USDA United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the Agriculture Experiment Station and the Cooperative Extension Service of the College of Agriculture, The Pennsylvania State University; the Pennsylvania Department of Environmental Resources; and the Pennsylvania Department of Agriculture

Soil Survey of Bedford County, Pennsylvania

How to Use This Soil Survey

General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

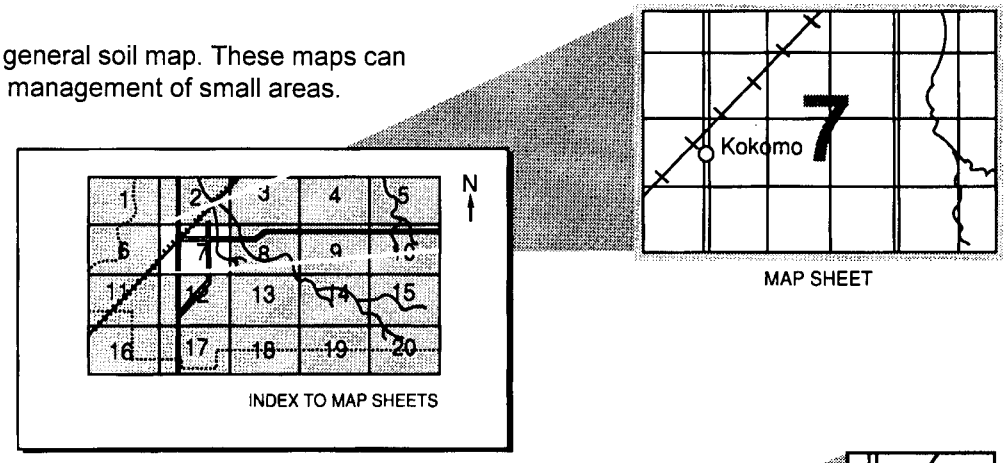
Detailed Soil Maps

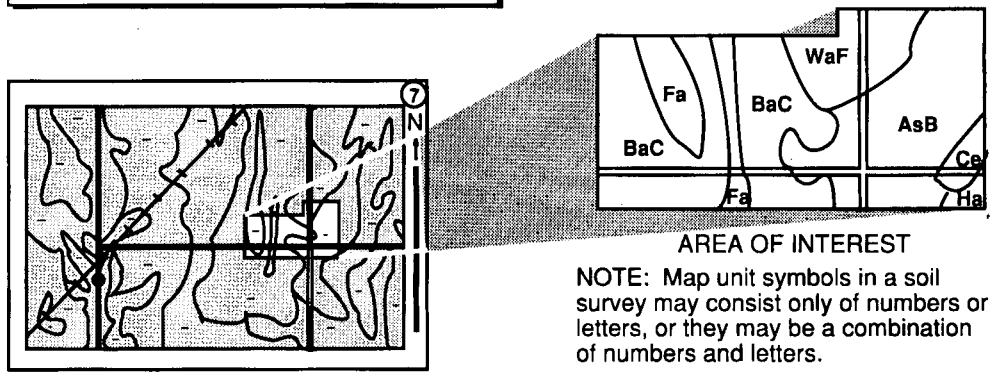
The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map units symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.





NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

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 Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service and the the Agriculture Experiment Station and the Cooperative Extension Service of the College of Agriculture, The Pennsylvania State University; the Pennsylvania Department of Environmental Resources; and the Pennsylvania Department of Agriculture. The survey is part of the technical assistance furnished to the Bedford County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: Typical landscape in Morrisons Cove, Bedford County, Pennsylvania. Morrison channery sandy loam, 8 to 15 percent slopes, is in the foreground. Hagerstown silt loam, 3 to 8 percent slopes, is in the middleground.

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Foreword

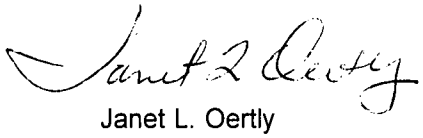
This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.



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Soil Survey of
Bedford County, Pennsylvania

By William R. Knight, Natural Resources Conservation Service

Fieldwork by William R. Knight, Ned B. Ellenberger, Robert R. Dobos, John R. Hudak, Edgar A. White, and Reginald Speir, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Agriculture Experiment Station and the Cooperative Extension Service of the College of Agriculture, The Pennsylvania State University; the Pennsylvania Department of Environmental Resources; and the Pennsylvania Department of Agriculture

BEDFORD COUNTY is located in the south-central part of Pennsylvania (fig. 1). The county covers 652,040 acres, or about 1,018 square miles. It is bordered by Somerset and Cambria Counties to the west, Blair and Huntingdon Counties to the north, Fulton County to the west, Blair and Huntingdon Counties to the north, Fulton County to the east, and Allegany County, Maryland, to the south. Bedford is both the largest town and the county seat. It lies in the approximate geographic center of the county.

The first European explorers of the area now called Bedford County arrived about 1630. Before then, the area was a hunting ground for various Indian tribes and nations. About 1710 an English party from eastern Virginia settled the area now known as Southampton Township. Raystown, the present site of Bedford, was settled in 1750. When Bedford County was established in 1771, it included some or all of 26 counties now separate in western and central Pennsylvania. The early settlers of Bedford County were Scotch-Irish, Welsh, German, and Huguenots. The population of the county increased from 23,077 in 1850 to 39,468 in 1900. It was 45,154 in 1980.

Dairying is the main farm enterprise in Bedford County. Poultry, beef, hogs, sheep, fruit, grain, and wood products are also important. In 1984, the 1,092 farms in the county covered, on average, 215 acres. Lumber and pulpwood for paper manufacturing are the main wood products.

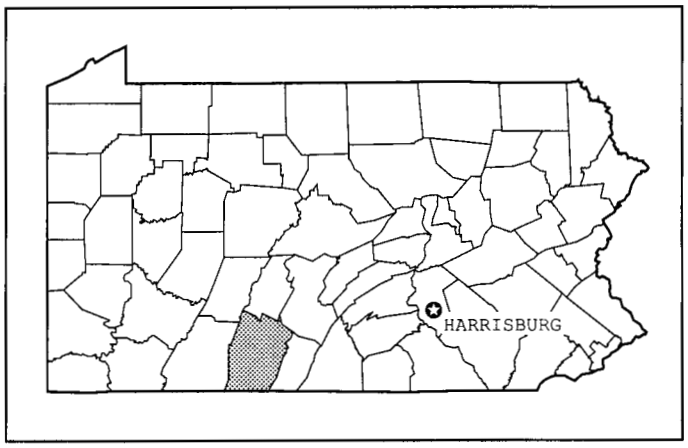

Figure 1.—Location of Bedford County in Pennsylvania.

This soil survey updates the survey of Bedford County published in 1913 (*14*). It provides additional information and has larger maps that show the soils in greater detail.

General Nature of the County

This section provides general information about Bedford County. It discusses physiography, geology, mineral resources, water resources, and climate.

Physiography

Bruce A. Benton, geologist, Natural Resources Conservation Service, helped to prepare this section.

Most of Bedford County is in the Valley and Ridge Physiographic Province. A small area along the northwest border of the county is in the Allegheny Mountain Section of the Appalachian Plateaus Physiographic Province. The prominent Allegheny Front escarpment separates the two provinces. The Ridge and Valley physiographic province is characterized by long, narrow ridges and valleys oriented northeast-southwest. Typically, the major ridges are 2,200 feet above mean sea level (MSL) and the valley uplands are 1,000 to 1,400 feet above MSL. The Appalachian Plateaus physiographic province ranges 2,000 to 2,700 feet above MSL. The highest point in the county is 3,136 feet above MSL at Blue Knob in the northwest corner of the county, and the lowest point is 740 feet above MSL at Wills Creek along the Bedford County-Maryland border.

Geology

The rocks in the Ridge and Valley Province of the county range from Cambrian to Pennsylvanian in age. The rocks in the Appalachian Plateaus Province were formed during the Devonian and Mississippian Periods. During those periods, several advances of the sea deposited repeated sequences of sand, gravel, silt, and calcium carbonates. Some coal swamps formed in the northeast corner of the county during the Pennsylvanian Period. After consolidation of sediments, compression during the Permian Period (230 million years ago) from the southeast intensely folded and faulted the sediments, forming northeast-southwest-oriented valleys and ridges of high relief. Tectonic activity also tilted the sandstone and shale beds in the plateaus toward the northwest. Subsequent geologic erosion of the ridges resulted in the present landscape. The major ridges consist of quartzite and sandstone, both of which resist erosion. The lower ridges and slopes consist of siltstone and shale. The valleys are limestone (*4*).

Clymer, Hazleton, and Wharton soils and Dystrochrepts are dominant in the cyclic sequences of sandstone, conglomerate, siltstone, and shale of Pennsylvanian age in the Broad Top area and in sandstone and shale of Mississippian and Devonian ages along the Allegheny Front.

Berks, Weikert, and Bedington soils are dominant in the siltstone and shale beds of the Devonian-aged Foreknobs and Scherr Formations in the southeastern and western parts of the county. Calvin, Klinesville, and Leck Kill are dominant in the grayish-red shale and sandstone of the Devonian-aged Catskill Formation located on the Allegheny Front and in the eastern part of the county.

Westmoreland, Edom, and Opequon soils are dominant in the Silurian- and Devonian-aged calcareous shale and carbonates. Vanderlip, Elliber, and Mertz soils are common in the Devonian-aged Ridgely sandstone and Shiver chert and limestone in the central and western parts of the county.

Dystrochrepts predominate on Tuscarora orthoquartzite of Silurian age located on ridges in the central part of the county. Laidig and Buchanan soils formed on the colluvial slopes of ridges.

Opequon, Hagerstown, and Murrill soils are dominant on the Ordovician carbonates in the gently rolling valleys in the central part of the county. Morrison soils are common on the Cambrian-aged Gatesburg sandstone on the low hills of the central and north-central parts of the county.

Mineral Resources

Mineral resources mined in the county are limestone and coal (*8*).

Limestone is mined for commercial sale as concrete aggregate and lime. It is taken from the Ordovician-aged Coburn through Loysberg Formations and from the Devonian-Silurian-aged Kesyer and Tonoloway Formations. The Keyser Formation consists of limestone that is as much as 90 percent calcium carbonate in some beds. The Tonoloway Formation consists of as much as 80 percent calcium carbonate. Reserves from the Keyser and Tonoloway Formations and the Ordovician-aged Beekmantown Formation have potential use as agricultural limestone, dolomite, cement, flux stone, rip rap, and railroad ballast (*6*).

Bituminous coal is mined to a small extent in the Broad Top coalfield located in the northeast corner of the county. About a dozen coal seams exist in the Allegheny Group, which is Pennsylvanian in age. The three seams mined commercially have been both deep mined and strip mined in the past and are currently strip mined. Mineable reserves are estimated to be 60 million tons (*13*).

Gravel from the weathered Shriver Formation is used as light-duty roadfill (*7*).

Other minerals were mined. They were sandstone and quartzite used for glass sand, construction sand, and dimension stone; shale and clay used for fill and brickmaking; and iron ore (*7*).

Water

The county has an average annual precipitation of about 40 inches and an average annual runoff of 18 inches (*3*).

The northern three-fourths of the county drains into the Susquehanna River Basin via the Raystown Branch of the Juniata River. The southern one-fourth drains into the Potomac River Basin.

About three-fourths of the water supply for the county comes from ground water sources and one-fourth from surface water supplies. Less than 5 million gallons per day are used in the county (*3*).

The major sources of ground water are limestone and dolomite aquifers of Cambrian and Ordovician age and calcareous shale aquifers of Devonian and Silurian age. Most of these rocks formed in valleys where ground water is in extensive use. Most ground water sources are developed from shallow or deep wells and serve the needs of both domestic and municipal water supplies. Some springs common in carbonate valleys are used for water supply (*9*).

Water from ground water sources is generally fit to drink. But, hardness is common from supply sources located in carbonate rocks. Hydrogen sulfide gas, which fouls water, is present in some areas of Reedsville shale (*9*).

About a dozen small reservoirs provide water to many small communities. Two large reservoirs located on Evitts Creek provide water to communities in Maryland (*11*).

Climate

The climatic data for this section were specially prepared for the Natural Resources Conservation Service by the National Climatic Data Center, Asheville, North Carolina.

Winters are cold an snowy at the higher elevations in Bedford County. The valleys are also frequently cold, but intermittent thaws preclude a long-lasting snow cover. Summers are fairly warm on mountainsides and very warm and occasionally very hot in valleys. Normal annual precipitation is adequate for all crops, although summer temperatures and growing season length, particularly at the higher elevations, may be inadequate.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Everett, Pennsylvania, in the period 1951-88. 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 30 degrees F and the average daily minimum temperature is 17.9 degrees. The lowest temperature on record, which occurred on January 17, 1982, is -16 degrees. In summer, the average temperature is 70 degrees and the average daily maximum temperature is 84.5 degrees. The highest recorded temperature, which occurred on July 2, 1966, is 108 degrees.

Growing degree days are shown in table 1. They 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.

The total annual precipitation is about 35.88 inches. Of this, 20 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 4.30 inches on July 20, 1977. Thunderstorms occur on about 32 days each year, and most occur in summer.

The average seasonal snowfall is about 31 inches. The greatest snow depth at any one time during the period of record was 13 inches. On average, 20 days of the year have at least 1 inch of snow on the ground. 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 at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the west-northwest. Average windspeed is highest, 10 miles per hour, in summer.

Heavy rains, which occur at any time of the year, and severe thunderstorms in summer sometimes cause flash flooding, particularly in narrow valleys.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area (*18*). The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were

formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another, but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map 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 soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Buchanan-Dystrochrepts-Meckesville

Sloping to very steep, very deep to moderately deep, well drained to moderately well drained soils formed in colluvium and material weathered from acid sandstone, orthoquartzite, siltstone, and shale

This general soil map unit makes up about 24 percent of the county (fig. 2). It is on mountain ridges throughout the county. The landscape consists of very steep mountain ridges, sloping to steep colluvial benches, and foot slopes. Areas are dissected by streams and water gaps.

This map unit is about 28 percent Buchanan soils, 25 percent Dystrochrepts, and 17 percent Meckesville soils. Minor soils make up the rest. Buchanan soils are very deep, moderately well drained soils that have a medium or moderately fine textured subsoil and a fragipan. Dystrochrepts are moderately deep to very deep, well drained soils that have a coarse to medium textured subsoil. Meckesville soils are very deep and well drained and have a medium or moderately fine textured subsoil and a fragipan.

Minor soils include the well drained Berks, Bedington, Laidig, Murrill, Clymer, and Hazleton soils. Also included are the poorly drained Andover soils.

Most areas of this map unit are wooded. A few small areas are farmed or in nonfarm uses. The soils in this map unit are not suited to farming because of slope and large stones and boulders. They are suited to woodland, and potential productivity is moderate or moderately high. The soils are limited for most uses in community development because of slope, large stones, slow permeability, and the seasonal high water table. They have potential for development as wildlife habitat and as recreation areas. This map unit comprises large areas of State game lands and forest lands.

2. Hazleton-Clymer-Dystrochrepts

Gently sloping to very steep, very deep to moderately deep, well drained soils formed in material weathered from acid sandstone, conglomerate, siltstone, and shale

This map unit makes up about 6 percent of the survey area. It is on broad mountaintops and ridges throughout the county. The landscape consists of smooth side slopes of ridges, convex ridgetops, and undulating plateaus. Areas are irregularly dissected by small or medium streams.

This map unit is about 45 percent Hazleton soils, 30 percent Clymer soils, and 10 percent Dystrochrepts. Minor soils make up the rest. Hazleton soils are deep or very deep, well drained soils that have a moderately coarse textured or medium textured subsoil. Clymer soils are deep or very deep, well drained soils that have a medium or moderately fine textured subsoil. Dystrochrepts are moderately deep to very deep, well drained soils that have a coarse to medium textured subsoil.

Minor soils include the moderately well drained Wharton and Buchanan soils and the well drained Laidig and Cedarcreek soils.

Most areas of this map unit are wooded. A few small areas are farmed or in nonfarm uses. This map unit comprises some parts of State gamelands and forest land and several public watersheds. The soils in this map unit are not well suited to farming because of slope and large stones and boulders on the surface. They have potential

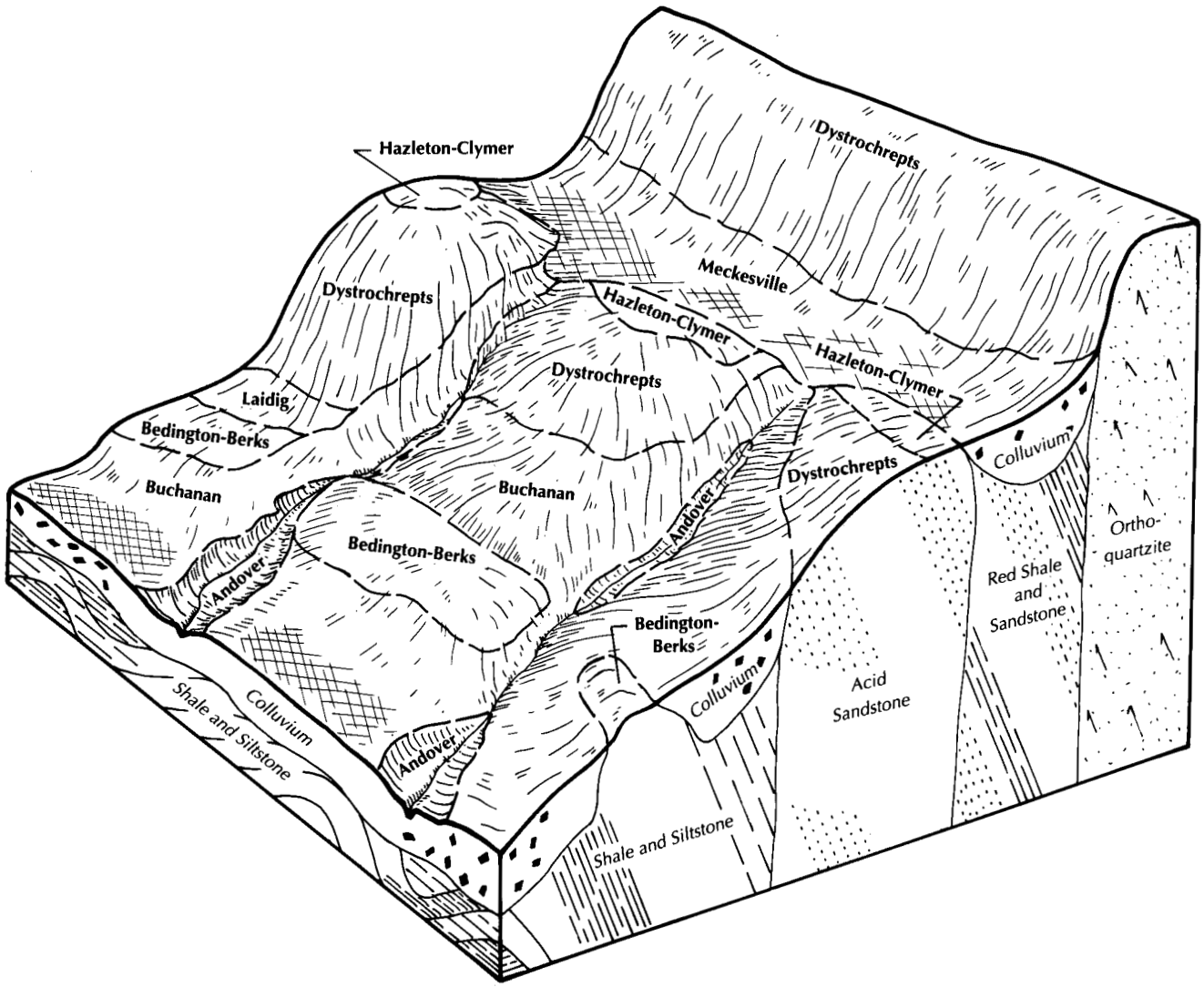

Figure 2.—Typical pattern of soils and underlying material in the Buchanan-Dystrochrepts-Meckesville general soil map unit.

for woodland, wildlife habitat, and some recreation uses. On woodland, potential productivity is moderately high. The soils in this map unit have limitations for most community development uses because of slope, large stones and boulders, slow permeability, and the seasonal high water table.

3. Calvin-Klinesville-Leck Kill

Gently sloping to very steep, very deep to shallow, well drained soils formed in material weathered from acid, red sandstone, siltstone, and shale

This map unit makes up about 18 percent of the county (fig. 3). The landscape consists of deeply dissected hills and low ridges. Areas are dissected by streams that have narrow and moderately wide flood plains and bottom land.

This map unit is about 36 percent Calvin soils, 24 percent Klinesville soils, 5 percent Leck Kill soils, and 35 percent minor soils. Calvin soils are moderately deep and well drained. They have a medium or moderately fine textured subsoil. Klinesville soils are shallow and well drained. They have a medium textured subsoil. Leck Kill soils are deep or very deep and well drained. They have a medium or moderately fine textured subsoil.

The minor soils include the moderately well drained Albrights and Basher soils and the well drained Birdsboro and Meckesville soils.

