8-37	0.6-20	0.06-0.08	4.5-5.5	Low	0.17	
	37	---	---	---	---	---	
Ln	0-10	2.0-6.0	0.14-0.18	3.6-6.0	Low	0.49	4
Linden	10-45	2.0-6.0	0.14-0.18	3.6-6.0	Low	0.64	
	45-62	6.0-20	0.05-0.08	3.6-6.0	Low	0.17	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
MeB, MeC, MeD----	0-7	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.32	4
Meckesville	7-31	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.28	
	31-70	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.28	
	70-96	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.28	
MkB, MkC----------	0-7	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.32	4
Meckesville	7-31	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.28	
	31-70	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.28	
	70-96	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.28	
Ph----------	0-51	0.2-2.0	0.12-0.20	4.5-6.0	Low----------	---	4
Philo	51-60	2.0-20.0	0.06-0.10	4.5-6.0	Low----------	---	
Po----------	0-40	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.28	4
Pope	40-62	0.6-6.0	0.07-0.15	3.6-5.5	Low----------	0.28	
ShA, ShB----------	0-8	0.6-2.0	0.14-0.18	3.6-5.0	Low----------	0.32	3-2
Shelmadine	8-19	0.6-2.0	0.10-0.14	3.6-5.0	Low----------	0.28	
	19-46	0.06-0.2	0.08-0.12	3.6-5.0	Low----------	0.28	
	46-60	0.06-0.6	0.10-0.14	3.6-5.0	Low----------	---	
SmB----------	0-8	0.6-2.0	0.12-0.18	3.6-5.0	Low----------	0.24	3-2
Shelmadine	8-19	0.6-2.0	0.10-0.14	3.6-5.0	Low----------	0.28	
	19-46	0.06-0.2	0.08-0.12	3.6-5.0	Low----------	0.28	
	46-60	0.06-0.6	0.10-0.14	3.6-5.0	Low----------	0.28	
UD*, UF*.							
Udifluvents							
UM*.							
Udorthents							
UU*:							
Urban land.							
Udults.							
WaB, WaC----------	0-8	0.6-2.0	0.14-0.18	4.5-5.5	Moderate-------	0.32	3-2
Watson	8-28	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-------	0.17	
	28-60	0.06-0.2	0.08-0.12	4.5-5.5	Moderate-------	0.17	
WKF*:							
Weikert----------	0-5	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.28	2
	5-18	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28	
	18	---	---	---	----------	---	
Klinesville-----	0-6	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20	2
	6-14	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.28	
	14-19	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28	
	19	---	---	---	----------	---	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AeB, AeC---------- Allenwood	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
AgA, AgB---------- Alvira	C	None--------	---	---	0.5-1.5	Perched	Oct-May	>60	---	High-----	High-----	High.
AnA, AnB, ArB----- Andover	D	None--------	---	---	0.0-0.5	Perched	Oct-Jun	>60	---	High-----	High-----	High.
At---------- Atkins	D	Common------	Brief	Sep-Jul	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Moderate.
Ba---------- Basher	B	Occasional	Brief	Dec-Apr	1.5-2.0	Apparent	Jan-May	>40	Hard	Moderate	Moderate	Moderate.
BeB, BeC, BeD----- Berks	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Low------	Low------	High.
BuB, BuC, BxB, BxD---------- Buchanan	C	None--------	---	---	0.5-3.0	Perched	Nov-Mar	>60	---	Moderate	High-----	High.
CaB, CaC, CaD----- Calvin	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low------	Moderate.
DeB, DeC, DeD, DkB, DkC---------- Dekalb	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
DMF*: Dekalb----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
Lehew----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
DR*: Dekalb----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
Rubble land.												
Ds*, Du*. Dumps												
HaB, HaC, HaD----- Hartleton	B	None--------	---	---	>6.0	---	---	>40	Rippable	Moderate	Low------	High.
HeB, HeC, HeD, HfB, HfC---------- Hazleton	B	None--------	---	---	>6.0	---	---	40-60	Hard	Moderate	Low------	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
HGB*, HGC*: Hazleton	B	None	---	---	>6.0	---	---	40-60	Hard	Moderate	Low	High.
Clymer	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
KeB, KeC, KvB, KvC, Kedron	C	None	---	---	0.5-3.0	Perched	Nov-May	>60	---	Moderate	Moderate	High.
LaB, LaC, LdB, LdC, Laidig	C	None	---	---	2.5-4.0	Perched	Jan-Mar	>60	---	Moderate	Moderate	High.
LeB, LeC, Leck Kill	B	None	---	---	>6.0	---	---	>40	Rippable	Moderate	Low	Moderate.
LgB, LgC, LgD, LhB, LhC, Lehew	C	None	---	---	>6.0	---	---	20-40	Hard	Low	Low	High.
Ln, Linden	B	Rare to common.	Very brief to brief.	Jan-Apr	3.0-6.0	Apparent	Nov-Mar	>60	---	Moderate	Low	High.
MeB, MeC, MeD, MkB, MkC, Meckesville	C	None	---	---	2.5-3.5	Perched	Nov-Apr	>60	---	Moderate	Moderate	High.
Ph, Philo	B	Common	Very brief	Nov-Apr	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low	High.
Po, Pope	B	Rare to common.	Very brief	Nov-Apr	>4.0	Apparent	Feb-Mar	>60	---	Moderate	Low	High.
ShA, ShB, SmB, Shelmadine	D	None	---	---	0.0-0.5	Perched	Sep-Jun	>60	---	High	High	High.
UD*, UF*. Udifluvents												
UM*. Udorthents												
UU*: Urban land.												
Udults.												
WaB, WaC, Watson	C	None	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
WKF*: Weikert	C/D	None	---	---	>6.0	---	---	10-20	Rippable	Moderate	Moderate	Moderate.
Klinesville	C/D	None	---	---	>6.0	---	---	10-20	Rippable	Moderate	Moderate	Moderate

* See description of the map unit for the composition and behavior characteristics of the soil.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allenwood	Fine-loamy, mixed, mesic Typic Hapludults
Alvira	Fine-loamy, mixed, mesic Aeric Fragiaquults
Andover	Fine-loamy, mixed, mesic Typic Fragiaquults
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Basher	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Buchanan	Fine-loamy, mixed, mesic Aquic Fragiudults
Calvin	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Clymer	Fine-loamy, mixed, mesic Typic Hapludults
Dekalb	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Hartleton	Loamy-skeletal, mixed, mesic Typic Hapludults
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Kedron	Fine-loamy, mixed, mesic Aquic Fragiudults
Klinesville	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Laidig	Fine-loamy, mixed, mesic Typic Fragiudults
Leck Kill	Fine-loamy, mixed, mesic Typic Hapludults
Lehew	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Linden	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Meckesville	Fine-loamy, mixed, mesic Typic Fragiudults
Philo	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Pope	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Shelmadine	Fine-loamy, mixed, mesic Typic Fragiaquults
Watson	Fine-loamy, mixed, mesic Typic Fragiudults
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts

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