The lesser sloping areas of this map unit are commonly used for farming. The steeper areas are wooded, pasture, or idle. Some areas are droughty because of low or moderate available water capacity. On woodland, potential

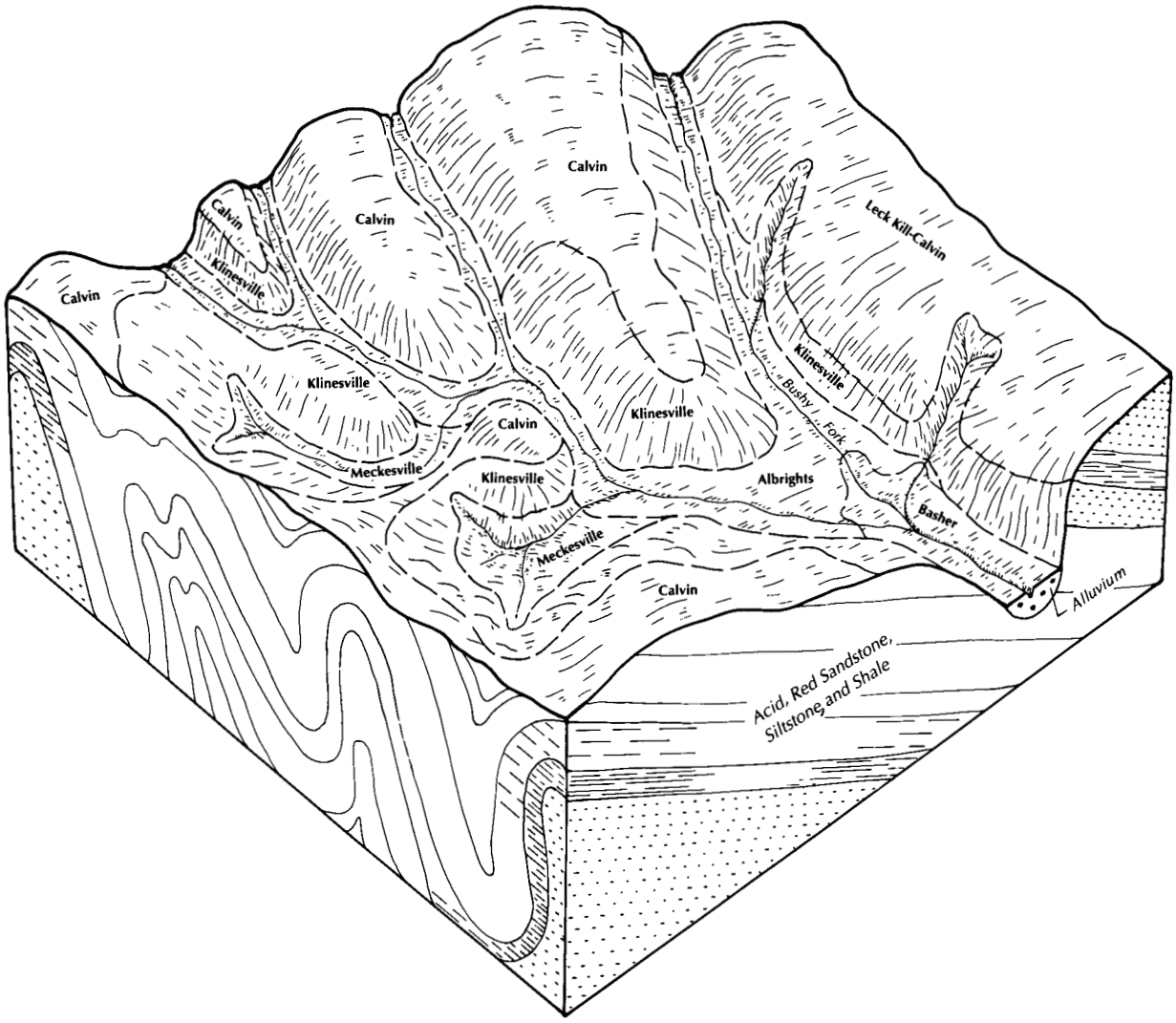

Figure 3.—Typical pattern of soils and underlying material in the Calvin-Klinesville-Leck Kill general soil map unit.

productivity is moderate or moderately high; the main limitations are droughtiness and steep slopes. These soils are limited for most community development uses because of shallow or moderate depth to bedrock, slope, and moderately rapid permeability.

4. Morrison-Murrill

Gently sloping to very steep, very deep, moderately well drained or well drained soils formed in material weathered from dolomitic limestone and calcareous sandstone

This map unit makes up about 4 percent of the county. It consists of dissected uplands in limestone valleys and coves and on low ridges. The uplands are rolling; the ridges are long and narrow.

This map unit is about 50 percent Morrison soils, 40 percent Murrill soils, and 10 percent minor soils. Morrison soils are very deep and well drained. They have a moderately fine to moderately coarse textured subsoil. Murrill soils are very deep and well drained. They have a medium or moderately fine textured subsoil.

Minor soils include the moderately well drained Buchanan soils and the well drained Vanderlip, Hagerstown, and Opequon soils.

Many areas of this map unit are wooded. Because of surface stones and slope, some areas are not suited to farming. Areas that are relatively free of surface stones are used for cultivated crops and orchards. On woodland, potential productivity is moderate or moderately high. The soils in this map unit have limitations for most types of community development because of slope, the hazard of ground water contamination, and rapid permeability.

Figure 4.—Typical pattern of soils and parent material in the Berks-Weikert-Blairton general soil map unit.

5. Berks-Weikert-Blairton

Gently sloping to very steep, shallow to very deep, well drained to somewhat poorly drained soils formed in material weathered from acid shale, siltstone, and some sandstone

This map unit makes up about 30 percent of the survey area (fig. 4). The landscape consists of rolling hills and long, narrow ridges. They are dissected by streams that have narrow flood plains. The valleys are narrow and the foot slopes are narrow and moderately wide.

This map unit is about 35 percent Berks soils, 30 percent Weikert soils, 10 percent Blairton soils, and 25 percent minor soils. Berks soils are moderately deep and well drained. They have a medium or moderately fine textured subsoil. Weikert soils are shallow and well drained. They have a medium textured subsoil. Blairton soils are moderately deep, moderately well drained soils that have a medium or moderately fine textured subsoil.

The minor soils include the well drained Bedington soils and the moderately well drained Monongahela and Ernest soils. Also included are the poorly drained Atkins and Brinkerton soils.

Most of the lesser sloping areas in this map unit are

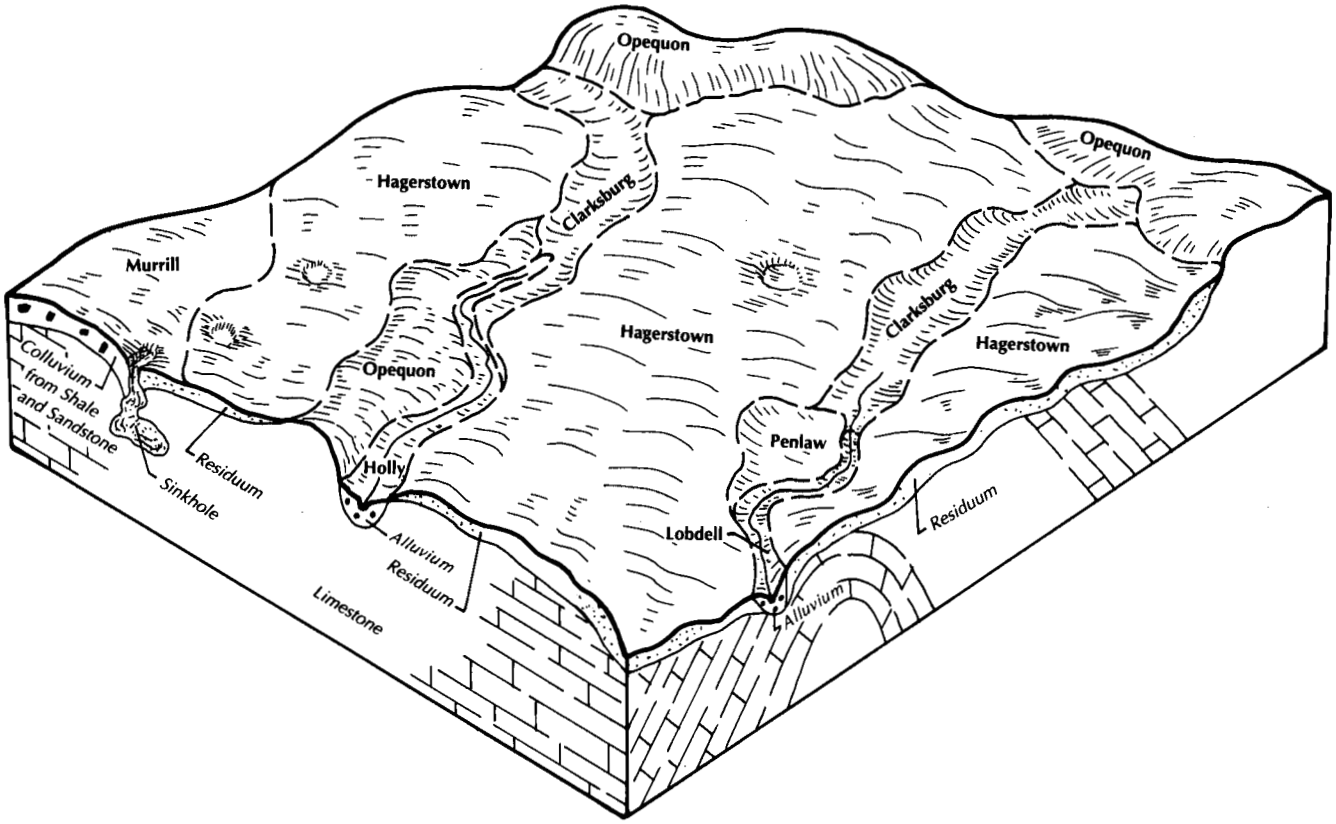

Figure 5.—Typical pattern of soils and underlying material in the Hagerstown-Clarksburg-Opequon general soil map unit.

cleared and used for hay, pasture, and cultivated crops. In some areas available water capacity and natural fertility both are low. On woodland, the soils in this unit have moderate or moderately high potential productivity. Shallow and moderate depth to bedrock and slope are limitations for community development.

6. Hagerstown-Clarksburg-Opequon

Gently sloping to steep, shallow to very deep, well drained to moderately well drained soils formed in residuum and colluvium derived from limestone, shale, and sandstone

This map unit makes up about 7 percent of the survey area (fig. 5). It consists of soils in limestone valleys and coves. The landscape is undulating to hilly. Uplands are broad and bottom land is moderately wide.

This map unit is 64 percent Hagerstown soils, 12 percent Clarksburg soils, 5 percent Opequon soils, and 19 percent minor soils. Hagerstown soils are deep or very deep and well drained. They have a fine textured subsoil. Clarksburg soils are very deep, moderately well drained soils that have a medium or moderately fine textured subsoil. Opequon soils are shallow and well drained. They have a fine textured subsoil.

Minor soils include the well drained Murrill and Laidig soils. Also included are the moderately well drained Lindside soils, the somewhat poorly drained Penlaw soils, and the poorly drained Holly soils.

Most areas of this map unit are cleared and are used for farming. Steep or very steep areas are generally woodland. The soils in this unit are suited to cultivated crops. Productivity is high. The soils are suited to woodland. Potential productivity is moderate or moderately high. Sinkholes and the hazard of ground water contamination, shallowness to bedrock, and slope are limitations for community development.

7. Westmoreland-Edom-Opequon

Gently sloping to steep, shallow to very deep, well drained soils formed in material weathered from calcareous shale, siltstone, and sandstone and thin-bedded limestone

This map unit makes up about 4 percent of the survey area (fig. 6). It is on hills and minor ridges. The landscape

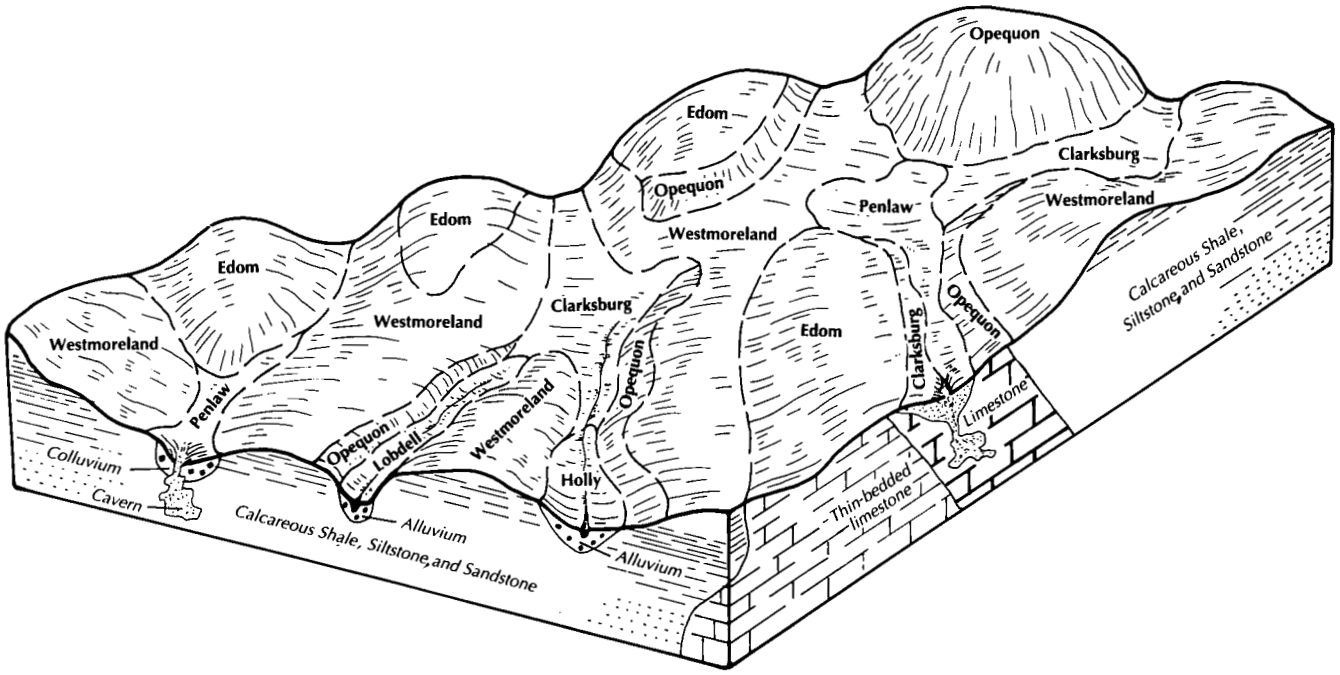

Figure 6.—Typical pattern of soils and underlying material in the Westmoreland-Edom-Opequon general soil map unit.

is undulating to rolling and irregularly dissected by streams that have moderate or wide flood plains and bottom land.

This map unit is about 28 percent Westmoreland soils, 15 percent Edom soils, 10 percent Opequon soils, and 47 percent minor soils. Westmoreland soils are deep or very deep and well drained. They have a medium or moderately fine textured subsoil. Edom soils are deep or very deep and well drained. They have a moderately fine to fine textured subsoil. Opequon soils are shallow and well drained. They have a fine textured subsoil.

Minor soils include the moderately well drained Clarksburg soils and the well drained Berks, Klinesville, and Hagerstown soils.

Most lesser sloping areas of this map unit are cleared and are cultivated. The steeper areas are used for pasture and woodland. The soils in this map unit are generally suited to farming. The major limitations are a moderate or severe hazard of erosion and shallowness to bedrock. The soils are suited to woodland. Potential productivity is moderate or moderately high. Sinkholes and the hazard of ground water contamination are limitations for community development.

8. Elliber-Opequon-Mertz

Gently sloping to steep, shallow to very deep, well drained soils formed in residuum and colluvium from cherty limestone

This map unit makes up about 7 percent of the county. It is on minor ridges. The landscape consists of relatively broad, undulating to smooth ridgetops and steep, smooth side slopes. The ridges are elongated and are occasionally dissected by major streams.

This map unit is about 28 percent Elliber soils, 10 percent Opequon soils, 5 percent Mertz soils, and 57 percent minor soils. Elliber soils are deep or very deep and well drained. They have a moderately coarse or medium textured subsoil. Opequon soils are shallow and well drained. They have a fine textured subsoil. Mertz soils are deep or very deep and well drained. They have a medium or moderately fine textured subsoil.

Minor soils include the well drained Edom, Vanderlip, and Murrill soils and the moderately well drained Lobdell and Clarksburg soils. Also included are the somewhat poorly drained Penlaw soils and the poorly drained Holly soils.

Many of the lesser sloping areas of this map unit are

cleared and are cultivated. Many favorable areas are used as orchards. Most steep areas are wooded. Some small areas of this unit are being mined for roadfill material. The soils in this map unit are generally suited to farming. The main limitations are the erosion hazard, small stones on the surface, and shallowness to bedrock.

The soils are also suited to woodland. Potential productivity is moderate or moderately high. The hazard of ground water contamination, shallowness to bedrock, and steep slopes are limitations for community development.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Berks channery silt loam, 3 to 8 percent slopes, is a phase of the Berks series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Morrison-Murrill complex, 3 to 8 percent slopes, very stony, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey

area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Hazleton-Clymer association, 25 to 45 percent slopes, extremely stony, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Klinesville and Calvin soils, 25 to 50 percent slopes, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits and quarries is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

AbB—Albrights silt loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and moderately well drained or somewhat poorly drained. It is in upland depressions, along drainageways, on foot slopes, and on benches. Areas occurring in drainageways are generally dissected by intermittent streams. Slopes are concave and range from 50 to 400 feet in length. Areas are elongated or irregular in shape and range from 4 to 50 acres.

Typically, this soil has a reddish brown silt loam surface layer about 5 inches thick. The subsoil extends to a depth of 50 inches. It is reddish brown silt loam to a depth of 18 inches, mottled reddish brown silty clay loam to a depth of 26 inches, and firm, brittle, and mottled reddish brown silty clay loam to a depth of 50 inches. The substratum is reddish gray channery clay loam to a depth of 60 inches.

Included with this soil in mapping some areas of soils that are similar to the Albrights soil but that have a very stony or channery surface layer. Also included are areas of poorly drained or very poorly drained soils adjacent to seeps and springs. Inclusions make up about 15 percent of the map unit.

Permeability in the Albrights soil is moderate above the fragipan and moderately slow within it. Available water capacity is low. Surface runoff is medium. The hazard of erosion is moderate. A seasonal high water table is within 6 to 36 inches of the surface in wet seasons. The high water table and fragipan restrict the root zone to the upper 18 to 30 inches of soil. In unlimed areas the soil ranges from strongly acid to extremely acid in the upper part of the solum and from slightly acid to very strongly acid in the lower part of the solum and the substratum.

This soil is used for farming or woodland or is in nonfarm uses.

This soil is suited to cultivated crops and hay, but the seasonal high water table is a limitation for some crops, such as alfalfa hay. The water table can be lowered and the root zone increased by installing subsurface drains. Stripcropping, conservation tillage, crop rotations that include grasses and legumes, grassed waterways, and use of cover crops help to reduce runoff and to control erosion.

This soil is suited to pasture. Plant species that tolerate the seasonal high water table are suitable for planting. Grazing during wet conditions causes surface compaction, reduced infiltration, increased runoff, and damage to plant stands. Proper stocking rates, rotational grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition.

This soil is suited to woodland. Potential productivity is moderately high. Management problems are few. Removing undesirable species will increase the water available to the more desirable trees. Machine planting of seedlings is practical in larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table and moderately slow permeability are limitations for onsite waste disposal. The seasonal high water table also is a limitation for dwellings with basements and excavations. If buildings are constructed on this soil, foundation drains with proper outlets help to prevent seepage of water into the basements.

The capability subclass is IIe. The woodland ordination symbol is 4a.

AbC—Albrights silt loam, 8 to 15 percent slopes

This soil is sloping, very deep, and moderately well drained or somewhat poorly drained. It is in upland depressions, in draws, on foot slopes, and along drainageways. Most areas are dissected by intermittent streams. Slopes are uniform to concave and range from 50 to 300 feet in length. Areas are long and narrow or irregular in shape and range from 2 to 75 acres in size.

Typically, this soil has a reddish brown silt loam surface layer about 5 inches thick. The subsoil extends to a depth of 50 inches. It is reddish brown silt loam to a depth of 18 inches, mottled reddish brown silty clay loam to a depth of

26 inches, and firm, brittle, and mottled reddish brown silty clay loam to a depth of 50 inches. The substratum to a depth of 60 inches is reddish gray channery clay loam.

Included with this soil in mapping are areas of soils that are similar to the Albrights soil but that have a channery surface layer and, in some wooded areas, that have a very stony surface layer. Also included are some areas of poorly drained soils that have a thick, dark surface layer and are ponded after heavy rains. Inclusions make up about 15 percent of the map unit.

Permeability in the Albrights soil is moderate above the fragipan and moderately slow within it. Available water capacity is low. Surface runoff is rapid. The hazard of erosion is severe. A seasonal high water table is within 6 to 36 inches of the surface in wet seasons. The root zone is limited to the upper 18 to 30 inches of the soil by the seasonal high water table and the fragipan. In unlimed areas the soil ranges from extremely acid to strongly acid in the upper part of the solum and from slightly acid to very strongly acid in the lower part of the solum and the substratum.

Areas of this soil are in pasture, cropland, or woodland. Some areas are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, conservation tillage, use of crop residue on the surface, crop rotations that include grasses and legumes, and grassed waterways help to reduce runoff and to control erosion. Wetness delays plowing and causes the soil to warm slowly in spring. Fall-sown small grain and alfalfa may be subject to losses over winter because of frost action and wetness. Subsurface drains help to remove excess ground water and allow for timely tillage.

This soil is suited to pasture. Grasses and legumes that tolerate wetness are suitable for planting. Grazing when the soil is wet causes surface compaction, reduced infiltration, increased runoff, and damage to plant stands. Proper stocking rates, rotational grazing, and deferment of grazing when the soil is wet help to keep the pasture in good condition.

This soil is suited to woodland. Potential productivity is moderately high and management problems are few. Removing undesirable species will increase the moisture available to the more desirable trees. Machine planting of seedlings is practical in larger areas.

This soil has limitations for most types of nonfarm uses. The seasonal high water table and moderately slow permeability are limitations affecting onsite waste disposal and building sites. If buildings are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage of water into the basements. If this soil is disturbed for construction, management practices will be needed to control erosion and sediment.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

AeB—Allegheny loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and well drained. It is on river and stream terraces and alluvial fans. Slopes are convex and range from 100 to 400 feet in length. Areas are irregular in size and range from 5 to 40 acres.

Typically, the Allegheny soil has a brown to dark brown loam surface layer about 10 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish brown loam in the upper part and strong brown loam below. The substratum to a depth of 60 inches is yellowish brown gravelly fine sandy loam.

Included with this soil in mapping are areas of Monongahela and Birdsboro soils. Also included are areas of soils that are similar to this Allegheny soil but that have more than 15 percent rock fragments throughout. Inclusions make up about 20 percent of the map unit.

Permeability in the Allegheny soil is moderate. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas are used for cropland and pasture. Some small areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, no-till, crop rotations, conservation tillage, and winter cover crops help to reduce runoff and to control erosion. Additions of organic materials and crop residue management help to maintain the condition of the soil and to increase available water capacity.

This soil is suited to pasture. Rotational grazing and proper stocking rates help to maintain the desired plant species. Periodic applications of plant nutrients help to maintain production.

This soil is suited to woodland. Potential productivity is moderately high and management problems are few. Machine planting of seedlings is practical in larger areas.

This soil has few limitations for nonfarm uses. In some areas seepage and ground water contamination from lagoons are hazards.

The capability subclass is IIe. The woodland ordination symbol is 4a.

AeC—Allegheny loam, 8 to 15 percent slopes

This soil is sloping, very deep, and well drained. It is on river and stream terraces and alluvial fans. Slopes are convex and range from 50 to 300 feet in length. Areas are irregular in size and range from 5 to 20 acres.

Typically, this soil has a brown to dark brown loam surface layer about 10 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish brown loam in the

upper part and strong brown loam below. The substratum to a depth of 60 inches is yellowish brown gravelly fine sandy loam.

Included with this soil in mapping are areas of Birdsboro and Calvin soils. Also included are areas of soils that are similar to this Allegheny soil but that have more than 15 percent rock fragments throughout. Inclusions make up about 20 percent of the map unit.

Permeability in the Allegheny soil is moderate. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas of this soil are cleared and farmed. Some small areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. No-till, conservation tillage, stripcropping, crop rotations, including grasses and legumes in the cropping system, and grassed waterways help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer can help to maintain organic matter and improve tilth.

This soil is suited to pasture. Rotational grazing and proper stocking rates help to maintain the desired plant species. Periodic application of plant nutrients helps to maintain production.

This soil is suited to woodland. Potential productivity is moderately high. Management problems are few. Logging roads should be constructed on the contour during harvesting to minimize erosion and gullying. Machine planting of seedlings is practical in larger areas.

This soil has limitations for nonfarm uses. Slope is a limitation for onsite waste disposal and building sites.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

ArB—Andover cobbly loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and poorly drained. It is on the lower slopes, benches, and foot slopes of ridges and mountains. Slopes are concave to convex and range from 100 to 300 feet in length. Areas are irregular in shape and range from 4 to 75 acres.

Typically, the surface layer is mottled, grayish brown cobbly loam about 6 inches thick. The subsoil is mottled, gray cobbly sandy clay loam to a depth of 20 inches; firm, brittle, and mottled, light brownish gray cobbly sandy clay loam to a depth of 30 inches; and firm, brittle, and mottled, light yellowish brown cobbly sandy clay loam to a depth of 40 inches. The substratum to a depth of 60 inches is mottled, brown cobbly sandy loam.

Included with this soil in mapping are areas of Clarksburg soils. Also included are areas of soils that are similar to this Andover soil but that have a cobbly sandy loam surface layer and areas of poorly drained soils that have a clay or silty clay subsoil and substratum. Inclusions make up about 15 percent of the map unit.

Permeability in the Andover soil is moderate above the fragipan and slow within it. Available water capacity is low. Surface runoff is medium. The hazard of erosion is moderate. A seasonal high water table is at a depth of 0 to 6 inches in wet seasons. Depth to the fragipan is 18 to 25 inches. The fragipan and the seasonal high water table limit the rooting depth. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most areas are used for pasture, hayland, or cropland. A few areas are in nonfarm uses.

This soil is fairly suited to cultivated crops, but wetness caused by a high water table is a serious limitation. Subsurface drains can be used to hasten removal of excess water and make the soil more suitable for some crops. Stripcropping, conservation tillage, sod-based rotations, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. Frost action is a problem for perennial plants and winter small grains. This soil is slow to dry out and slow to warm in spring. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and improve tilth.

This soil is suited to pasture. Subsurface drains will increase the grazing season and the productivity of pasture. Proper stocking rates, rotational grazing, and weed control are suitable management practices. Restricted grazing when the soil is wet will prevent surface compaction and damage to plant stands. Plant species that tolerate wetness are preferred for planting.

This soil is suited to woodland. Potential productivity is moderately high. Wetness is a problem that causes increased seedling mortality and an increased windthrow hazard. Decreased soil stability in wet periods reduces trafficability. Machine planting in large areas is generally practical.

This map unit has serious limitations for most types of nonfarm uses. A high water table and slow and moderately slow permeability are limitations for homesites and septic tank absorption fields. Frost action and wetness are limitations on sites for local roads and streets.

The capability subclass is IVw. The woodland ordination symbol is 4w.

ArC—Andover cobbly loam, 8 to 15 percent slopes

This soil is sloping, very deep, and poorly drained. It is on the lower slopes, benches, and foot slopes of ridges and mountains. Slopes are convex to concave and range

from 50 to 250 feet in length. Areas are irregular in shape and range from 4 to 40 acres.

Typically, this soil has a mottled grayish brown cobbly loam surface layer about 6 inches thick. The subsoil is mottled gray cobbly sandy clay loam to a depth of 20 inches; firm, brittle, mottled light brownish gray cobbly sandy clay loam to a depth of 30 inches; and firm, brittle, and mottled light yellowish brown cobbly sandy clay loam to a depth of 40 inches. The substratum to a depth of 60 inches is mottled brown cobbly sandy loam.

Included with this soil in mapping are small areas of Brinkerton, Purdy, and Buchanan soils. Also included are some areas of soils that are similar to the Andover soil but that have a sandy loam surface layer. Inclusions make up about 15 percent of the map unit.

Permeability in the Andover soil is moderate above the fragipan and slow within it. Available water capacity is low. Surface runoff is rapid. The hazard of erosion is severe. A seasonal high water table is at a depth of 0 to 6 inches in wet seasons. Depth to the fragipan is 18 to 25 inches. The fragipan and the high water table limit the rooting depth. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most areas are used for pasture or hay. A few areas are cropped or in nonfarm uses.

This soil is fairly suited to cultivated crops but the wetness caused by the seasonal high water table and the severe hazard of erosion are serious limitations. Subsurface drains can be used to hasten removal of excess water and to make the soil suitable for some crops. Stripcropping, conservation tillage, sod-based rotations, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. Frost action is a problem for perennial plants and winter small grains. This soil is slow to dry out and warm up in spring. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Subsurface drains can increase the grazing season. Proper stocking rates, rotational grazing, weed control, and avoiding grazing when the soil is wet are suitable management practices. Species that tolerate wetness are suitable for planting.

This soil is suited to woodland. Potential productivity is moderately high. Wetness is a problem that causes increased seedling mortality and windthrow hazard. Decreased soil stability reduces trafficability during wet periods. Constructing logging roads on the contour helps to control erosion.

This soil has significant limitations for most types of nonfarm uses. A high water table and slow and moderately slow permeability are limitations for homesites and septic tank absorption fields.

The capability subclass is IVw. The woodland ordination symbol is 4w.

AvB—Andover cobbly sandy loam, 0 to 8 percent slopes, very stony

This soil is nearly level to gently sloping, very deep, and poorly drained. It is on the lower side slopes, benches, and foot slopes of ridges and mountains. Slopes are concave to convex and range from 100 to 500 feet in length. Areas are irregular in shape and range from 5 to 100 acres. Stones cover 0.1 to 3 percent of the surface.

Typically, the surface layer is covered by a mat of partly decomposed organic matter. The surface layer is mottled grayish brown cobbly sandy loam about 6 inches thick. The subsoil extends to a depth of 40 inches. It is friable, mottled gray cobbly sandy clay loam in the upper part; firm, brittle, mottled light brownish gray cobbly sandy clay loam in the next part; and firm, brittle, mottled light yellowish brown cobbly sandy clay loam in the lower part. The substratum to a depth of 60 inches is mottled brown cobbly sandy loam.

Included with this soil in mapping are areas of Laidig and Buchanan soils. Springs and seeps are common in most areas. Also included are some areas of poorly drained soils that have a clayey or shaly subsoil and substratum. Some areas have a sandy loam texture throughout. Inclusions make up about 15 percent of the map unit.

Permeability in the Andover soil is moderate above the fragipan and slow within it. Available water capacity is low. Surface runoff is slow or medium, but water may be ponded in some spots. Depth to the fragipan is 18 to 25 inches. A seasonal high water table is at a depth of 0 to 6 inches in wet seasons. The rooting depth is restricted by the fragipan and the high water table. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most areas of this soil are wooded. A few small areas are in unimproved pasture or in nonfarm uses.

This soil is not suited to cultivated crops or pasture because of large stones. It is generally not feasible to remove the stones.

This soil is suited to woodland. Potential productivity is moderately high. Management problems include equipment limitations and seedling mortality because of the seasonal high water table and large stones on the surface.

This soil has limitations for most types of nonfarm use. A high water table and slow and moderately slow permeability are limitations for onsite waste disposal and building sites.

The capability subclass is VIIs. The woodland ordination symbol is 4w.

AvC—Andover cobbly sandy loam, 8 to 15 percent slopes, very stony

This soil is sloping, very deep, and poorly drained. It is on benches, foot slopes, and the lower side slopes of ridges and mountains. Slopes are concave to convex and range from 50 to 300 feet in length. Areas are irregular in shape and range from 3 to 30 acres in size. Stones cover 0.1 to 3 percent of the surface.

Typically, the surface layer is covered by a mat of partly decomposed organic matter. The surface layer is mottled grayish brown cobbly sandy loam about 6 inches thick. The subsoil extends to a depth of 40 inches. It is friable, mottled gray cobbly sandy clay loam in the upper part; firm, brittle, mottled light brownish gray cobbly sandy clay loam in the next part; and firm, brittle, mottled light yellowish brown cobbly sandy clay loam in the lower part. The substratum to a depth of 60 inches is mottled brown cobbly sandy loam.

Included with this soil in mapping are areas of Buchanan and Laidig soils. Also included are some areas along drainageways where stones cover more than 3 percent of the surface and some areas that have a clayey subsoil and substratum. Inclusions make up about 15 percent of the map unit.

Permeability in the Andover soil is moderate above the fragipan and slow within it. Available water capacity is low. Surface runoff is rapid. The hazard of erosion is severe. Depth to the fragipan is 18 to 25 inches. A seasonal high water table is at a depth of 0 to 6 inches in wet seasons. The root zone is restricted by the fragipan and the high water table. Unless limed, soil reaction is very strongly acid or strongly acid throughout.

Most areas of this soil are wooded. A few small areas are in unimproved pasture or in nonfarm uses.

This soil is not well suited to cultivated crops or pasture because of large stones. It is generally not feasible to remove the stones.

This soil is suited to woodland. Potential productivity is moderately high. Management problems include equipment limitations and seedling mortality because of the seasonal high water table and large stones on the surface. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most types of nonfarm use. The seasonal high water table and slow and moderately slow permeability are limitations for onsite waste disposal and building sites.

The capability subclass is VIIs. The woodland ordination symbol is 4w.

Aw—Atkins silt loam

This soil is nearly level, very deep, and poorly drained. It is on broad to narrow flood plains. Individual areas are long and narrow to broad in shape and range from 4 to 100 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil extends to a depth of 40 inches. It is mottled, olive gray silty clay loam in the upper part and mottled grayish brown silty clay loam in the lower part. The substratum to a depth of 60 inches is gray, stratified sandy loam and silty clay loam.

Included with this soil in mapping are areas of soils that have a silty clay loam surface layer. Also included are some areas of Purdy and Philo soils and some areas of very poorly drained soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Atkins soil is slow or moderate in the solum and moderately slow to moderately rapid in the substratum. Available water capacity is high. Surface runoff is slow or very slow. A seasonal high water table is at or near the surface for long periods. It is frequently flooded and often ponded. In unlimed areas the soil reaction is strongly acid or very strongly acid throughout.

This soil is used for pasture, hay, cropland, woodland, or marshland wildlife habitat.

This soil is not well suited to cultivated crops because of long periods of wetness and the hazard of flooding. Some areas that have surface and subsurface drains are used for corn or hay. Some areas of this soil are plowed in fall to allow freezing and thawing to break up a cloddy surface layer and to allow timely planting in spring. Soil compaction is a problem if the soil is worked when wet. The soil is slow to dry out and warm up in spring. Hayland should be planted with species tolerant of wetness.

This soil is suited to pasture. Selecting species that tolerate soil wetness, deferment of grazing when the soil is wet, rotational grazing, and proper stocking rates are suitable management practices.

This soil is suited to woodland and potential productivity of water-tolerant species is moderately high. Plant competition and seedling mortality are limitations because of the seasonal high water table and wetness. Use of equipment for planting, harvesting, and maintaining is restricted for long periods during wet seasons.

This soil has significant limitations for most nonfarm uses. The hazard of flooding, slow or moderately slow permeability, and a high water table are limitations for homesites, lot waste disposal, and local roads and streets.

The capability subclass is IIIw. The woodland ordination symbol is 4w.

Ax—Atkins-Ernest complex, 0 to 8 percent slopes

This map unit consists of nearly level and gently sloping, poorly drained and moderately well drained, very deep soils. They are on narrow flood plains and lower foot slopes. These soils are in such narrow areas and in such intricate patterns that mapping them was not possible at the scale used for mapping.

The poorly drained Atkins soils are on flood plains and make up about 45 percent of the unit. The moderately well drained Ernest soils are on colluvial foot slopes and along drainageways and make up about 35 percent of the unit. Slopes are uniform on flood plains and slightly convex to concave on lower foot slopes. Areas are long and narrow and are 5 to 100 acres in size.

Typically, the Atkins soil has a dark grayish brown silt loam surface layer about 6 inches thick. The subsoil extends to a depth of 40 inches. It is mottled, olive gray silty clay loam in the upper part and mottled, grayish brown silty clay loam in the lower part. The substratum to a depth of 60 inches is gray, stratified sandy loam and silty clay loam.

Typically, the Ernest soil has a dark brown silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 63 inches. It is yellowish brown and mottled light yellowish brown, friable silty clay loam in the upper part and mottled strong brown and brown, firm and brittle, channery silty clay loam in the lower part.

Included in these soils in mapping are small areas of Philo, Tyler, and Brinkerton soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Atkins soil is slow to moderate. In the Ernest soil permeability is moderate above the fragipan and moderately slow or slow within it. Available water capacity is high in the Atkins soil and moderate in the Ernest soil. On both soils surface runoff is slow or medium and the hazard of erosion is slight or moderate. The Atkins soil has a seasonal high water table at or near the surface in wet seasons. The fragipan in the Ernest soil causes a seasonal high water table to be perched at a depth of 18 to 36 inches in wet seasons. The Atkins soil is subject to frequent flooding. The Ernest soil is at slightly higher elevations and is not subject to flooding. In unlimed areas reaction is strongly acid or very strongly acid in the Atkins soil and strongly acid to extremely acid in the Ernest soil.

Areas of this map unit are wooded, cropped, or pastured. Some areas are in nonfarm uses.

This map unit is suited to cultivated crops, but wetness and a hazard of flooding are limitations. On the Ernest soil erosion is a moderate hazard. Crop rotations with grasses and legumes, crop residue management, conservation tillage, and stripcropping help to reduce runoff and to control erosion. Subsurface drains can be installed to lower the water table and make the soil more suited to some crops and grasses.

This map unit is suited to pasture. Plant species that tolerate wetness should be used for planting in areas that are not artificially drained. Deferment of grazing when the soil is wet, rotational grazing, and proper stocking rates to avoid overgrazing are suitable management practices.

These soils are suited to woodland. Potential productivity is moderately high. The seasonal high water table and the hazard of flooding are limitations for woodland management. In wet seasons poor soil trafficability and flooding may delay equipment used for harvesting, maintaining, and planting trees.

This map unit has limitations for most nonfarm uses. Flooding, a high water table, and slow or moderately slow permeability are limitations for onsite waste disposal, buildings, and roads.

The capability subclass for the Atkins and Ernest soils is IIIw. The woodland ordination symbol on both soils is 4w.

Ba—Basher silt loam

This soil is nearly level, very deep, and moderately well drained. It is on wide to narrow flood plains. Areas are long and narrow and range from 5 to 400 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 40 inches. It is reddish brown loam in the upper part; yellowish red, mottled loam in the next part; and reddish brown, mottled loam in the lower part. The substratum to a depth of 64 inches is reddish brown, mottled sandy loam in the upper part and variegated, yellowish red and pinkish gray loam in the lower part.

Included with this soil in mapping are areas of soils that are similar to this Basher soil but that are well drained or poorly drained. Also included are areas of Albrights soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Basher soil is moderate in the solum and moderate or moderately rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The hazard of erosion is slight. This soil is susceptible to occasional flooding. A seasonal high water table at a depth of 18 to 24 inches in wet seasons. The rooting depth is limited by the seasonal high water table. In unlimed areas soil reaction is extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum.

Most areas are used for cropland and pasture. Small acreages are wooded or in nonfarm uses.

This soil is well suited to cropland but the high water table and occasional flooding may delay timely field

operations. Growing cover crops, utilizing crop residue, and including grasses and legumes in the cropping system help to maintain the content of organic matter and the good condition of the soil. Cover crops will help protect the soil from scouring during flooding. Installing subsurface drains will remove excess water and improve the suitability of the soil for cultivated crops.

This soil is suited to hay and pasture. Limitations are few. Subsurface drainage, where outlets are available, improves drainage for more timely tillage and improves crop production. Proper stocking rates and rotational grazing help to keep the pasture in good condition.

This soil is suited to woodland. Potential productivity is moderately high. The high water table and flooding may interfere with equipment use during wet periods. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. Flooding and the high seasonal water table are limitations for onsite septic systems and homesites.

The capability subclass is IIw. The woodland ordination symbol is 4a.

BbB—Basher-Birdsboro complex, 0 to 8 percent slopes

This map unit consists of nearly level to gently sloping, well drained to moderately well drained, very deep soils on terraces and flood plains. These soils are in such an intricate pattern and occupy such narrow areas that it was not possible to separate them at the scale of mapping. The Basher soil on flood plains makes up about 45 percent of the map unit. The Birdsboro soil on terraces makes up about 40 percent of the map unit. Slopes are uniform on flood plains and uniform to slightly convex on terraces. Slopes range from 50 to 500 feet in length. Areas are long and narrow and range from 10 to 400 acres.

Typically, the Basher soil has a reddish brown silt loam surface layer about 8 inches thick. The subsoil extends to a depth of 40 inches. It is reddish brown loam in the upper part, yellowish red, mottled loam in the next part, and reddish brown, mottled loam in the lower part. The substratum to a depth of 64 inches is reddish brown, mottled sandy loam in the upper part and variegated, yellowish red and pinkish gray loam in the lower part.

Typically, the Birdsboro soil has a dark brown silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 46 inches. It is reddish brown silty clay loam in the upper part, reddish brown loam in the next part, and brown to dark brown, mottled sandy clay loam in the lower part. The substratum to a depth of 70 inches is reddish brown, mottled very gravelly clay loam.

Included with these soils in mapping are some areas of somewhat poorly drained and poorly drained soils. Also included are areas of Albrights soils and some areas of soils that have a cobbly or stony surface layer. Inclusions make up about 15 percent of the map unit.

Permeability in the Basher soil is moderate in the solum and moderate or moderately rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The hazard of erosion is slight. The Basher soil is subject to occasional flooding and has a seasonal high water table within a depth of 18 to 24 inches in wet seasons. The rooting depth is limited by the seasonal high water table. In unlimed areas soil reaction ranges from extremely acid to moderately acid in the surface layer and subsoil and from very strongly acid to slightly acid in the substratum.

Permeability in the Birdsboro soil is moderate. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. The Birdsboro soil is at slightly higher positions than the Basher soil and is subject to rare flooding. The Birdsboro soil has a seasonal high water table at a depth of 24 to more than 36 inches in wet seasons. The rooting depth is limited by the seasonal high water table. In unlimed areas soil reaction ranges from extremely acid to strongly acid throughout.

Most areas are used for pasture, woodland, and cropland. Some areas are idle land or in nonfarm uses.

This map unit is suited to cultivated crops but the seasonal high water table and occasional flooding may delay timely field operations. Crops may be damaged by flooding during the growing season. In some places winter grains and alfalfa can be subject to some losses over winter because of wetness and frost action. Surface and subsurface drains, where suitable outlets are available, will remove excess water and can improve the suitablity of the soil for cultivated crops. Cover crops, conservation tillage, grassed waterways, and crop rotations help to control erosion and to reduce runoff. Incorporating crop residue into the surface layer and applying plant nutrients as needed can help to maintain the content of organic matter and to improve tilth.

This map unit is suited to pasture. Grasses and legumes need to tolerate occasional wetness. Proper stocking rates, rotational grazing, and deferment of grazing during wet periods help to maintain the good condition of the soil and to promote the growth of desired plant species. Best production requires maintaining fertility through periodic applications of nutrients.

This map unit is suited to woodland. Potential productivity is moderately high. Removing undesirable

species will increase production. The high water table and flooding may interfere with equipment used for planting, maintaining, and harvesting trees. Machine planting is practical in larger areas.

These soils have limitations for most nonfarm uses. The seasonal high water table and flooding are limitations for roads, homesites, and onsite waste disposal.

The capability subclass for the Basher and Birdsboro soils is IIw. The woodland ordination symbol is 3a on the Basher soil and 4a on the Birdsboro soil.

BcC—Bedington-Berks complex, 8 to 15 percent slopes

This map unit consists of sloping areas of very deep to moderately deep, well drained soils. These soils are on the side slopes of minor ridges and on the knobby side slopes of mountains. Slopes are uniform to slightly concave and range from 100 to 600 feet in length. Areas are long and narrow or irregular in shape and range from 3 to 70 acres. These soils occur in areas so intricately mixed on the landscape that separating them in mapping was not feasible. The Bedington soil makes up about 60 percent of the map unit and is generally on the broad, smooth slopes. The Berks soil makes up about 30 percent of the map unit and is generally on side slopes and adjacent to streams that have dissected these areas. More shale rock fragments are on the surface of the Berks soil than on the Bedington soil.

Typically, the surface layer of the Bedington soil is brown channery silt loam about 8 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown and strong brown channery loam and silt loam in the upper part and yellowish red and strong brown very channery silt loam and loam in the lower part. The substratum to a depth of 60 inches is yellowish brown extremely channery loam.

Typically, the surface layer of the Berks soil is brown channery silt loam about 7 inches thick. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Shale and siltstone bedrock is at a depth of 34 inches.

Included with these soils in mapping are some small areas of Ernest, Blairton, Brinkerton, Weikert, and Laidig soils. Inclusions make up about 10 percent of the map unit.

Permeability in the Bedington soil is moderate. Available water capacity is moderate. Permeability in the Berks soil is moderate or moderately rapid. Available water capacity is very low. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches on the Bedington soil and is 20 to 40 inches on the Berks soil. In unlimed areas the Bedington soil is strongly acid or very strongly acid throughout and the Berks soil ranges from slightly acid to extremely acid throughout.

Most areas of this map unit are used for hay, pasture, or cultivated crops. Some areas are in trees or nonfarm uses.

This map unit is suited to cultivated crops. No-till, stripcropping, conservation tillage, crop rotations that include grasses and legumes, and grassed waterways help to control erosion and to reduce runoff. Areas of the Berks soil tend to be droughty and not as productive as the Bedington soil. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This map unit is suited to pasture. Applying plant nutrients as needed can help to maintain desired plant stands and increase production. Rotational grazing and proper stocking rates help to maintain pasture quality and to reduce runoff.

This map unit is suited to woodland. Potential productivity is moderately high. Management limitations for Bedington soils are few. Berks soils have higher rates of seedling mortality. Removing undesirable species will increase the moisture available to the more desirable trees. Machine planting is practical in larger areas. Constructing logging roads on the contour helps to control erosion.

These soils have limitations for nonfarm uses. The depth to bedrock and slope are limiting factors for septic tank absorption fields and building site development.

The capability subclass for the Bedington and Berks soils is IIIe. The woodland ordination symbol is 4a on the Bedington soil and 4f on the Berks soil.

BcD—Bedington-Berks complex, 15 to 25 percent slopes

This map unit consists of moderately steep areas of very deep to moderately deep, well drained soils. They are on the side slopes of minor ridges and on the knobby side slopes of mountains. Slopes are uniform to concave and range from 50 to 400 feet in length. Areas are long and narrow or irregular in shape and range from 5 to 50 acres. These soils are in areas so intricately mixed on the landscape that separating them in mapping was not feasible. The Bedington soil makes up about 60 percent of the map unit and generally is on broad, smooth slopes. The Berks soil makes up about 30 percent of the map unit and generally is on narrow side slopes and adjacent to streams that have dissected these areas. More shale rock fragments are on the surface of the Berks soil than on the Bedington soil.

Typically, the surface layer of the Bedington soil is brown channery silt loam about 8 inches thick. The

subsoil extends to a depth of 50 inches. It is yellowish brown and strong brown channery loam and silt loam in the upper part and yellowish red and strong brown very channery silt loam and loam in the lower part. The substratum to a depth of 60 inches is yellowish brown extremely channery loam.

Typically, the surface layer of the Berks soil is brown channery silt loam about 7 inches thick. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Shale and siltstone bedrock is at a depth of 34 inches.

Included with these soils in mapping are some areas of Ernest, Weikert, Laidig, and Blairton soils. Inclusions make up about 10 percent of the map unit.

Permeability is moderate in the Bedington soil and moderate or moderately rapid in the Berks soil. Available water capacity is moderate in the Bedington soil and very low in the Berks soil. On both soils surface runoff unit is very rapid and the hazard of erosion is severe. Depth to bedrock is more than 40 inches on the Bedington soil and is 20 to 40 inches on the Berks soil. In unlimed areas the Bedington soil is strongly acid or very strongly acid throughout and the Berks soil ranges from slightly acid to extremely acid throughout.

Most areas of this map unit are used for hay, pasture, or woodland. Some areas are used for cultivated crops.

This map unit is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Conservation tillage, stripcropping, no-till, grassed waterways, and crop rotations help to control erosion and to reduce runoff. The soils are sometimes droughty because of a moderate or low water holding capacity.

This map unit is suited to pasture. Applying nutrients as needed can help to maintain the desired stands and increase production. Rotational grazing and proper stocking rates help to maintain pasture and to reduce runoff.

This map unit is suited to woodland. Potential productivity is moderately high. Moderately steep slopes limit use of some equipment and machine planting. The hazard of erosion can be reduced by constructing logging roads on the contour. Removing undesirable species will increase the moisture available to the more desirable trees. Seedling mortality is higher in areas of the Berks soil.

These soils have limitations for nonfarm uses. Depth to bedrock and slope are limiting factors for sanitary facilities. Slope is a limiting factor for building site development. If the soils are disturbed for construction, management practices will be needed to control erosion and sedimentation.

The capability subclass for the Bedington and Berks soils is IVe. The woodland ordination symbol is 4r on the Bedington soil and 4f on the Berks soil.

BdC—Bedington-Berks complex, 8 to 15 percent slopes, very stony

This map unit consists of sloping, very deep to moderately deep, well drained soils. They are on the side slopes of minor ridges and on the knobby side slopes of mountains. Slopes are uniform to convex and range from 200 to 600 feet in length. Areas are long and narrow or irregular in shape and range from 5 to 100 acres. These soils are in such an intricate pattern that separating them was not possible at the scale used for mapping. Generally, the Bedington soil is on broad smooth slopes and make up about 60 percent of the map unit. The Berks soil is on side slopes of knobby hills and near the tops of minor ridges and make up about 30 percent of the map unit. Large stones cover from 0.1 to 3 percent of the surface.

Typically, the surface layer of the Bedington soil is dark grayish brown channery loam about 2 inches thick. The subsurface layer, to a depth of 9 inches, is light yellowish brown channery loam. The subsoil extends to a depth of 50 inches. It is yellowish brown to strong brown channery loam and silt loam in the upper part and yellowish red and strong brown very channery silt loam and loam in the lower part. The substratum to a depth of 60 inches is yellowish brown extremely channery loam.

Typically, the surface layer of the Berks soil is very dark grayish brown channery silt loam about 3 inches thick. The subsurface layer, to a depth of 7 inches, is light yellowish brown channery silt loam. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Fractured shale bedrock is at a depth of 34 inches.

Included with these soils in mapping are areas of Ernest, Laidig, and Weikert soils. Inclusions make up about 10 percent of the map unit.

Permeability is moderate in the Bedington soil and moderate or moderately rapid in the Berks soil. Available water capacity is moderate in the Bedington soil and very low in the Berks soil. On both soils surface runoff is rapid and the hazard of erosion is severe. Depth to bedrock is more than 40 inches on the Bedington soil and ranges from 20 to 40 inches on the Berks soil. Unless limed, the Bedington soil is strongly acid or very strongly acid throughout and the Berks soil is slightly acid to extremely acid throughout.

Most areas of this map unit are wooded. Some small areas are in nonfarm uses. Because of large stones on

the surface, these soils are generally not suited to cultivation. Some areas are used for unimproved pasture.

This map unit is suited to woodland. Potential productivity is moderately high. Management problems are few. Removing undesirable species will increase the moisture available to the more desirable trees. On the Berks soil seedling mortality is higher. Constructing logging roads on the contour helps to control erosion.

This map unit has limitations for most nonfarm uses. Slope and depth to bedrock are limitations on sites for septic tank absorption fields, shallow excavations, and homes with basements.

The capability subclass for the Bedington and Berks soils is VIs. The woodland ordination symbol is 4a on the Bedington soil and 4f on the Berks soil.

BdD—Bedington-Berks complex, 15 to 25 percent slopes, very stony

This map unit consists of moderately steep, very deep to moderately deep, well drained soils. They are on the side slopes of minor ridges and on the knobby side slopes of mountains. Slopes are slightly concave to convex and range from 100 to 600 feet in length. Areas are long and narrow or irregular in shape and range from 5 to 200 acres. These soils are in such an intricate pattern that separating them was not possible at the map scale used for mapping. Generally, the Bedington soil is on broad smooth slopes and makes up about 60 percent of the map unit. The Berks soil is on the side slopes of knobby hills and near the tops of minor ridges and makes up about 30 percent of the map unit. Large stones cover from 0.1 to 3 percent of the surface.

Typically, the surface layer of the Bedington soil is dark grayish brown channery loam about 2 inches thick. The subsurface layer, to a depth of 9 inches, is light yellowish brown channery loam. The subsoil extends to a depth of 50 inches. It is yellowish brown to strong brown channery loam and silt loam in the upper part and yellowish red and strong brown very channery silt loam and loam in the lower part. The substratum to a depth of 60 inches is yellowish brown extremely channery loam.

Typically, the surface layer of the Berks soil is very dark grayish brown channery silt loam about 3 inches thick. The subsurface layer, to a depth of 7 inches, is light yellowish brown channery silt loam. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Fractured shale bedrock is at a depth of 34 inches.

Included with these soils in mapping are areas of Ernest, Blairton, Weikert, and Laidig soils. Inclusions make up about 10 percent of the map unit.

Permeability is moderate in the Bedington soil and moderate or moderately rapid in the Berks soil. Available water capacity is moderate in the Bedington soil and very low in the Berks soil. On both soils surface runoff is very rapid and the hazard of erosion is severe. Depth to bedrock is more than 40 inches on the Bedington soil and ranges from 20 to 40 inches on the Berks soil. Unless limed, the Bedington soil is strongly acid or very strongly acid throughout and the Berks soil is slightly acid to extremely acid throughout.

Most areas of this map unit are wooded. Some small areas are in nonfarm uses. Because of large stones on the surface, these soils are generally not suited to cultivation. Some areas are used for unimproved pasture.

These areas are suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the moisture available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Seedling mortality is higher on the Berks soil.

This soil has limitations for most nonfarm uses. Slope and depth to bedrock are limitations on sites for septic tank absorption fields, shallow excavations, and homes with basements. If they are disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Bedington and Berks soils is VIs. The woodland ordination symbol is 4r on the Bedington soil and 4f on the Berks soil.

BdE—Bedington-Berks complex, 25 to 35 percent slopes, very stony

This map unit consists of steep, very deep to moderately deep, well drained soils. The soils are on the side slopes of minor ridges and on the knobby side slopes of mountains. Slopes are slightly concave to convex and range from 200 to 1,000 feet in length. Areas are long and narrow or irregular in shape and range from 10 to 400 acres. These soils are in such an intricate pattern that separating them was not possible at the map scale used for mapping. Generally, the Bedington soil is on broad, smooth slopes and make up about 60 percent of the map unit. The Berks soil is on side slopes of knobby hills and near the tops of minor ridges and make up about 30 percent of the map unit. Large stones cover from 0.1 to 3 percent of the surface.

Typically, the surface layer of the Bedington soil is dark grayish brown channery loam about 2 inches thick. The subsurface layer, to a depth of 9 inches, is light yellowish brown channery loam. The subsoil extends to a depth of 50 inches. It is yellowish brown to strong brown channery loam and silt loam in the upper part and yellowish red and

strong brown very channery silt loam and loam in the lower part. The substratum to a depth of 60 inches is yellowish brown extremely channery loam.

Typically, the surface layer of the Berks soil is very dark grayish brown channery silt loam about 3 inches thick. It has a subsurface layer of light yellowish brown channery silt loam to a depth of 7 inches. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Fractured shale bedrock is at a depth of 34 inches.

Included with these soils in mapping are areas of Ernest, Weikert, and Blairton soils. Inclusions make up about 10 percent of the map unit.

Permeability is moderate in the Bedington soil and moderate or moderately rapid in the Berks soil. Available water capacity is moderate in the Bedington soil and very low in the Berks soil. On both soils surface runoff is very rapid and the hazard of erosion is severe. Depth to bedrock ranges from 20 to 40 inches on the Berks soil and is more than 40 inches on the Bedington soil. Unless limed, the Bedington soil is strongly acid or very strongly acid throughout and the Berks soil is slightly acid to extremely acid throughout.

Most areas of this map unit are wooded. These soils are not suited to farming because of slope, large stones, and the severe hazard of erosion. Some areas are used for unimproved pasture.

These soils are suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the moisture available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. On the Berks soil seedling mortality is higher.

Slope is the main limitation of this soil for most nonfarm uses. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Bedington and Berks soils is VIe. The woodland ordination symbol is 4r on the Bedington soil and 4f on the Berks soil.

BkB—Berks channery silt loam, 3 to 8 percent slopes

This soil is gently sloping, moderately deep, and well drained. It is on the tops of hills and on side slopes and benches of minor ridges. Slopes are slightly convex and range from 200 to about 500 feet in length. Areas are irregular in shape and range from 4 to 150 acres.

Typically, this soil has a brown channery silt loam surface layer about 7 inches thick. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Fractured shale bedrock is at depth of 34 inches.

Included with this soil in mapping are areas of Blairton, Ernest, Bedington, and Weikert soils. A few springs or seeps that emerge in wet weather are included in some map units. Inclusions make up about 15 percent of the map unit.

Permeability in the Berks soil is moderate or moderately rapid. Available water capacity is very low. Surface runoff is medium. The hazard of erosion is moderate. Depth to bedrock is 20 to 40 inches. In unlimed areas the soil is slightly acid to extremely acid throughout.

This soil is used for cropland, pasture, and woodland. Some areas are in nonfarm uses.

The soil is suited to cultivated crops. Yields may be reduced during periods of little rainfall because of low available water capacity. Stripcropping, crop rotations, no-till, conservation tillage, and winter cover crops help to control erosion and to reduce runoff. Additions of organic materials and crop residue management help to maintain the good condition of the soil and to increase available water capacity.

This soil is suited to pasture. Rotational grazing and proper stocking rates help to maintain the desired plant species. Periodic applications of plant nutrients help to maintain production.

This soil is suited to woodland. Potential productivity is moderately high. The rooting depth is restricted by moderately deep bedrock. Removing undesirable species will increase the moisture available to the more desirable trees. Seedling mortality is a management concern because of low available water. Machine planting of seedlings is practical in larger areas.

This soil has limitations for some nonfarm uses. The depth to bedrock is a limitation on sites for septic tank absorption fields and sewage lagoons.

The capability subclass is IIe. The woodland ordination symbol is 4f.

BkC—Berks channery silt loam, 8 to 15 percent slopes

This soil is sloping, moderately deep, and well drained. It is on the tops and side slopes of hills and on the side slopes and benches of minor ridges. Slopes are uniform to convex and range from 100 to 700 feet in length. Areas are irregular in shape and range from 3 to 150 acres.

Typically, this soil has a brown channery silt loam surface layer about 7 inches thick. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Fractured shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are areas of soils that

are similar to this Berks soil but that are deeper than 40 inches to bedrock. Also included are areas of Weikert, Blairton, and Ernest soils. A few poorly drained seeps or springs that emerge in wet weather are in some units. Inclusions make up about 20 percent of the map unit.

Permeability in the Berks soil is moderate or moderately rapid. Available water capacity is very low. Surface runoff is rapid. The hazard of erosion is severe. The depth to bedrock averages 20 to 40 inches. In unlimed areas the soil is slightly acid to extremely acid throughout.

This soil is used for cropland, pasture, and woodland. Some areas are in nonfarm uses.

This soil is suited to cropland. Low available water capacity and low natural fertility are management concerns. Contour stripcropping (fig. 7), no-till, conservation tillage, grassed waterways, cover crops, and including grasses and legumes in the cropping system help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth. Applying plant nutrients as needed will increase production.

This soil is suited to pasture. Applying plant nutrients as needed helps to maintain desirable stands and to increase production. Rotational grazing and proper stocking rates help to maintain pasture quality.

This soil is suited to woodland. Potential productivity is moderately high. The rooting depth is restricted by moderately deep bedrock. Seedling mortality is a management concern especially during droughty periods. Removing undesirable species will increase moisture available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. The depth to bedrock is a limitation for onsite waste disposal and buildings with basements.

The capability subclass is IIIe. The woodland ordination symbol is 4f.

BkD—Berks channery silt loam, 15 to 25 percent slopes

This soil is moderately steep, moderately deep, and well drained. It is on the side slopes of hills and minor ridges. Slopes are uniform to convex and range from 100 to 800 feet in length. Areas are irregular in shape and range from 3 to 100 acres.

Typically, this soil has a brown channery silt loam surface layer about 7 inches thick. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Fractured shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are areas of some very channery soils and areas of soils that are similar to the Berks soil but that are deeper than 40 inches to bedrock. Also included are areas of Weikert, Ernest, and Blairton soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Berks soil is moderate or moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. The depth to bedrock averages 20 to 40 inches. In unlimed areas the soil is slightly acid to extremely acid throughout.

This soil is used for woodland, pasture, and in some places cropland. Some areas are in nonfarm uses or are idle.

This soil is suited to cultivated crops. The severe erosion hazard and low available water capacity are the main limitations for crops. Conservation tillage, stripcropping, no-till, grassed waterways, and crop rotations help to reduce runoff and to control erosion.

This soil is suited to pasture and hay. Applying plant nutrients as needed helps to maintain good stands of grasses and legumes. Rotational grazing and proper stocking rates help to maintain pasture quality and to reduce runoff.

This soil is suited to woodland. Potential productivity is moderately high. Slope limits use of some equipment and machine planting. Seedling mortality is a management concern especially during droughty periods. The rooting depth is restricted by depth to bedrock. Removing the undesirable trees will increase moisture available to the more desirable trees. Erosion can be controlled by constructing logging roads on the contour.

This soil has limitations for most nonfarm uses. Slope and depth to bedrock are limitations for onsite waste disposal and buildings with basements. If this soil is disturbed for construction, management practices are needed to control erosion and to prevent sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4f.

BkE—Berks channery silt loam, 25 to 35 percent slopes

This soil is steep, moderately deep, and well drained. It is on the side slopes of hills and minor ridges. Slopes are uniform to slightly convex and range from 200 to 1,000 feet in length. Areas are irregular in shape and range from 5 to 200 acres.

Typically, this soil has a very dark grayish brown channery silt loam surface layer about 3 inches thick and

Figure 7.—In the middleground, contour strips help to control erosion on the moderately deep Berks channery silt loam, 8 to 15 percent slopes.

a light yellowish brown channery silt loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 29 inches. It is yellowish brown very channery silt loam. The substratum to a depth of 34 inches is yellowish brown extremely channery silt loam. Fractured shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are some areas of very channery soils and areas of soils that have a channery silty clay loam subsoil. Also included are areas of Weikert, Blairton, Bedington, Ernest, and Brinkerton soils. Inclusions make up about 25 percent of the map unit.

Permeability in the Berks soil is moderate or moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is 20 to 40 inches. In unlimed areas the soil is slightly acid to extremely acid throughout.

This soil is used for woodland, pasture, or wildlife habitat.

It is not suited to cropland because of slope. Some areas used for permanent hay cannot be easily managed because of slope.

This soil is suited to pasture. Rotational grazing, proper stocking rates to avoid overgrazing, especially during dry periods, and weed and brush control help to reduce runoff and to improve plant stands. Applying plant nutrients as needed helps to maintain good stands.

This soil is suited to woodland. Potential productivity is moderately high. Slope is a limitation in the use of equipment for harvesting or planting. Constructing logging roads and trails on the contour helps to prevent excessive erosion. Droughtiness may cause an increase in seedling mortality. The rooting depth is limited by depth to bedrock. Removing undesirable species increases moisture available to the more desirable trees.

Slope is the main limitation for most nonfarm uses. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIe. The woodland ordination symbol is 4f.

Bm—Birdsboro silt loam, rarely flooded

This soil is nearly level, very deep, and well drained and moderately well drained. It is on terraces and benches above the flood plains along the larger streams. Slopes range from 0 to 3 percent. Areas are irregular in shape and range from 4 to 200 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil extends to a depth of 46 inches. It is reddish brown silty clay loam in the upper part, reddish brown loam in the next part, and brown to dark brown, mottled sandy clay loam in the lower part. The substratum to a depth of 70 inches is reddish brown, mottled very gravelly clay loam.

Included with this soil in mapping are areas of soils that are somewhat poorly drained, that have a yellowish brown subsoil, that have a gravelly layer at a depth of less than 40 inches, or that have a silty clay or clay substratum. Also included are areas that have a cobbly sandy loam surface layer. Inclusions make up about 25 percent of the map unit.

Permeability in the Birdsboro soil is moderate. Available water capacity is moderate. Surface runoff is slow. The hazard of erosion is slight. This soil is subject to rare flooding and has a seasonal high water table at a depth of 24 to more than 36 inches in wet seasons. The root zone is limited by the seasonal high water table. In unlimed areas the soil is extremely acid to strongly acid throughout.

Most areas are used for cropland and pasture. Some small areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. In some years a seasonal high water table and flooding interfere with field operations. In some places winter grains and alfalfa are subject to some losses over winter because of wetness and frost action. Applying plant nutrients as needed will increase production. Crop rotations and incorporating crop residue into the surface layer can help to maintain organic matter and the good condition of the soil. Subsurface drains are needed in some depressions.

This soil is suited to pasture. The hazards or limitations are not significant. Rotational grazing and proper stocking rates help to maintain the desired plant species. Periodic applications of plant nutrients help to maintain production.

This soil is suited to woodland. Productivity is moderately high. The limitations or hazards are nil. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table and the hazard of flooding are limitations for onsite waste disposal and homesites. If buildings are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage into basements.

The capability subclass is I. The woodland ordination symbol is 4a.

BrB—Blairton channery silt loam, 3 to 8 percent slopes

This soil is gently sloping, moderately deep, and moderately well drained. It is on the tops and side slopes of hills and ridges. It also is on foot slopes and in the drainageways of minor ridges. Slopes are convex to concave and range from 200 to 800 feet in length. Areas are irregular in shape and range from 4 to 50 acres.

Typically, this soil has a dark grayish brown channery silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 27 inches. It is light olive brown channery silt loam to a depth of 20 inches, yellowish brown channery silt loam to a depth of 24 inches, and mottled, yellowish brown channery silt loam to a depth of 27 inches. The substratum to a depth of 32 inches is mottled yellowish brown extremely channery silt loam. Dark grayish brown siltstone and shale bedrock is at a depth of 32 inches.

Included with this soil in mapping are small areas of Brinkerton, Berks, and Weikert soils. Also included are areas of soils that are similar to the Blairton soil but that are deeper than 40 inches to bedrock or that are moderately acid to neutral. Also included are some small seeps and wet spots. Inclusions make up about 20 percent of the map unit.

Permeability in the Blairton soil is moderately slow. Available water capacity is low. Surface runoff is medium. The hazard of erosion is moderate. Depth to bedrock is 20 to 40 inches. A seasonal high water table is at a depth of 6 to 30 inches below the surface in wet seasons. The rooting depth is restricted by the seasonal high water table. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas are used for cropland, pasture, or woodland. Some areas are in nonfarm uses.

This soil is suited to cultivated crops. Fall sown grains and alfalfa may be damaged over winter because of wetness and frost action. Stripcropping, crop rotations, conservation tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth. Installing subsurface drains helps to eliminate wet spots.

This soil is suited to pasture. Unless drained, grasses and legumes that tolerate wetness are suitable for planting. Surface compaction occurs if this soil is grazed when wet. Rotational grazing, proper stocking rates, and restricted grazing during wet periods help to keep the soil in good condition.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase moisture available to the more desirable trees. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table, moderately slow permeability, and depth to bedrock are limitations on sites for septic tank absorption fields or homes. If buildings are

constructed on this soil, foundation drains that have proper outlets should be used to prevent seepage of water into the basements.

The capability subclass is IIIw. The woodland ordination symbol is 4w.

BrC—Blairton channery silt loam, 8 to 15 percent slopes

This soil is sloping, moderately deep, and moderately well drained. It is on the side slopes of hills and ridges. Slopes are convex to uniform and range from 100 to 600 feet in length. Areas are irregular in shape and range from 3 to 100 acres.

Typically, the surface layer is dark grayish brown channery silt loam about 10 inches thick. The subsoil extends to a depth of 27 inches. It is light olive brown and yellowish brown channery silt loam in the upper part and mottled, yellowish brown channery silt loam in the lower part. The substratum to a depth of 32 inches is mottled, yellowish brown extremely channery silt loam. Shale and siltstone bedrock is at a depth of 32 inches.

Included with this soil in mapping are areas of Brinkerton, Berks, and Weikert soils. Also included are areas of soils that are similar to the Blairton soil but that are deeper than 40 inches to bedrock or that are moderately acid to neutral. Also included are some small seeps and wet spots. Inclusions make up about 20 percent of the map unit.

Permeability in the Blairton soil is moderately slow. Available water capacity is low. Surface runoff is rapid. The hazard of erosion is severe. Bedrock is at a depth of 20 to 40 inches. A seasonal high water table is at a depth of 6 to 30 inches below the surface. The rooting depth is restricted by the seasonal high water table. In unlimed areas the soil is strongly acid to extremely acid throughout.

Most areas are used for cropland, pasture, or woodland. Some areas are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, diversions, grass and legume rotations, cover crops, and conservation tillage help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth. Installing subsurface drains will help to eliminate wet spots.

This soil is fairly suited to pasture. Unless artificially drained, grasses and legumes that tolerate wetness are suitable for planting. Frost action is a hazard for some perennial plants. Rotational grazing and restricted grazing during wet periods help to maintain the good condition of the soil. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Constructing logging roads and trails on the contour helps to control erosion. Removing undesirable species will increase moisture available to the more desirable trees. Machine planting is practical in large areas.

This soil has limitations for most nonfarm uses. The seasonal high water table, moderately slow permeability, and moderate depth to bedrock are limitations for onsite waste disposal and homesites. If buildings are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage of water into the basements.

The capability subclass is IVe. The woodland ordination symbol is 4w.

BrD—Blairton channery silt loam, 15 to 25 percent slopes

This soil is moderately steep, moderately deep, and moderately well drained. It is on the side slopes of hills and ridges. Slopes are concave to uniform and range from 50 to 400 feet in length. Areas are irregular in shape and range from 3 to 50 acres in size.

Typically, this soil has a dark brown channery silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 27 inches. It is light olive brown and yellowish brown channery silt loam in the upper part and mottled yellowish brown channery silt loam in the lower part. The substratum to a depth of 32 inches is mottled yellowish brown extremely channery silt loam. Dark grayish brown siltstone and shale bedrock is at a depth of 32 inches.

Included with this soil in mapping are a few areas of soils that are similar to the Blairton soil but that are more than 40 inches deep to bedrock or that are moderately acid to neutral. Also included are areas of Weikert, Brinkerton, and Berks soils. Inclusions make up about 25 percent of the map unit.

Permeability in the Blairton soil is moderately slow. Available water capacity is low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is 20 to 40 inches. A seasonal high water table is at a depth of 6 to 30 inches. The rooting depth is restricted by the seasonal high water table. In unlimed areas the soil is strongly acid to extremely acid throughout.

Most areas are used for hay, pasture, or woodland. A few areas are used for cultivated crops.

This soil is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Conservation tillage, stripcropping, grassed waterways, cover crops, and grass and legume rotations help to reduce runoff and to control erosion.

This soil is suited to pasture. Grasses and legumes that tolerate wetness are suitable for planting. Rotational

grazing and proper stocking rates help to maintain pasture quality and to reduce runoff. Frost action potential is high and may damage some perennial plants. Applying plant nutrients as needed helps to maintain good stands of grass and legumes.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase moisture available to the more desirable trees. Moderately steep slopes limit use of some equipment. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. Slope, wetness, moderately slow permeability, and depth to bedrock are limitations for onsite waste disposal and homesites. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIe. The woodland ordination symbol is 4r.

BtA—Brinkerton silt loam, 0 to 3 percent slopes

This soil is nearly level, very deep, and poorly drained. It is on broad lowlands and in drainageways. Slopes are concave and range from 100 to 500 feet in length. Areas are irregular in shape and range from 2 to 40 acres.

Typically, the surface layer is grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 45 inches. It is mottled, light brownish gray silty clay loam in the upper 22 inches and firm, brittle, mottled light brownish gray and pale brown channery silt loam below. The substratum to a depth of 60 inches is pale brown very channery silt loam.

Included with this soil in mapping are small areas of poorly drained soils that are shallow or moderately deep over bedrock. Also included are small areas of Ernest and Purdy soils and soils that are similar to the Brinkerton soil but that have a silty clay subsoil. Inclusions make up about 15 percent of the map unit.

Permeability in the Brinkerton soil is moderate above the fragipan and slow within it. Available water capacity is moderate. Runoff is slow. The hazard of erosion is slight. The root zone is restricted by the seasonal high water table and the fragipan. The water table is within 0 to 6 inches of the surface in wet periods. In unlimed areas the soil ranges from moderately acid to very strongly acid in the solum and from strongly acid to slightly acid in the substratum.

Most areas are used for cultivated crops, hay, or pasture. A few areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops, but the high water table interferes with timely field operations and reduces crop yields. Subsurface or open ditch drainage removes excess water and increases the suitability of this soil for some crops. The soil is slow to dry out and warm up in spring. Fall sown grains and alfalfa are frequently injured by wetness and frost action.

This soil is suited to pasture. Unless drained, grasses and legumes that tolerate wetness are suitable plants for maximum production. Proper stocking rates, rotational grazing, and deferred grazing during wet periods help to maintain the good condition of the soil and the desired plant species.

This soil is suited to woodland. Potential productivity is moderately high. The seasonal high water table interferes with equipment use and increases seedling mortality. Trees tolerant of wetness should be favored for planting. Machine planting is generally practical in the larger areas.

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

The capability subclass is IVw. The woodland ordination symbol is 4w.

BtB—Brinkerton silt loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and poorly drained. It is on the lower slopes and in drainageways. Narrow map units adjacent to streams may be flooded during periods of high rainfall and frozen ground. Slopes are uniform to concave and range from 100 to 600 feet in length. Areas are irregular in shape and range from 3 to 80 acres.

Typically, the surface layer is grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 45 inches. It is mottled light brownish gray silty clay loam in the upper 22 inches and firm, brittle, mottled light brownish gray and pale brown channery silt loam below. The substratum to a depth of 60 inches is pale brown very channery silt loam.

Included with this soil in mapping are small areas of poorly drained, shallow soils and small areas of Ernest and Purdy soils. Also included are some narrow map units adjacent to streams that are subject to flooding after periods of intensive rainfall or frozen ground. Inclusions make up about 15 percent of the map unit.

Permeability in the Brinkerton soil is moderate above the fragipan and slow below. Available water capacity is moderate. Runoff is slow or medium. The hazard of erosion is moderate. The root zone is restricted by the high water table and the fragipan. The water table is within 0 to 6 inches of the surface in wet periods. In unlimed areas the soil ranges from moderately acid to very strongly acid in the solum and from strongly acid to slightly acid in the substratum.

Most areas of this soil are farmed and are used for

cropland, hay, or pasture. A few areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops, but soil wetness interferes with timely field operations and reduces crop yields. Subsurface or open ditch drainage helps to remove excess water and increases suitability of this soil for some crops. Soil erosion and runoff can be minimized by stripcropping, conservation tillage, cover crops, and crop rotations. The soil is slow to dry out and warm up in spring. Winter grains and alfalfa may be damaged over winter because of wetness and frost action.

This soil is suited to pasture. Unless drained, grasses and legumes that tolerate wetness should be planted to obtain maximum production and longevity. Proper stocking rates, rotational grazing, and deferred grazing during wet periods help to maintain the good condition of the soil and the desired plant species.

This soil is suited to woodland. Potential productivity is moderately high. The high water table may interfere with equipment and increase seedling mortality. Trees tolerant of wetness should be favored for planting.

This soil has limitations for most nonfarm uses. A high water table and slow permeability are significant limitations for on-site waste disposal, homesites, and excavations.

The capability subclass is IVw. The woodland ordination symbol is 4w.

BtC—Brinkerton silt loam, 8 to 15 percent slopes

This soil is sloping, very deep, and poorly drained. It is on the lower slopes and in narrow drainageways. Slopes are concave and range from 50 to 300 feet in length. Areas are long and narrow and range from 2 to 30 acres.

Typically, the surface layer is grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 45 inches. It is mottled, light brownish gray silty clay loam in the upper 22 inches and firm, brittle, mottled light brownish gray and pale brown channery silt loam below. The substratum to a depth of 60 inches is pale brown very channery silt loam.

Included with this soil in mapping are small areas of Ernest soils. Also included are soils that are similar to the Brinkerton soil but that have more clay and that do not have a fragipan. Some areas adjacent to streams are subject to rare periods of overflow. Inclusions make up about 15 percent of the map unit.

Permeability is moderate above the fragipan and slow below. Available water capacity is moderate. Runoff is rapid. The hazard of erosion is severe. The root zone is restricted by the high water table and the fragipan. The water table is within 6 inches of the surface in wet periods. In unlimed areas the soil ranges from moderately acid to very strongly acid in the solum and from strongly acid to slightly acid in the substratum.

Most areas are used for pasture or hay. A few areas are in cultivated crops or in nonfarm uses.

This soil is suited to cultivated crops. Soil wetness interferes with timely field operations and reduces crop yields. Subsurface drainage, where outlets are available, removes excess water and increases suitability of the soil for some crops. Soil erosion and runoff can be minimized by stripcropping, conservation tillage, grassed waterways, cover crops, and crop rotations. The soil is slow to dry out and warm up in spring. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Unless the soil is drained, grass and legumes that tolerate wetness and poor aeration are suitable for planting. Proper stocking rates, rotational grazing, and deferred grazing during wet periods help to maintain the soil condition and the desired plant species.

This soil is suited to woodland. Potential productivity is moderately high. The high water table and the hazard of erosion are limitations. Soil wetness causes occasional poor trafficability and increases seedling mortality. Logging roads should be constructed on the contour to control erosion.

This soil has limitations for most nonfarm uses. Slow permeability and the high water table are limitations for onsite waste disposal, homesites, and excavations.

The capability subclass is IVw. The woodland ordination symbol is 4w.

BuB—Buchanan cobbly loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and moderately well drained. It is on the lower side slopes of mountains and ridges and on upland slopes and benches. Slopes are convex to concave and range from 200 to 800 feet in length. Areas are irregular in shape and range from 4 to 100 acres.

Typically, this soil has a dark brown cobbly loam surface layer about 9 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown gravelly loam in the upper part; mottled pale brown gravelly clay loam in the next part; and firm and brittle, mottled light brown very gravelly clay loam in the lower part.

Included with this soil in mapping are small areas of Laidig, Ernest, Murrill, Andover, and Clarksburg soils. Some areas have small pebbles throughout. Also included are small areas of very poorly drained soils. In some areas the soil is clayey below a depth of 40 inches. Inclusions make up about 15 percent of the map unit.

Permeability in the Buchanan soil is moderate above

the fragipan and slow within it. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. A seasonal high water table is within 18 to 36 inches of the surface in wet seasons. A fragipan at a depth of 25 to 36 inches and the seasonal high water table limit the rooting depth. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

Most areas are used for cropland, pasture, or woodland. A small acreage is in nonfarm use or is idle land.

This soil is suited to cultivated crops. Cover crops, conservation tillage, grassed waterways, and crop rotations that include grasses and legumes in the cropping system help to reduce runoff and to control erosion. The seasonal high water table delays plowing and causes the soil to warm up slowly in spring. Winter grains and alfalfa will be damaged over winter because of wetness and frost action. Diversions and subsurface drains help to remove excess water and allow for timely tillage.

This soil is suited to pasture. The seasonal high water table and frost action limit the growth of some deep-rooted legumes. Surface compaction occurs if the pasture is grazed when the soil is wet. Proper stocking rates, rotational grazing, and avoiding overgrazing help to maintain pasture.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. Use of equipment may be restricted for brief periods during wet seasons because of the seasonal high water table. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table and slow permeability are limitations on sites for septic tank absorption fields, homesites, and roads. If buildings are constructed on this soil, foundation drains that have proper outlets should be used to prevent seepage of water into the basements. If this soil is disturbed for construction, management practices will be needed to reduce wetness and to reduce runoff, to control erosion, and to prevent sedimentation.

The capability subclass is IIe. The woodland ordination symbol is 4a.

BuC—Buchanan cobbly loam, 8 to 15 percent slopes

This soil is sloping, very deep, and moderately well drained. It is on the lower side slopes of mountains and ridges and on upland slopes and benches. Areas are concave to convex and range from 200 to 1,000 feet in length. Areas are irregular in shape and range from 3 to 100 acres.

Typically, this soil has a dark brown cobbly loam surface layer about 9 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown gravelly loam in the upper part, mottled pale brown gravelly clay loam in the next part, and firm and brittle, mottled light brown very channery clay loam in the lower part.

Included with this soil in mapping are areas of Laidig and Andover soils. Also included are a few areas of soils that have a gravelly sandy loam surface layer. In some areas the soil is clayey below a depth of 40 inches. Inclusions make up about 20 percent of the map unit.

Permeability in the Buchanan soil is moderate above the fragipan and slow within it. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. A seasonal high water table is within 18 to 36 inches of the surface in wet seasons. The fragipan is at a depth of 25 to 36 inches. Root depth is restricted by the water table and the fragipan. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas are used for cropland, pasture, or woodland. A small acreage is in nonfarm uses.

This soil is suited to cultivated crops. In some years the seasonal high water table delays and field operations. Subsurface drainage, especially in low areas, will hasten removal of excess water and increase suitability of this soil for some crops. Stripcropping, crop rotations, conservation tillage, grassed waterways, and crop residue management help to control erosion and to reduce runoff.

This soil is suited to pasture. The seasonal high water table, wetness, and frost action may effect the growth of some perennial plants. Rotational grazing, proper stocking rates, and additions of lime and fertilizer are suitable management practices.

The soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. Use of equipment may be restricted for brief periods during wet seasons because of the seasonal high water table. Machine planting is practical in larger areas. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. The seasonal high water table, slow and moderately slow permeability, and slope are limitations for septic tank absorption fields, homesites, and excavations. If buildings are constructed on this soil, foundation drains that have proper outlets should be used to prevent seepage of water into basements. If this soil is disturbed for construction, management practices will be needed to reduce wetness and to reduce runoff, to control erosion, and to prevent sedimentation.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

BwB—Buchanan cobbly loam, 3 to 8 percent slopes, extremely stony

This soil is gently sloping, very deep, and moderately well drained. It is on the lower side slopes and benches of mountains and ridges. It also is in mountain valleys and along drainageways. Slopes are concave to convex and range from 200 to 1,200 feet in length. Areas are irregular or long and narrow and range from 5 to 250 acres. Large stones cover from 3 to 15 percent of the surface.

Typically, this soil has a very dark grayish brown cobbly loam surface layer about 3 inches thick and a light yellowish brown gravelly loam subsurface layer about 8 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown gravelly loam in the upper part, mottled pale brown gravelly clay loam in the next part, and firm and brittle, mottled light brown very gravelly clay loam in the lower part.

Included with this soil in mapping are areas of soils that have a sandy loam surface layer. Also included are areas of Brinkerton, Berks, Andover, and Laidig soils. In some areas the soil is clayey below a depth of 40 inches. Inclusions make up about 15 percent of the map unit.

Permeability in the Buchanan soil is moderate above the fragipan and slow within it. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. Depth to bedrock is more than 60 inches. A fragipan is at a depth of 25 to 36 inches below the surface. A seasonal high water table is perched at a depth of 18 to 36 inches in wet seasons. Root growth is restricted by the water table and the fragipan. Unless limed the soil is strongly acid to extremely acid throughout.

Areas of this soil are generally wooded.

This soil is not suited to cultivated crops because of large stones. It is not suited to improved pasture or hay because the large stones interfere with the use of tillage and planting equipment. In places the soil is used for unimproved pasture, but surface compaction occurs if the soil is grazed when wet.

This soil is suited to woodland. Potential productivity is moderately high. Large stones may be a problem for such forestry operations as roadbuilding and harvesting and planting trees. Trafficability is reduced during wet periods.

This soil has limitations for most nonfarm uses. Moderately slow permeability and the seasonal high water table are limitations on sites for septic tank absorption fields and homes.

The capability subclass is VIIs. The woodland ordination symbol is 4x.

BwC—Buchanan cobbly loam, 8 to 15 percent slopes, extremely stony

This soil is sloping, very deep, and moderately well drained. It is on the middle and lower side slopes of ridges and mountains. It also is in mountain valleys and along drainageways. Slopes are concave to convex and range from 200 to 1,000 feet in length. Areas are irregular and from 5 to 300 acres. Large stones cover from 3 to 15 percent of the surface.

Typically, this soil has a very dark grayish brown cobbly loam surface layer about 3 inches thick and a light yellowish brown gravelly loam subsurface layer about 8 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown gravelly loam in the upper part; mottled pale brown gravelly clay loam in the next part; and firm and brittle, mottled light brown very gravelly clay loam in the lower part.

Included with this soil in mapping are areas of Laidig and Andover soils. Also included are some areas that have a clayey texture below a depth of 40 inches. Also included are some areas of moderately deep, well drained soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Buchanan soil is moderate above the fragipan and slow within it. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 60 inches. A fragipan is at a depth of 25 to 36 inches below the surface. A seasonal high water table is at a depth of 18 to 36 inches in wet seasons. Root growth is restricted by the water table and the fragipan. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

Areas of this soil are generally wooded.

This soil is not suited to cultivated crops, hay, or improved pasture because of large stones. In places it is used for unimproved pasture, but surface compaction occurs if the soil is grazed when wet.

This soil is suited to woodland. Potential productivity is moderately high. Large stones on the surface may be a problem when harvesting and planting trees. The seasonal high water table causes a reduction in soil trafficability during wet periods. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. Moderately slow permeability, slope, and the seasonal high water table are limitations on sites for septic tank absorption fields and homesites.

The capability subclass is VIIs. The woodland ordination symbol is 4x.

BwD—Buchanan cobbly loam, 15 to 25 percent slopes, extremely stony

This soil is moderately steep, very deep, and moderately well drained. It is on the middle and the lower side slopes of mountains and ridges. Slopes are concave to convex and range from 100 to 1,500 feet in length. Areas are irregular in shape and range from 5 to 900 acres. Large stones cover from 3 to 15 percent of the surface.

Typically, this soil has a very dark grayish brown cobbly loam surface layer about 3 inches thick and a light yellowish brown gravelly loam subsurface layer about 8 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown gravelly loam in the upper part; mottled pale brown gravelly clay loam in the next part; and firm and brittle, mottled light brown very gravelly clay loam in the lower part.

Included with this soil in mapping are small areas of Berks, Laidig, and Andover soils. Also included are some very bouldery areas and some areas that have a reddish brown clayey subsoil and that do not have a fragipan. Inclusions make up 25 percent of the map unit.

Permeability in the Buchanan soil is moderate above the fragipan and slow within it. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. A seasonal high water table is at a depth of 18 to 36 inches in wet seasons. Depth to the fragipan is 25 to 36 inches. Root growth is restricted by the water table and fragipan. The depth to bedrock is more than 60 inches. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

Most areas of this soil are wooded.

Areas of this soil are not suited to farming because of large stones on the surface, slope, and the seasonal high water table. Some areas, if cleared of trees, have potential use for unimproved pasture.

This soil is suited to woodland. Potential productivity is moderately high. Limitations for equipment use include moderately steep slopes, large stones, and the seasonal high water table. Logging roads should be constructed on the contour to control erosion.

This soil has many limitations for nonfarm uses. Slope, the seasonal high water table, and moderately slow permeability are limitations on sites for septic tank absorption fields and homesites. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4x.

CaB—Calvin channery silt loam, 3 to 8 percent

This soil is gently sloping, moderately deep, and well drained. It is on side slopes and hilltops. Slopes are convex and range from 200 to 600 feet in length. Areas are irregular in shape and range from 4 to 150 acres.

Typically, this soil has a dark reddish brown channery silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 26 inches. It is reddish brown very channery silt loam. The substratum to a depth of 40 inches is reddish brown extremely channery silt loam. Shale bedrock is at a depth of 40 inches.

Included with this soil in mapping are small areas of Lehew, Berks, Klinesville, and Albrights soils. Also included are soils that are deeper over bedrock and that have more clay in the subsoil and fewer rock fragments throughout. Inclusions make up about 20 percent of the map unit.

Permeability in the Calvin soil is moderately rapid. Available water capacity is low. Surface runoff is medium. The hazard of erosion is moderate. The depth to bedrock is 20 to 40 inches. In unlimed areas the soil is very strongly acid or moderately acid throughout.

This soil is used for cropland or pasture. Some areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, no-till, conservation tillage, grassed waterways, crop rotations that include grasses and legumes, and crop residue management help to control erosion, to reduce runoff, and to increase infiltration.

This soil is suited to pasture. Rotational grazing and proper stocking rates to maintain key plant species are suitable management practices. Plant nutrients and lime should be applied as needed for best production.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Seedling mortality rates are increased because of droughtiness. The rooting depth is restricted by depth to bedrock. Removing undesirable species will increase moisture available to the more desirable trees. Machine planting is practical in larger areas.

This soil has some limitations for nonfarm uses. Depth to bedrock is a limitation for onsite waste disposal and buildings with basements.

The capability subclass is IIe. The woodland ordination symbol is 4f.

CaC—Calvin channery silt loam, 8 to 15 percent slopes

This soil is sloping, moderately deep, and well drained. It is on hilltops and side slopes. Slopes are convex and range from 100 to 500 feet in length. Areas are irregular in shape and range from 3 to 150 acres.

Typically, this soil has a dark reddish brown channery silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 26 inches. It is reddish brown very channery silt loam. The substratum to a depth of 40 inches is reddish brown extremely channery silt loam. Shale bedrock is at a depth of 40 inches.

Included with this soil in mapping are small areas of Lehew, Klinesville, Weikert, and Berks soil. Also included are soils that are deeper over bedrock and that have more clay in the subsoil and fewer rock fragments throughout. Inclusions make up about 20 percent of the map unit.

Permeability in the Calvin soil is moderately rapid. Available water capacity is low. Surface runoff is rapid. The hazard of erosion is severe. The depth to bedrock is 20 to 40 inches. In unlimed areas the soil ranges from very strongly acid to moderately acid throughout.

This soil is used for cropland, hay, or pasture. Some areas are wooded.

This soil is suited to cultivated crops. Stripcropping, no-till, conservation tillage, sod-based rotations, and winter cover crops help to control erosion, to reduce runoff, and to increase infiltration. Runoff can be controlled with diversions and grassed waterways.

This soil is suited to pasture (fig. 8). Rotational grazing and proper stocking rates to avoid overgrazing are suitable management practices. Plant nutrients and lime can be used to increase productivity.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Seedling mortality rates are increased because of droughtiness. The rooting depth is restricted by depth to bedrock. Removing undesirable species will increase moisture available to the more desirable trees. Machine planting is practical in larger areas.

This soil has some limitations for nonfarm uses. Slope and depth to bedrock are limitations for onsite waste disposal and buildings with basements.

The capability subclass is IIIe. The woodland ordination symbol is 4f.

CaD—Calvin channery silt loam, 15 to 25 percent slopes

This soil is moderately steep, moderately deep, and well drained. It is on side slopes. Slopes are convex and range from 100 to 400 feet in length. Areas are irregular in shape and range from 3 to 80 acres.

Typically, this soil has a dark reddish brown channery silt loam surface layer about 8 inches thick. The subsoil extends to a depth of 26 inches. It is reddish brown very channery silt loam. The substratum to a depth of 40 inches is reddish brown extremely channery silt loam. Shale bedrock is at a depth of 40 inches.

Included with this soil are areas of Lehew, Klinesville, and Berks soils. Also included are some areas of soils that are deeper over bedrock and that have more clay in the subsoil and fewer rock fragments throughout. Inclusions make up about 20 percent of the map unit.

Permeability in the Calvin soil is moderately rapid. Available water capacity is low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock ranges from 20 to 40 inches. In unlimed areas the soil ranges from very strongly acid to moderately acid throughout.

This soil is used for cropland, hay, or pasture. Some areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Stripcropping, crop rotations that include grasses and legumes, conservation tillage, no-till, and crop residue management help to control erosion and to reduce runoff. In some areas grassed waterways and diversions are needed to help to reduce runoff.

This soil is suited to pasture. Overgrazing is a major concern in managing pasture. Proper stocking rates to maintain key plant species, rotational grazing, and periodic application of nutrients are suitable management practices.

This soil is suited to woodland. Potential productivity is moderately high. In some areas the moderate available water capacity increases the seedling mortality rate. The rooting depth is restricted by depth to bedrock. Removing undesirable species will increase moisture available to the more desirable trees. Constructing logging roads on the contour helps to control erosion and gullying. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. Slope and depth to bedrock are limitations on sites for septic tank absorption fields and homesites. If this soil is disturbed for construction, management practices are needed to control erosion and to prevent sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4r.

CeC—Cedarcreek extremely channery loam, 3 to 25 percent slopes, very stony

These soils are gently sloping to moderately steep, very deep, and well drained. They are on broad mountaintops particularly in the Broad Top Area. The areas were created by excavating soil and bedrock

Figure 8.—Pasture is a common land use on rolling hills. The soil is Calvin channery silt loam, 8 to 15 percent slopes.

material overlying coal deposits. The material was thoroughly mixed when it was deposited in huge piles and then backfilled after the coal had been extracted. Slopes range from 50 to 400 feet in length. Areas are irregular in shape and range from 5 to 100 acres. The surface varies from very channery to extremely channery or extremely flaggy.

Typically, these soils have a dark brown extremely channery loam surface layer about 4 inches thick. The substratum to a depth of 70 inches is olive brown extremely channery loam.

Included with this unit in mapping are areas of natural soils that have not been altered by surface mining. Also included are areas of exposed bedrock and areas of poorly drained soils. In some areas the fill material is in piles and in some places the material is mostly acid carbolith from deep mining activities. Inclusions make up about 25 percent of the map unit.

Permeability in the Cedarcreek soil is moderate to rapid. Available water capacity is very low. Surface runoff is medium to very rapid. The hazard of erosion is moderate or severe. Depth to bedrock is more than 60 inches. In some areas a seasonal high water table is at or near the surface in wet seasons. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas of this map unit are idle or woodland.

This map unit has variable potential productivity for cultivated crops, pasture, and woodland. In areas where the soil material has been replaced and the percentage of fine earth is high, potential productivity for these uses is fair or good. Heavy applications of lime and fertilizer are generally needed to maintain the desired species and to increase production. In areas where the soil contains very little fine earth, potential productivity for cultivated crops, pasture, and woodland is poor.

The suitability of the soils for most nonfarm use depends on the degree of reclamation.

The capability subclass is VIs. The woodland ordination symbol is 4x.

CeF—Cedarcreek extremely channery loam, 25 to 80 percent slopes, very stony

These soils are very steep, very deep to shallow, and well drained and moderately well drained. The soils have been altered by surface mining activities. They are on broad mountaintops, particularly in the Broadtop area. They consist of V-shaped cuts and mounded, convex fills. Slopes range from 50 to 600 feet in length. Areas are irregular to long and narrow and range from 5 to 300 acres. The surface varies from very channery to extremely channery or extremely flaggy.

Typically, these soils have a dark brown extremely channery loam surface layer about 4 inches thick. The substratum to a depth of 70 inches is olive brown extremely channery loam.

Included with this soil in mapping are areas of exposed bedrock. Also included are areas of poorly drained soils and small areas of Clymer, Hazleton, Wharton, and Buchanan soils. In some areas the fill material is in piles

and in some places the material is mostly acid carbolith from deep mining activities. Inclusions make up about 25 percent of the map unit.

Permeability in the Cedarcreek soil is moderate to rapid. Available water capacity is very low. Surface runoff is very rapid in most areas, but ponding is possible in closed depressions. The hazard of erosion is severe. Depth to bedrock is more than 60 inches. In some areas a seasonal high water table is at or near the surface in wet seasons. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas of this map unit are used for wildlife habitat or recreation areas or are idle and are reverting to woodland. Some areas have little or no vegetation. Most areas of this map unit are not suited to cultivated crops or pasture because of slope. Vegetation is needed to control erosion.

This map unit has variable potential productivity for woodland. In some areas erosion control structures are needed to trap sediments and pollutants from entering nearby streams. Tree stands are often difficult to establish because of poor physical condition, acidity, and droughtiness.

Because of the variability within this map unit, on-site investigations are needed to determine the suitability for most nonfarm use.

The capability subclass is VIIs. The woodland ordination symbol is 4r.

CkB—Clarksburg silt loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and moderately well drained. It is on colluvial slopes, on benches, and along drainageways in or near limestone valleys and coves. Slopes are concave and range from 100 to 800 feet in length. Areas are irregular in shape and range from 4 to 300 acres.

Typically, this soil has a brown to dark brown silt loam surface layer about 8 inches thick. The subsoil extends to a depth of 45 inches. It is yellowish brown silt loam and silty clay loam to a depth of 20 inches; mottled yellowish brown silty clay loam to a depth of 30 inches; and firm and brittle, mottled, yellowish brown silt loam to a depth of 45 inches. The substratum to a depth of 60 inches is mottled yellowish brown silty clay loam.

Included with this soil in mapping are areas that are cobbly or gravelly loam or sandy loam throughout. Also included are areas of soils that are similar to this Clarksburg soil but that have a clay texture in some layers and that in some areas do not have a fragipan. Also included are areas of Penlaw and Buchanan soils. Sinkholes are common in some map units. Inclusions make up about 15 percent of the map unit.

Permeability in the Clarksburg soil is moderate above the fragipan and moderately slow or slow within it. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. A seasonal high water table is within 18 to 36 inches of the surface in wet seasons. A firm, weakly developed fragipan is at a depth of 20 to 36 inches. Root growth is restricted by the water table and the fragipan. In unlimed areas the soil ranges from slightly acid to strongly acid throughout.

Most areas are used for cultivated crops, hay, or pasture. Some areas are wooded.

This soil is suited to cultivated crops. Stripcropping, conservation tillage, grassed waterways, cover crops, and crop rotations help to reduce runoff and to control erosion. Wetness delays plowing and causes the soil to warm slowly in spring. In some years fall-sown small grain is subject to losses over winter because of frost action and wetness. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to reduce the tendency of this soil to clod and crust. Subsurface drains may be needed in some areas to help remove excess water.

This soil is suited to pasture and hay. In some years the seasonal high water table and frost action hinders the growth of some deep-rooted, perennial legumes. Proper stocking rates, rotational grazing, and periodic application of nutrients are suitable management practices. Restricted grazing when the soil is wet will prevent surface compaction and damage to plant stands.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. The seasonal high water table may decrease soil trafficability and interfere with equipment operation during wet periods. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table and slow or moderately slow permeability are limitations for onsite waste disposal and buildings with basements. If buildings are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage of water into basements.

The capability subclass is IIe. The woodland ordination symbol is 4a.

DkC—Dystrochrepts-Rock outcrop complex, 3 to 15 percent slopes

This map unit consists of Dystrochrepts, rock outcrop, and rubble land. Dystrochrepts are shallow to very deep and well drained to excessively drained. This map unit is on the tops and the upper side slopes of major ridges and mountains. Slopes are convex or uniform and range from 200 to 600 feet in length. Individual areas are irregular in shape and range from 4 to 500 acres. Surface stones and

Figure 9.—Farming is unsuitable on the Dystrochrepts-Rock outcrop complex, 3 to 15 percent slopes, because boulders cover much of the surface.

boulders cover from 30 to 90 percent of the surface (fig. 9). Because of stone on the surface, these areas were not separated in mapping. Dystrochrepts make up about 65 percent and rock outcrops about 15 percent of the map unit.

Typically, the surface layer of Dystrochepts is under a cover of stones and boulders. It is dark brown very channery loamy sand or sandy loam. The subsoil is pale brown to yellowish brown very channery sandy loam or loamy sand. The substratum is yellowish brown very channery loamy sand.

Typically, Rock outcrop consists of thick- or moderately thick-bedded quartzite or sandstone outcrops.

Included with this soil in mapping are some areas of soils that have slope of 15 to 35 percent. Also included are areas of Laidig, Hazleton, Clymer, and Buchanan soils. Inclusions make up about 20 percent of the map unit.

Permeability in Dystrochrepts is rapid. Available water capacity is low. Runoff is rapid. The hazard of erosion is severe. Depth to bedrock ranges from 10 to more than 60 inches. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

Nearly all this map unit is used for woodland or wildlife habitat because of the extremely stony surface. Some areas have been used as a source of building stone, sand, and silica.

This map unit is not suited to farming of any kind because very large stones and boulders cover much of the surface.

This map unit has been used for timber production in some areas. It has moderate potential for woodland

because of droughtiness, low productivity, and large stones and boulders on the surface. Roads and trails need extensive stone removal. Constructing logging roads on the contour helps to control erosion.

Areas of this map unit are not suited to nonfarm uses because of slope and boulders.

The capability subclass for Dystrochrepts is VIIs. The woodland ordination symbol on Dystrochrepts is 3x.

DkE—Dystrochrepts-Rock outcrop complex, 15 to 35 percent slopes

This map unit consists of Dystrochrepts, rock outcrops, and rubble land. Dystrochrepts are shallow to very deep and well drained to excessively drained. This map unit is near the tops and on the upper side slopes of major ridges and mountains. Slopes are convex, concave, or uniform and range from 200 to 1,500 feet in length. Individual areas are irregular in shape and range from 10 to 500 acres. Surface stones and boulders cover from 30 to 90 percent of the surface. Because of stone cover it was not practical to separate these areas in mapping. Dystrochrepts make up about 65 percent of the map unit. They are on side slopes that have been influenced by colluvial materials. Rock outcrops are on the upper side slopes of major ridges. They make up about 15 percent of the map unit.

Typically, the surface layer of Dystrochrepts is under a cover of stones and boulders. It is dark brown very channery loamy sand or sandy loam. The subsoil is pale brown to yellowish brown very channery sandy loam or loamy sand. The substratum is yellowish brown very channery loamy sand.

Typically, Rock outcrop consists of thick- to moderately thick-bedded quartzite or sandstone outcrops.

Included with this unit in mapping are some areas of soils that have slope of 3 to 15 percent atop major ridges. These areas are narrow and less than 100 feet wide. Also included are areas of Laidig, Hazleton, Clymer, and Buchanan soils. Inclusions make up about 20 percent of the map unit.

Permeability of Dystrochrepts is rapid. Available water capacity is low. Runoff is very rapid. The hazard of erosion is severe. Depth to bedrock ranges from 10 inches to more than 60 inches. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

Nearly all this map unit is used for woodland or wildlife habitat because of the extremely stony surface and the steep slopes. Some areas have been used as a source of building stone, sand, and silica.

This map unit is not suited to any kind of farming because of slope and very large stones and boulders covering much of the surface.

This map unit is used for timber production in some areas. It has moderate potential for woodland because of slope, droughtiness, low productivity, and large stones and boulders on the surface. Roads and trails need extensive stone removal. Constructing logging roads on the contour helps to control erosion.

Areas of this map unit are not suited to nonfarm use because of slope and large stones and boulders.

The capability subclass for Dystrochrepts is VIIs. The woodland ordination symbol on Dystrochrepts is 3x.

DkF—Dystrochrepts-Rock outcrop complex, 35 to 70 percent slopes

This map unit consists of Dystrochrepts, rock outcrops, and rubble land. Dystrochrepts are shallow to very deep and well drained to excessively drained. This map unit is near the tops and on the upper side slopes of major ridges and mountains. Slopes are convex or uniform and range from 200 to 1,500 feet in length. Individual areas are irregular in shape and range from 50 to 1,000 acres. Surface stones and boulders cover from 15 to 90 percent of the surface. Because of surface stones and the very steep and intricate slopes, these areas were not separated in mapping. Dystrochrepts make up about 65 percent of the map unit. They are on side slopes influenced by colluvial materials. Rock outcrops are on the upper side slopes of ridges and on ridgetops. They make up about 15 percent of the map unit.

Typically, the surface layer of Dystrochrepts is under a cover of stones and boulders. It is dark brown very channery loamy sand or sandy loam. The subsoil is pale brown to yellowish brown very channery sandy loam or loamy sand. The substratum is yellowish brown very channery loamy sand.

Typically, Rock outcrop consists of thick- or moderately thick-bedded quartzite or sandstone outcrops.

Included with this unit in mapping are areas of soils that have slope of 3 to 25 percent atop major ridges. These areas are narrow and less than 100 feet wide. Also included are areas of Laidig, Hazleton, Clymer, and Buchanan soils. Inclusions make up about 20 percent of the map unit.

Permeability of Dystrochrepts is rapid. Available water capacity is low. Runoff is very rapid. The hazard of erosion is severe. Depth to bedrock ranges from 10 to more than 60 inches. The soil is strongly acid to extremely acid throughout.

Most areas of this map unit are wooded rubble land. Some areas have been used as a source of building stone, sand, and silica.

This map unit is not suited to any kind of farming because of very steep slopes and very large stones and boulders that cover much of the surface.

This map unit is used for timber production in some

areas. It has moderate potential for woodland because of slope, droughtiness, low productivity, and large stones and boulders on the surface. Extensive stone removal is needed for roads and trails. Construction of logging roads on the contour helps to control erosion.

Areas of this map unit are not suited to nonfarm uses because of slope and large stones and boulders.

The capability subclass for Dystrochrepts is VIIs. The woodland ordination symbol on Dystrochrepts is 3r.

EdB—Edom silty clay loam, 3 to 8 percent slopes

This soil is gently sloping, deep or very deep, and well drained. It is on side slopes and hilltops in limestone valleys. Slopes are convex and range from 100 to 500 feet in length. Areas are irregular in shape and range from 5 to 100 acres.

Typically, the Edom soil has a dark yellowish brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 35 inches. It is strong brown silty clay loam to a depth of 14 inches and strong brown channery silty clay to a depth of 35 inches. The substratum extends to a depth of 60 inches. It is yellowish brown very channery silty clay loam to a depth of 40 inches and weathered, interbedded shale, siltstone, and limestone to a depth of 60 inches.

Included with this soil in mapping are some areas of Westmoreland, Opequon, Hagerstown, and Klinesville soils. Also included are soils that are moderately deep over bedrock. Inclusions make up about 35 percent of the map unit.

Permeability in the Edom soil is moderately slow or moderate. Available water capacity is low. Surface runoff is medium. The hazard of erosion is moderate. Depth to hard bedrock is more than 40 inches. In unlimed areas the soil ranges from slightly acid to mildly alkaline throughout.

Most areas are used for cropland or pasture. A few areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Crop rotations, stripcropping, no-till, conservation tillage, cover crops, and including grasses and legumes in the cropping system help to control erosion and to reduce runoff. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction is possible if this soil is grazed when wet. Rotational grazing and proper stocking rates help to maintain the desired plant species and the good condition of the soil. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Management problems are few. Removing undesirable species will increase production. Machine planting is practical in large areas.

This soil has some limitations for nonfarm uses. Moderately slow or moderate permeability is a limitation for onsite waste disposal. Shrinking and swelling and low strength are limitations on sites for buildings.

The capability subclass is IIe. The woodland ordination symbol is 4a.

EdC—Edom silty clay loam, 8 to 15 percent slopes

This soil is sloping, deep or very deep, and well drained. It is on side slopes in limestone valleys. Slopes are convex and range from 100 to 400 feet in length. Areas are irregular in shape and range from 5 to 100 acres.

Typically, the Edom soil has a dark yellowish brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 35 inches. It is strong brown silty clay loam to a depth of 14 inches and strong brown channery silty clay to a depth of 35 inches. The substratum extends to a depth of 60 inches. It is yellowish brown very channery silty clay loam to a depth of 40 inches and weathered, interbedded shale, siltstone, and limestone to a depth of 60 inches.

Included with this soil in mapping are some areas of Westmoreland, Opequon, Hagerstown, and Klinesville soils. Also included are areas of soils that are moderately deep over bedrock. Inclusions make up about 35 percent of the map unit.

Permeability in the Edom soil is moderately slow or moderate. Available water capacity is low. Surface runoff is rapid. The hazard of erosion is severe. Depth to hard bedrock is more than 40 inches. In unlimed areas the soil ranges from slightly acid to mildly alkaline throughout.

Most areas are used for cropland, pasture, or hayland. A few areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Crop rotations, cover crops, including grasses and legumes in the cropping system, stripcropping, no-till, and conservation tillage help to control erosion and to reduce runoff. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction is possible if this soil is grazed when wet. Rotational grazing and proper stocking rates help to maintain the desired plant species and the good condition of the soil. Best production requires maintaining fertility through periodic applications of lime and fertilizer.

This soil is suited to woodland. Potential productivity is

moderately high. Management problems are few. Machine planting is practical in larger areas. Constructing logging roads on the contour helps to control erosion.

This soil has some limitations for nonfarm uses. Moderately slow and moderate permeability are limitations for onsite waste disposal. Shrinking and swelling and slope are limitations on sites for buildings.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

EdD—Edom silty clay loam, 15 to 25 percent slopes

This soil is moderately steep, deep or very deep, and well drained. It is on side slopes in limestone valleys. Slopes are convex and range from 50 to 300 feet in length. Areas are irregular in shape and range from 3 to 50 acres.

Typically, this soil has a dark yellowish brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 35 inches. It is strong brown silty clay loam to a depth of 14 inches and strong brown channery silty clay to a depth of 35 inches. The substratum extends to a depth of 60 inches. It is yellowish brown very channery silty clay loam to a depth of 40 inches and weathered interbedded shale, siltstone, and limestone to a depth of 60 inches.

Included with this soil in mapping are some areas of Westmoreland, Opequon, Hagerstown, and Klinesville soils. Also included are some areas of soils that are moderately deep over bedrock. Inclusions make up about 35 percent of the map unit.

Permeability in the Edom soil is moderately slow or moderate. Available water capacity is low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to hard bedrock is 40 to 72 inches. In unlimed areas the soil ranges from slightly acid to mildly alkaline throughout.

Most areas are used for pasture, permanent hayland, or cropland. Other areas are wooded.

This soil is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Stripcropping, conservation tillage, no-till, and long-term permanent hay help to control erosion. Additions of manure, growing cover crops, and utilizing crop residue help to maintain the organic matter content and to improve soil condition. Applications of lime and fertilizer as needed help to maintain productivity.

This soil is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction is possible if this soil is grazed when wet. Rotational grazing, proper stocking rates, weed control, and avoiding overgrazing help to control erosion and to keep the soil in good condition.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. Slope causes some equipment limitations. Constructing logging roads and trails on the contour helps to control erosion.

This soil has limitations for nonfarm uses. Slope and moderately slow and moderate permeability are limitations for onsite waste disposal. Slope is a limitation for buildings with basements. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4r.

ElB—Elliber very channery loam, 3 to 8 percent slopes

This soil is gently sloping, deep or very deep, and well drained. It is on the tops of minor ridges. Slopes are uniform or slightly convex and range from 200 to 800 feet in length. Areas are broad and irregular in shape and range from 10 to 500 acres.

Typically, the surface layer is very dark gray very channery loam about 1 inch thick and the subsurface layer is pale brown very channery loam to a depth of 5 inches. The subsoil extends to a depth of 60 inches. It is light yellowish brown very channery loam in the upper part and brownish yellow extremely channery loam in the lower part.

Included with this soil in mapping are small areas of Hagerstown, Opequon, Morrison, and Mertz soils. Inclusions make up about 10 percent of the map unit.

Permeability in the Elliber soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. The surface layer contains more than 50 percent rock fragments. Depth to bedrock is more than 60 inches. In unlimed areas the soil is strongly acid or extremely acid throughout.

Most areas are used for cropland, hayland, or pasture. A few areas of this soil on Chestnut Ridge are used for orchards.

This soil is suited to cultivated crops. Stripcropping, crop rotations, no-till, conservation tillage, and winter cover crops help to reduce runoff and to control erosion. Additions of organic materials and crop residue management help to maintain the good condition of the soil and to increase available water capacity. The Elliber soil is somewhat droughty but can be easily worked and

planted early. Planting early allows use of spring moisture. Rock fragments may cause excessive wear on tillage and planting equipment.

This soil is suited to pasture. Overgrazing is a major concern in managing pasture. Some suitable management practices are stocking rates to maintain key plant species, rotational grazing, and periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the water available to the more desirable trees. Machine planting generally is practical in large areas.

This soil has some limitations for nonfarm uses. Seepage is a hazard for some types of waste-disposal facilities.

The capability subclass is IIe. The woodland ordination symbol is 4f.

EIC—Elliber very channery loam, 8 to 15 percent slopes

This soil is sloping, deep or very deep, and well drained. It is on the tops and the upper side slopes of minor ridges. Slopes are slightly convex and range from 200 to 600 feet in length. Areas are long and narrow or irregular in shape and range from 3 to 150 acres.

Typically, the surface layer is very dark brown very channery loam about 1 inch thick and the subsurface layer is pale brown very channery loam to a depth of 5 inches. The subsoil extends to a depth of 60 inches. It is light yellowish brown very channery loam in the upper part and brownish yellow extremely channery loam in the lower part.

Included with this soil in mapping are some areas of soils that have fractured siltstone bedrock at a depth of less than 40 inches. Also included are some areas of soils that are similar to this Elliber soil but that have a seasonal high water table in wet seasons. Small areas of Mertz and Opequon soils are on some side slopes. Inclusions make up about 10 percent of the map unit.

Permeability in the Elliber soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. The surface layer contains more than 50 percent rock fragments. Depth to bedrock is more than 60 inches. In unlimed areas the soil is strongly acid or extremely acid throughout.

Most areas are used for cropland, hayland, or pasture. A few areas of this soil on Chestnut Ridge are used for orchards (fig. 10).

This soil is suited to cultivated crops. Stripcropping, crop rotations, no-till, conservation tillage, and winter cover crops help to reduce runoff and to control erosion. Additions of organic materials help to maintain the good condition of the soil and to increase available water capacity. The Elliber soil is somewhat droughty but can be easily worked and planted early. Planting early allows use of spring moisture. Rock fragments may cause excessive wear on tillage and planting equipment.

This soil is suited to pasture. Few limitations affect this use. Proper stocking rates to maintain key plant species and rotational grazing help to keep the pasture and the soil in good condition.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the water available to the more desirable trees. Machine planting generally is practical in large areas. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for nonfarm uses. Slope and the hazard of seepage are limitations for some types of waste disposal facilities.

The capability subclass is IIIe. The woodland ordination symbol is 4f.

EID—Elliber very channery loam, 15 to 25 percent slopes

This soil is moderately steep, deep or very deep, and well drained. It is on the side slopes of minor ridges. Slopes are uniform to slightly convex and range from 100 to 500 feet in length. Areas are irregular in shape and range from 2 to 80 acres in size.

Typically, this soil has a surface layer of very dark brown very channery loam about 1 inch thick and a subsurface layer of pale brown very channery loam to a depth of 5 inches. The subsoil extends to a depth of 60 inches. It is light yellowish brown very channery loam in the upper part and brownish yellow extremely channery loam in the lower part.

Included with this soil in mapping are some areas of soils where fractured bedrock is less than 40 inches below the surface. Also included are some areas of soils that are similar to the Elliber soil but that have a seasonal high water table in wet seasons. Small areas of Opequon and Mertz soils are on some side slopes. Inclusions make up about 15 percent of the map unit.

Permeability in the Elliber soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. The surface layer contains more than 50 percent rock fragments. Depth to bedrock is more than 60 inches in most places. In unlimed areas the soil is strongly acid or extremely acid throughout.

Most areas are used for hayland, woodland, pasture, or cultivated crops. A few areas are used for orchards.

This soil is suited to cultivated crops. The severe

Figure 10.—Apple orchards are common on Chestnut Ridge. The soil is Elliber very channery loam, 8 to 15 percent slopes.

hazard of erosion is the main limitation for crops. Stripcropping, crop rotations, conservation tillage, no-till, and long-term permanent hay help to control erosion and to reduce runoff. Additions of manure, growing cover crops, and utilizing crop residue help to maintain the organic matter content and to improve soil condition. Applications of lime and fertilizer as needed help to maintain productivity. The Elliber soil is sometimes droughty but is easy to work and can be planted early. Rock fragments may cause excessive wear on tillage and planting equipment.

This soil is suited to pasture. Applying nutrients as needed helps to maintain the desired stands and to increase production. Rotational grazing and proper stocking rates help to maintain pasture quality and to reduce runoff.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for nonfarm uses. Slope is a limitation on sites for septic tank absorption fields and buildings. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation of adjacent areas and streams.

The capability subclass is VIe. The woodland ordination symbol is 4f.

EIE—Elliber very channery loam, 25 to 45 percent slopes

This soil is steep, deep or very deep, and well drained. It is on the side slopes of minor ridges. Slopes are uniform and range from 100 to 500 feet in length. Areas are irregular in shape and range from 5 to 100 acres.

Typically, this soil has a surface layer of very dark gray very channery loam about 1 inch thick and a subsurface layer of pale brown very channery loam to a depth of 5 inches. The subsoil extends to a depth of 60 inches. It is light yellowish brown very channery loam in the upper part and brownish yellow extremely channery loam in the lower part.

Included with this soil in mapping are some small, narrow areas of soils that are similar to this Elliber soil but that have a seasonal high water table in wet seasons.

Also included are some areas of Opequon, Hagerstown, Morrison, and Mertz soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Elliber soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. The surface layer contains more than 50 percent rock fragments. Depth to bedrock is more than 60 inches. In unlimed areas the soil is strongly acid or extremely acid throughout.

Most areas of this soil are wooded.

This soil is not suited to farming because of slope and droughtiness. It has limited suitability for pasture. Steep slopes and the severe hazard of erosion are the main limitations.

This soil is suited to woodland. Potential productivity is moderately high. Slope is a limitation for use of equipment. Constructing logging roads on the contour helps to control erosion. Removing undesirable species will increase the water available to the more desirable trees.

Slope limits most nonfarm uses of this soil. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIIe. The woodland ordination symbol is 4f.

ErB—Ernest silt loam, 0 to 8 percent slopes

This soil is nearly level to gently sloping, very deep, and moderately well drained. It is in draws, drainageways, and depressions and on the lower side slopes of hills. Slopes are concave and range from 100 to 600 feet in length. Areas are long and narrow or irregular in shape and range from 3 to 50 acres.

Typically, this soil has a brown to dark brown silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 63 inches. It is mottled, yellowish brown and light yellowish brown silty clay loam in the upper part and mottled strong brown and brown, firm and brittle, channery silty clay loam in the lower part.

Included with this soil in mapping are areas of Berks, Brinkerton, Blairton, and Wharton soils. Also included are some channery areas and areas of soils that are similar to this Ernest soil but that do not have a fragipan. In some wooded areas stones cover 1 to 15 percent of the surface. Inclusions make up about 15 percent of the map unit.

Permeability in the Ernest soil is moderate above the fragipan and moderately slow or slow within it. Available water capacity is moderate. Runoff is medium. The hazard of erosion is moderate. A fragipan is at a depth of 20 to 36 inches below the surface. A seasonal high water table is perched at a depth of 18 to 36 inches in wet seasons. The root zone is restricted by the seasonal high water table and the fragipan. In unlimed areas the soil is strongly acid or very strongly acid throughout.

Areas of this soil are used for cropland, pasture, or woodland. Some small areas are in nonfarm uses.

This soil is suited to cultivated crops. The seasonal high water table delays plowing and causes the soil to warm slowly in spring. Winter grains and alfalfa will be damaged over winter because of wetness and frost action. Practices such as stripcropping, conservation tillage, crop rotations, cover crops, and crop residue management to help to reduce runoff and to control erosion. In narrow areas grassed waterways may be needed to control gullying. Subsurface drains, where outlets are available, may be needed to remove excess water from some areas.

This soil is suited to pasture. The seasonal high water table limits growth of deep-rooted legumes. Surface compaction occurs if the pasture is grazed when the soil is wet. Proper stocking rates, rotational grazing, and periodic applications of plant nutrients help to maintain the desired plant species and to keep the soil in good condition.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. In some years the seasonal high water table and related wetness delay planting and harvesting during wet seasons. Machine planting in the larger areas is generally practical.

This soil has limitations for most nonfarm uses. The seasonal high water table and slow or moderately slow permeability are limitations for onsite waste disposal and building site development. If buildings are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage of water into the basements. If this soil is disturbed for construction, management practices will be needed to reduce wetness and runoff, to control erosion, and to prevent sedimentation.

The capability subclass is IIe. The woodland ordination symbol is 4w.

ErC—Ernest silt loam, 8 to 15 percent slopes

This soil is sloping, very deep, and moderately well drained. It is on foot slopes and side slopes of hills. Slopes are slightly concave to slightly convex and range from 50 to 500 feet in length. Areas are irregularly shaped and range from 3 to 40 acres in size.

Typically, the surface layer is brown to dark brown silt loam about 10 inches thick. The subsoil extends to a depth of 63 inches. It is mottled, yellowish brown and light yellowish brown silty clay loam in the upper part and mottled strong brown and brown, firm and brittle, channery silty clay loam in the lower part.

Included with this soil in mapping are small areas of soils that are similar to this Ernest soil but that have a channery silt loam surface layer. Also included are small areas of Berks, Blairton, Wharton, and Brinkerton soils. In some small wooded areas stones cover 1 to 15 percent of the surface. Inclusions make up about 20 percent of the map unit.

Permeability in the Ernest soil is moderate above the fragipan and moderately slow or slow within it. Available water capacity is moderate. Runoff is rapid. The hazard of erosion is severe. A fragipan is at a depth of 20 to 36 inches below the surface. A seasonal high water table is perched at a depth of 18 to 36 inches in wet seasons. The root zone is restricted by the seasonal high water table and the fragipan. In unlimed areas the soil is strongly acid or very strongly acid throughout.

Most areas are used for cropland, pasture, or woodland. A few areas are in nonfarm uses.

This soil is suited to cultivated crops. The seasonal high water table delays plowing and causes the soil to warm up slowly in spring. Winter grains and alfalfa will be damaged over winter because of wetness and frost action. Stripcropping, conservation tillage, grassed waterways, and crop rotations help to control erosion and to reduce runoff. Because of the seasonal high water table, subsurface drains and diversions are needed to remove excess water and to permit timely field operations.

This soil is suited to pasture. Unless the soil is drained, grasses and legumes that tolerate wetness should be planted. Surface compaction occurs if the pasture is grazed when the soil is wet. Proper stocking rates, rotational grazing, and periodic applications of plant nutrients help to maintain the desired plant species.

This soil is suited to woodland. Potential productivity is moderately high. Erosion during harvesting can be reduced by constructing logging roads on the contour. The seasonal high water table may interfere with planting and harvesting during wet seasons. Removing undesirable species will increase production. Machine planting is generally practical in the larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table and slow or moderately slow permeability are limitations for onsite waste disposal and building site development. If buildings are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage of water into basements. If this soil is disturbed for construction, management practices will be needed to reduce wetness and runoff, to control erosion, and to prevent sedimentation.

The capability subclass is IIIe. The woodland ordination symbol is 4w.

HeB—Hagerstown silt loam, 3 to 8 percent slopes

This soil is gently sloping, deep or very deep, and well drained. It is on broad uplands in limestone valleys and coves. Slopes are concave to convex and range from 50 to 800 feet in length. Areas are irregular in shape and range from 4 to 1,000 acres.

Typically, this soil has a brown to dark brown silt loam surface layer about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish red silty clay loam, silty clay, and clay to a depth of 50 inches and strong brown clay to a depth of 60 inches. Limestone bedrock is at a depth of about 60 inches.

Included with this soil in mapping are some areas of Opequon, Clarksburg, and Murrill soils. Also included are some areas of soils that have a reddish brown silty clay loam or channery surface layer. Sinkholes are common in some areas. Inclusions make up about 20 percent of the map unit.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is medium. The hazard of erosion is moderate. Depth to bedrock is more than 40 inches. In unlimed areas the soil ranges from strongly acid to slightly acid in the upper part and from strongly acid to neutral in the lower part.

This soil is used intensively for cultivated crops. Other areas are in hayland or pasture. Some small areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, no-till, cover crops, crop rotations, conservation tillage, and grassed waterways help to reduce runoff and to control erosion. Additions of manure and crop residue help to maintain the organic matter content and to improve soil condition. Applications of lime and fertilizers help to maintain productivity.

This soil is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction occurs if this soil is grazed when wet. Rotational grazing and proper stocking rates help to maintain the desired plant species. Best production requires maintaining fertility through periodic applications of lime and fertilizer.

This soil is suited to woodland. Potential productivity is moderately high. Use of equipment may be restricted during wet periods because of the clayey subsoil. Machine planting is practical in larger areas.

This soil has some limitations for nonfarm uses. Depth to bedrock and moderate permeability are limitations for onsite waste disposal. Depth to bedrock and shrinking and swelling are limitations on sites for buildings with basements.

The capability subclass is IIe. The woodland ordination symbol is 4c.

HeC—Hagerstown silt loam, 8 to 15 percent slopes

This soil is sloping, deep or very deep, and well drained. It is on side slopes in limestone valleys and coves. Slopes are concave to convex and range from 50 to 500 feet in length. Areas are irregular in shape and range from 4 to 150 acres.

Typically, this soil has a brown to dark brown silt loam surface layer about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish red silty clay loam and silty clay to a depth of 50 inches and strong brown clay to a depth of 60 inches. Limestone bedrock is at a depth of about 60 inches.

Included with this soil in mapping are some areas of Opequon, Clarksburg, and Murrill soils. Also included are some small areas of soils that have a sandy loam, channery silt loam, or silty clay loam surface layer. Sinkholes are common in some areas. Inclusions make up about 20 percent of the map unit.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches. In unlimed areas the soil ranges from strongly acid to slightly acid in the upper part and from strongly acid to neutral in the lower part.

This soil is used for intensive farming. Some small areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. No-till, stripcropping, conservation tillage, crop rotations, including grasses and legumes in the cropping system, and grassed waterways help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction is possible if this soil is grazed when wet. Rotational grazing and proper stocking rates help to maintain the desired plant species. Best production requires maintaining fertility through periodic applications of lime and fertilizer.

This soil is well suited to woodland. Potential productivity is moderately high. Because of the high amount of clay in the soil, trafficability is occasionally poor in wet periods. Machine planting is practical in larger areas. Constructing logging roads on the contour helps to control erosion.

This soil has a few limitations for nonfarm uses. Slope, depth to bedrock, and moderate permeability are limitations for onsite waste disposal. Slope, shrinking and swelling, and depth to bedrock are limitations on sites for buildings with basements.

The capability subclass is IIIe. The woodland ordination symbol is 4c.

HgC—Hagerstown silty clay loam, 8 to 15 percent slopes

This soil is sloping, deep or very deep, and well drained. It is on side slopes in limestone valleys and coves (fig. 11). Slopes are concave to convex and range from 50 to 600 feet in length. Areas are irregular in shape and range from 4 to 100 acres.

Typically, this soil has a brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish red silty clay to a depth of 50 inches and strong brown clay to a depth of 60 inches. Limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are some areas that have a channery silty clay loam surface layer. Also included are areas of Opequon, Clarksburg, and Murrill soils. Sinkholes are common in some areas. Inclusions make up about 15 percent of the map unit.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches. In unlimed areas the soil ranges from strongly acid to slightly acid in the upper part and from strongly acid to neutral in the lower part.

This soil is used for farming. Some areas are used for pasture or small woodlots or are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, crop rotations, no-till, grassed waterways, and conservation tillage help to reduce runoff and to control erosion. Additions of manure and crop residue help to maintain the organic matter content and to improve soil condition. Applications of lime and fertilizer as needed help to maintain productivity.

This soil is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction is possible if this soil is grazed when wet. Rotational grazing and proper stocking rates are suitable management practices. Best production requires maintaining fertility through periodic applications of lime and fertilizer.

This soil is suited to woodland. Potential productivity is moderately high. Because of the high amount of clay in the soil, trafficability is occasionally poor in wet periods. Machine planting is practical in larger areas. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. Depth to bedrock, slope, and moderate permeability are

Figure 11.—In the foreground, the depressions, which are caused by shallow cave-ins into limestone caverns, are on Hagerstown silty clay loam, 8 to 15 percent slopes. Elliber soils are on the ridge in the background.

limitations for onsite waste disposal. Slope, shrinking and swelling, and depth to bedrock are limitations on sites for buildings with basements.

The capability subclass is IIIe. The woodland ordination symbol is 4c.

HgD—Hagerstown silty clay loam, 15 to 25 percent slopes

This soil is moderately steep, deep or very deep, and well drained. It is on side slopes in limestone valleys and coves. Slopes are concave to convex and range from 50 to 400 feet in length. Areas are long and narrow or irregular in shape and range from 3 to 50 acres.

Typically, this soil has a brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish red silty clay to a depth of 50 inches and strong brown clay to a depth of 60 inches. Limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are some areas of soils that have a surface layer of channery silty clay loam. Also included are areas of Opequon and Murrill soils. Sinkholes are common in some areas. Inclusions make up about 15 percent of the map unit.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches. In unlimed areas the soil ranges from strongly acid to slightly acid in the upper part and from strongly acid to neutral in the lower part.

This soil is farmed or wooded or in nonfarm uses.

This soil is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Stripcropping, conservation tillage, no-till, grassed waterways, and permanent hay help to control erosion and to reduce runoff. Additions of manure and crop residue help to maintain the organic matter content and to improve soil condition. Applications of lime and fertilizer as needed help to maintain productivity.

This soil is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction is possible if this soil is grazed when wet. Rotational grazing, proper stocking rates, weed control, and avoiding overgrazing help to control erosion. Best

production requires maintaining fertility through periodic applications of lime and fertilizer.

This soil is suited to woodland. Potential productivity is moderately high. Slope and low trafficability during wet periods are limitations to use of equipment. Constructing logging roads on the contour helps to control erosion.

This soil has some limitations for nonfarm uses. Slope is the main limitation for onsite waste disposal and buildings. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4c.

HnB—Hagerstown silty clay loam, 3 to 8 percent slopes, very rocky

This soil is gently sloping, deep or very deep, and well drained. It is on broad uplands in limestone valleys and coves. Slopes are concave to convex and range from 100 to 400 feet in length. Areas are irregular in shape and range from 2 to 40 acres. Limestone outcrops or ledges are 30 to 300 feet apart and make up 2 to 5 percent of the area.

Typically, this soil has a reddish brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish red silty clay and clay to a depth of 50 inches and strong brown clay to a depth of 60 inches. Limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Opequon, Clarksburg, and Murrill soils. Also included are areas of soils that have a silt loam, channery, or very stony surface layer. Sinkholes are common in some areas. Inclusions make up about 20 percent of the map unit.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is medium. The hazard of erosion is moderate. Depth to bedrock is more than 40 inches. In unlimed areas the soil ranges from strongly acid to slightly acid in the upper part and from strongly acid to neutral in the lower part.

This soil is used for cultivated crops, pasture, or woodland.

This soil is suited to cultivated crops. Rock outcrops interfere with tillage, planting, and harvesting activities. Stripcropping, conservation tillage, and crop rotations help to control erosion.

This soil is suited to pasture, but because of rock outcrops, renovation is difficult. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction occurs if this soil is grazed when wet. Rotational grazing and proper stocking rates help to control erosion and to maintain stands of desired species.

This soil is suited to woodland. Potential productivity is moderately high. Rock outcrops and poor trafficability during wet periods limit the use of equipment. Removing undesirable species will increase production.

This soil has some limitations for nonfarm uses. Depth to bedrock and moderate permeability are limitations for onsite waste disposal. Depth to bedrock and shrinking and swelling are limitations on sites for buildings with basements.

The capability subclass is IIIe. The woodland ordination symbol is 4c.

HnC—Hagerstown silty clay loam, 8 to 15 percent slopes, very rocky

This soil is sloping, deep or very deep, and well drained. It is on uplands, side slopes, and knobs in limestone valleys and coves. Slopes are concave to convex and range from 100 to 300 feet in length. Areas are irregular in shape and range from 2 to 100 acres. Outcrops and ledges of limestone are 30 to 300 feet apart and make up 2 to 5 percent of the area.

Typically, this soil has a reddish brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish red silty clay and clay to a depth of 50 inches and strong brown clay to a depth of 60 inches. Limestone bedrock is at a depth of 60 inches.

Included with this soil in mapping are areas of Opequon, Clarksburg, and Murrill soils. Also included are areas of soils that have a silt loam, channery, or very stony surface layer. Sinkholes are common in some areas. Inclusions make up about 20 percent of the map unit.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches. In unlimed areas the soil ranges from strongly acid to slightly acid in the upper part and from strongly acid to neutral in the lower part.

This soil is used for pasture, woodland, hayland, or cultivated crops.

This soil is suited to cultivated crops. Rock outcrops interfere with tillage, planting, and harvesting activities. Grassed waterways, cover crops, stripcropping, crop rotations, and conservation tillage help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture, but because of rock

outcrops, renovation is difficult. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction occurs if this soil is grazed when wet. Rotational grazing and proper stocking rates help to control erosion and to maintain stands of desired species. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Rock outcrops and poor trafficability during wet periods limit use of equipment. Machine planting is limited by rock outcrops. Constructing logging roads on the contour helps to control erosion.

This soil has some limitations for nonfarm uses. Depth to bedrock and moderate permeability are limitations for onsite waste disposal. Depth to bedrock and shrinking and swelling are limitations on sites for buildings with basements.

The capability subclass is IVe. The woodland ordination symbol is 4c.

HnD—Hagerstown silty clay loam, 15 to 25 percent slopes, very rocky

This soil is moderately steep, deep or very deep, and well drained. It is on side slopes in limestone valleys and coves. Slopes are uniform to convex and range from 50 to 300 feet in length. Areas are irregular in shape and range from 2 to 30 acres. Outcrops and ledges of limestone are 30 to 300 feet apart and make up 2 to 5 percent of mapped areas.

Typically, this soil has a reddish brown silty clay loam surface layer about 7 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish red silty clay and clay. Limestone bedrock is at a depth of 50 inches.

Included with this soil in mapping are areas of Opequon, Clarksburg, and Murrill soils. Also included are some areas where the surface layer is channery or very stony. Sinkholes are common in some areas. Inclusions make up about 20 percent of the map unit.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches. In unlimed areas the soil ranges from strongly acid to slightly acid in the upper part and from strongly acid to neutral in the lower part.

This soil is used for pasture, woodland, hayland, or cultivated crops.

This soil is suited to cultivated crops. The severe hazard of erosion is the main limitation for crops. Rock outcrops interfere with tillage, planting, and harvesting activities. Stripcropping, crop rotations, grassed waterways, and conservation tillage help to reduce runoff and to control erosion.

This soil is suited to pasture, but rock outcrops hinder renovation. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction is possible if this soil is grazed when wet. Rotational grazing and proper stocking rates help to control erosion and to maintain stands of desired species. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Rock outcrops and poor trafficability during wet periods are equipment limitations. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for nonfarm uses. Slope is the main limitation of this soil for onsite waste disposal. Slope and depth to bedrock are limitations on sites for buildings with basements and shallow excavations. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4c.

HTC—Hazleton-Clymer association, 8 to 25 percent slopes, extremely stony

The soils in this association are sloping to moderately steep, deep or very deep, and well drained. This association is on side slopes, ridgetops, and mountaintops. Slopes are convex or uniform and range from 300 to 1,500 feet in length. Areas are long and broad or irregular in shape and range from 10 to 1,000 acres. This association consists of 50 percent Hazleton soil and 40 percent Clymer soil. These soils were not separated in mapping because predicted use and management are similar. Stones cover from 3 to 15 percent of the surface.

Typically, the Hazleton soil has a black channery sandy loam surface layer about 1 inch thick and a dark gray channery sandy loam subsurface layer about 1 inch thick. The subsoil extends to a depth of 46 inches. It is brown very channery sandy loam to a depth of 15 inches, strong brown very channery sandy loam to a depth of 33 inches, and strong brown extremely channery loamy sand to a depth of 46 inches. The substratum is strong brown extremely channery sand to a depth of 60 inches.

Typically, the Clymer soil has a very dark grayish brown channery sandy loam surface layer about 2 inches thick and a yellowish brown channery sandy loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish brown loam in the upper part and strong brown channery sandy loam in the lower part. The substratum to a depth of 60 inches is light yellowish brown channery sandy loam.

Included with these soils in mapping are areas of

Meckesville, Buchanan, and Ungers soils. Also included are areas where stones cover as much as 80 percent of the surface and areas where sandstone bedrock is less than 40 inches deep. Inclusions make up about 15 percent of the map unit.

Permeability is moderately rapid in the Hazleton soil and moderate in the Clymer soil. In both soils available water capacity is low. On both soils runoff is very rapid and the hazard of erosion is severe. Depth to bedrock is more than 4 feet. In unlimed areas the Hazleton and Clymer soils are extremely acid to strongly acid throughout.

Areas of this map unit are wooded and are used for timber production, wildlife habitat, or recreation.

This map unit is not suited to cultivated crops or pasture because large stones and boulders, impractical to remove, limit the management and renovation of pasture.

This map unit is suited to woodland. Potential productivity is moderately high. Stones and boulders are limitations for equipment operations. Building logging roads on the contour helps to control erosion and to prevent gullying.

This map unit has limitations for most nonfarm uses. Slope and poor filtration are limitations on sites for septic tank absorption fields.

The capability subclass for the Hazleton and Clymer soils is VIIs. The woodland ordination symbol on both soils is 4x.

HTE—Hazleton-Clymer association, 25 to 45 percent slopes, extremely stony

The soils in this association are moderately steep to steep, deep or very deep, and well drained. This association is on tops and side slopes of ridges and mountains. Slopes are convex and range from 200 to 1,000 feet in length. Areas are long and broad or irregular in shape and range from 10 to 1,000 acres. This association consists of 50 percent Hazleton soil and 30 percent Clymer soil. These soils were not separated in mapping because predicted use and management are similar. Stones cover 3 to 15 percent of the surface.

Typically, the Hazleton soil has a black channery sandy loam surface layer about 1 inch thick and a dark gray channery sandy loam subsurface layer about 1 inch thick. The subsoil extends to a depth of 46 inches. It is brown very channery sandy loam to a depth of 15 inches, strong brown very channery sandy loam to a depth of 33 inches, and strong brown extremely channery loamy sand to a depth of 46 inches. The substratum is strong brown extremely channery sand to a depth of 60 inches.

Typically, the Clymer soil has a very dark grayish brown channery sandy loam surface layer about 2 inches thick and a yellowish brown channery sandy loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 36 inches. It is yellowish brown loam in the upper part and strong brown channery sandy loam in the lower part. The substratum to a depth of 60 inches is light yellowish brown channery sandy loam.

Included with these soils in mapping are areas of Meckesville, Buchanan, and Ungers soils. Also included are areas where stones cover as much as 80 percent of the surface and areas where sandstone bedrock is less than 40 inches deep. Inclusions make up about 20 percent of the map unit.

Permeability is moderately rapid in the Hazleton soil and moderate in the Clymer soil. On both soils available water capacity is low. On both soils runoff is very rapid and the hazard of erosion is severe. Depth to bedrock is more than 4 feet. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas of this map unit are wooded and are used for timber production, wildlife habitat, or recreation.

This map unit is not suited to cultivated crops or pasture because of slope and large stones.

This map unit is suited to woodland. Potential productivity is moderately high. Stoniness and slope are the major limitations for woodland management. Building logging roads on the contour helps to control erosion and to prevent gullying.

This map unit has limitations for most nonfarm uses. Slope and poor filtration are limitations on sites for septic tank absorption fields. Slope is a limitation for most other nonfarm uses. If the soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Hazleton and Clymer soils is VIIs. The woodland ordination symbol on both soils is 4r.

Hy—Holly silt loam

This soil is nearly level, very deep, and poorly drained. It is on flood plains. Areas are long and narrow and range from 4 to 120 acres in size. Slopes range from 0 to 3 percent.

Typically, this soil has a dark grayish brown silt loam surface layer about 4 inches thick. The subsoil extends to a depth of 40 inches. It is dark grayish brown, mottled silt loam in the upper part, grayish brown, mottled silt loam in the next part, and dark grayish brown, mottled silty clay loam in the lower part. The substratum to a depth of 60 inches is light gray to gray, mottled gravelly sandy loam.

Included with this soil in mapping are small areas of Lobdell, Penlaw, and Clarksburg soils. Also included are some areas of moderately well drained to poorly drained

gravelly soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Holly soil is moderately slow or moderate in the solum and moderate or moderately rapid in the substratum. Available water capacity is moderate or high. Surface runoff is slow and some small areas are ponded after rains. The hazard of erosion is slight. The Holly soil has a seasonal high water table at or near the surface in wet seasons and is subject to frequent flooding. Where unlimed, the soil ranges from moderately acid to neutral in the solum and from moderately acid to mildly alkaline in the substratum.

Most areas of this soil are wooded or pastured. A few areas are in cultivated crops.

This soil is not well suited to cultivated crops because of wetness and a hazard of flooding. Crops that can tolerate the seasonal high water table and brief, frequent flooding should be planted. In some areas, surface and subsurface drainage can be used to lower the water table where suitable outlets are available.

This soil is suited to pasture. Unless artificially drained, grasses and legumes that tolerate wetness are suitable for planting. Restricted grazing when the soil is wet will prevent surface compaction and damage to plant stands. Proper stocking rates and rotational grazing help to maintain pasture productivity.

This soil is suited to woodland. Potential productivity is moderately high. Because of wetness there are equipment limitations and a high rate of seedling mortality. Machine planting is practical in larger areas.

This soil is not well suited to nonfarm uses. The seasonal high water table, slow permeability, and hazard of flooding are limitations for on-site septic systems and homesites.

The capability subclass is IIIw. The woodland ordination symbol is 4w.

KIC—Klinesville channery silt loam, 8 to 15 percent slopes

This soil is sloping, shallow, and well drained. It is on the tops and side slopes of hills. Slopes are convex and range from 200 to 600 feet in length. Areas are irregular in shape and range from 3 to 50 acres.

Typically, this soil has a dark reddish brown channery silt loam surface layer about 6 inches thick. The subsoil extends to a depth of 18 inches. It is reddish brown very channery silt loam. Shale and siltstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are areas of Albrights, Calvin, Leck Kill, Berks, and Weikert soils. Also included are areas where slope is less than 8 percent. Inclusions make up about 20 percent of the map unit.

Permeability in the Klinesville soil is moderately rapid. Available water capacity is very low. Runoff is rapid. The hazard of erosion is severe. Bedrock at a depth of 10 to 20 inches restricts rooting depth. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

Most areas are used for cropland, hayland, or pasture. Some areas are wooded or in nonfarm uses.

The soil is suited to cultivated crops but it is droughty. Stripcropping, conservation tillage, no-till, cover crops, and crop rotation help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

The soil is suited to pasture. Rotational grazing and proper stocking rates help to control erosion and to maintain the desired plant species. Applications of lime and fertilizers as needed will increase production.

This soil is suited to woodland. Potential productivity is moderate. The very low available water capacity causes a high rate of seedling mortality. Removing undesirable species will increase the water available to the more desirable trees. Machine planting is practical in larger areas. Constructing logging roads on the contour helps to control erosion.

Depth to bedrock is the main limitation of the soil for nonfarm use, especially for use as a site for septic tanks and buildings with basements.

The capability subclass is IVe. The woodland ordination symbol is 3d.

KID—Klinesville channery silt loam, 15 to 25 percent slopes

This soil is moderately steep, shallow, and well drained. It is on the side slopes of hills. Slopes are convex and range from 100 to 800 feet in length. Areas are irregular in shape and range from 2 to 150 acres in size.

Typically, the surface layer is dark reddish brown channery silt loam about 6 inches thick. The subsoil extends to a depth of 18 inches. It is reddish brown very channery silt loam. Shale and siltstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are areas of Albrights, Leck Kill, Berks, Calvin, and Weikert soils. Also included are areas of soils that are similar to the Klinesville soil but that contain fewer rock fragments throughout. Inclusions make up about 20 percent of the map unit.

Permeability in the Klinesville soil is moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Bedrock at a depth of 10 to 20 inches restricts rooting depth. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

Most areas of this soil are wooded or pastured. A few areas are farmed or in nonfarm uses.

This soil is suited to cultivated crops. The severe erosion hazard and very low available water capacity are the major limitations for crops. Stripcropping, no-till, conservation tillage, permanent hay, and crop rotations that include grasses and legumes help to reduce runoff and to control erosion.

This soil is suited to pasture. Slope, depth to bedrock, and droughtiness are management concerns. Rotational grazing and avoiding overgrazing, especially during droughty periods, help to reduce runoff and to control erosion.

This soil is suited to woodland. Potential productivity is moderate. Shallowness to bedrock restricts root volume and causes droughtiness. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion.

Depth to bedrock and slope limit this soil for most nonfarm uses, especially for use as a site for septic tanks and buildings with basements. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIe. The woodland ordination symbol is 3d.

KmE—Klinesville and Calvin soils, 25 to 50 percent slopes

This map unit consists of steep areas of shallow or moderately deep, well drained soils. They are on the side slopes of hills. In some areas, flat stones cover 3 to 15 percent of the surface. Slopes are complex and range from 100 to 1,000 feet in length. Areas are long and narrow or irregular in shape and range from 10 to 200 acres. These soils were mapped together in this slope range because they are not different in any major ways in use and management. Some areas consist mostly of the Klinesville soils, some mostly of the Calvin soils, and some consist of both. The total acreage of this map unit is about 50 percent Calvin soils and 30 percent Klinesville soils.

Typically, the surface layer of the Klinesville soils is dark reddish brown channery silt loam about 2 inches thick. The subsurface layer is reddish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of 18 inches. It is reddish brown very channery silt loam. Shale and siltstone bedrock is at a depth of 18 inches.

Typically, the surface layer of the Calvin soils is dark reddish brown channery silt loam about 2 inches thick. The subsurface layer is reddish brown channery silt loam about 5 inches thick. The subsoil extends to a depth of 26 inches. It is reddish brown very channery silt loam. The substratum to a depth of 40 inches is reddish brown extremely channery silt loam. Shale bedrock is at a depth of 40 inches.

Included with these soils in mapping are some areas of Leck Kill, Berks, and Weikert soils. Also included are some wet spots and some areas of Basher and Albrights soils. Also included are a few areas that have a very channery surface layer. Inclusions make up about 20 percent of the map unit.

Permeability in the Klinesville and Calvin soils is moderately rapid. Available water capacity is very low in the Klinesville soils and moderate in the Calvin soils. On both soils runoff is very rapid and the hazard of erosion is severe. Depth to bedrock is 10 to 20 inches on the Klinesville soils and 20 to 40 inches on the Calvin soils. In unlimed areas the soil ranges from very strongly acid to moderately acid throughout.

Almost all areas of this map unit are wooded. This map unit is not suited to cultivated crops or pasture because of very steep slopes. Some areas can be used for woodland pasture or unimproved pasture.

This map unit is suited to woodland. Potential productivity is moderate on the Klinesville soils and moderately high on the Calvin soils. Slope limits planting and harvesting. Restricted rooting depth and droughtiness increase seedling mortality. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. Slope and depth to bedrock are limitations for onsite waste disposal and building sites. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Klinesville and Calvin soils is VIIe. The woodland ordination symbol is 3r on the Klinesville soils and 4r on the Calvin soils.

KoF—Klinesville-Rock outcrop complex, 35 to 80 percent slopes

This map unit consists of shallow, well drained Klinesville soils and areas of rock outcrop. It is on side slopes of hills and ridges. Slopes are uniform and range from 300 to 1,000 feet in length. Areas are irregular in shape and range from 10 to 500 acres. The map unit is made up of 70 percent Klinesville soils and 10 percent rock outcrop. The soils and areas of rock outcrops are in a pattern so intricate that it was not practical to separate them at the scale of mapping. Flat stones cover 3 to 15 percent of the surface.

Typically, the Klinesville soil has a dark reddish brown channery silt loam surface layer about 2 inches thick. The subsurface layer is reddish brown channery silt loam about 4 inches thick. The subsoil extends to a depth of 18

inches. It is reddish brown very channery silt loam. Shale bedrock is at a depth of about 18 inches.

Rock outcrop consists of areas where bedrock crops out in various sizes. The rock consists of thick- to thin-bedded shale, siltstone, and sandstone.

Included with this soil in mapping are areas of Leck Kill, Weikert, Berks, and Calvin soils. Included areas make up about 20 percent of the map unit.

Permeability in the Klinesville soil is moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Bedrock is 10 to 20 inches deep. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

This map unit is generally wooded. Because of the very steep slopes, depth to bedrock, and rock outcrops this map unit is not suited to cultivated crops, hayland, or pasture.

This map unit is suited to woodland. Potential productivity is moderate. Slope and rock outcrops are hazards for equipment. Construction of logging roads on the contour helps to control erosion.

Slope and depth to bedrock are the main limitations for most nonfarm uses. If these soils are disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Klinesville soil is VIIe. The woodland ordination symbol is 3r on the Klinesville soil.

LdB—Laidig cobbly loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and well drained. It is on the lower side slopes and foot slopes of mountains, ridges, and hills. Slopes are concave and convex and range from 200 to 600 feet in length. Areas are irregular in shape and range from 3 to 100 acres.

Typically, this soil has a very dark gray cobbly loam surface layer about 2 inches thick and a light yellowish brown channery loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 62 inches. It is brown channery loam to a depth of 33 inches and firm, brittle reddish brown very channery silt loam and loam to a depth of 62 inches.

Included with this soil in mapping are some areas of Berks, Murrill, Buchanan, and Andover soils. Also included are some areas where small stones cover less than 15 percent of the surface. Inclusions make up about 15 percent of the map unit.

Permeability in the Laidig soil is moderate or moderately rapid above the fragipan and moderately slow within it. Available water capacity is low. Runoff is medium. The hazard of erosion is moderate. A fragipan at a depth of about 33 inches and a seasonal high water table perched at a depth of 30 to 45 inches in wet seasons can restrict the rooting depth. Unless limed, the soil is strongly acid to extremely acid throughout.

Most areas are used for cropland, pasture, or woodland. Some areas are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, conservation tillage, grassed waterways, crop rotations, and winter cover crops help to reduce runoff and to control erosion. Additions of organic materials and crop residue help to maintain the good condition of the soil and to increase available water capacity.

This soil is suited to pasture. Rotational grazing, proper stocking rates, and periodic applications of plant nutrients help to maintain the desired plant species and pasture production.

This soil is suited to woodland. Potential productivity is moderately high. Removal of undesirable species will increase the water available for the more desirable trees. Machine planting generally is practical in large areas.

The moderately slow permeability and the seasonal high water table are the main limitations of this soil for nonfarm use. Permeability limits the soil as a site for septic tank absorption fields. The water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe. The woodland ordination symbol is 4a.

LdC—Laidig cobbly loam, 8 to 15 percent slopes

This soil is sloping, very deep, and well drained. It is on the side slopes and foot slopes of mountains, ridges, and hills. Slopes are concave and convex and range from 300 to 1,000 feet in length. Areas are irregular in shape and range from 5 to 60 acres.

Typically, this soil has a very dark gray cobbly loam surface layer about 2 inches thick and a light yellowish brown channery loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 62 inches. It is brown channery loam to a depth of 33 inches and firm, brittle reddish brown very channery silt loam and loam to a depth of 62 inches.

Included with this soil in mapping are some areas of soils that are similar to the Laidig soil but that do not have a fragipan. Also included are small areas of Buchanan, Bedington, and Berks soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Laidig soil is moderate or moderately rapid above the fragipan and moderately slow within it. Available water capacity is low. Runoff is rapid. The hazard of erosion is severe. A fragipan at a depth of about 33 inches and a seasonal high water table perched

at a depth of 30 to 45 inches in wet seasons can restrict the rooting depth. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

Most areas are used for cropland, pasture, or woodland. Some areas are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, crop rotations that include grasses and legumes, conservation tillage, grassed waterways, and winter cover crops help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Rotational grazing, proper stocking rates to avoid overgrazing, and periodic applications of plant nutrients help to control erosion and to improve pasture.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the water available for the more desirable trees. Constructing logging roads on the contour helps to control erosion. Machine planting generally is practical in large areas.

Moderately slow permeability, the seasonal high water table, and slope are the main limitations of this soil for nonfarm use. These are serious limitations for onsite disposal of waste. The water table and slope limit the soil as a site for houses with basements. If buildings with basements are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage of water into the basements.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

LdD—Laidig cobbly loam, 15 to 25 percent slopes

This soil is moderately steep, very deep, and well drained. It is on the side slopes of mountains and ridges. Slopes are concave and convex and range from 200 to 600 feet in length. Areas are irregular in shape and range from 3 to 50 acres.

Typically, this soil has a very dark gray cobbly loam surface layer about 2 inches thick and a light yellowish brown channery loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 62 inches. It is brown channery loam to a depth of 33 inches and firm, brittle reddish brown very channery silt loam and loam to a depth of 62 inches.

Included with this soil in mapping are areas Buchanan, Bedington, and Berks soils. Also included are areas of soils that are similar to the Laidig soil but that have a channery sandy loam surface layer. Inclusions make up about 15 percent of the map unit.

Permeability in the Laidig soil is moderate or moderately rapid above the fragipan and moderately slow within it. Available water capacity is low. Runoff is very rapid. The hazard of erosion is severe. A fragipan at a depth of 33 inches and a seasonal high water table perched at a depth of 30 to 45 inches in wet seasons can restrict the rooting depth. Unless limed, the soil is strongly acid to extremely acid throughout.

Most areas are used for woodland, hayland, or pasture. Some areas are used for cultivated crops. A few areas are in nonfarm uses.

This soil is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Stripcropping, crop rotations that include grasses and legumes, conservation tillage, and winter cover crops help to reduce runoff and to control erosion. Grassed waterways help to prevent gullies.

This soil is suited to pasture. Rotational grazing, proper stocking rates to avoid overgrazing, and periodic applications of plant nutrients help to control erosion and to improve pasture.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the water available to the more desirable trees. Slope can be a problem for planting and harvesting equipment. Constructing logging roads and trails on the contour helps to control erosion.

Slope, moderately slow permeability, and seasonal high water table are the main limitations of this soil for nonfarm use, especially for septic tank absorption fields. Slope limits the use of the soil for buildings and roads. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4r.

LgC—Laidig cobbly loam, 8 to 15 percent slopes, extremely stony

This soil is sloping, very deep, and well drained. It is on the side slopes and foot slopes of mountains and ridges. Slopes are uniform and range from 200 to 800 feet in length. Areas are irregular in shape and range from 4 to 80 acres. Large stones cover 3 to 15 percent of the surface.

Typically, this soil has a very dark gray cobbly loam surface layer about 2 inches thick and a light yellowish brown channery loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 62 inches. It is brown channery loam to a depth of 33 inches and firm, brittle reddish brown very channery silt loam and loam to a depth of 62 inches.

Included with this soil in mapping are some areas of soils that have slope of 3 to 8 percent. Also included are areas of Andover, Buchanan, Bedington, Berks, Clymer, and Meckesville soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Laidig soil is moderate or moderately rapid above the fragipan and moderately slow within it. Available water capacity is low. Runoff is rapid. The hazard of erosion is severe. A seasonal high water table perched at a depth of 30 to 45 inches in wet seasons and a fragipan at a depth of 33 inches can restrict the rooting depth. Unless limed, the soil is strongly acid to extremely acid throughout.

Most areas are used for woodland.

This soil is unsuited to cropland and poorly suited to improved pasture because stones on the surface impede the use of most farm machinery.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the water available to the more desirable trees. The stones on the surface make machine planting generally impractical. Constructing logging roads on the contour helps to control erosion.

Slope, moderately slow permeability, and the seasonal high water table are the main limitations of this soil for nonfarm use. Moderately slow permeability and the seasonal high water table limit the soil as a site for septic tanks. Slope and the seasonal high water table limit the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is VIIs. The woodland ordination symbol is 4x.

LgD—Laidig cobbly loam, 15 to 25 percent slopes, extremely stony

This soil is moderately steep, very deep, and well drained. It is on side slopes of mountains and ridges. Slopes are concave and convex and range from 200 to 1,200 feet in length. Areas are irregular in shape and range from 5 to 100 acres. Large stones cover 3 to 15 percent of the surface.

Typically, this soil has a very dark gray cobbly loam surface layer about 2 inches thick and a light yellowish brown channery loam subsurface layer about 4 inches thick. The subsoil extends to a depth of 62 inches. It is brown channery loam to a depth of 33 inches and firm, brittle reddish brown very channery silt loam and loam to a depth of 62 inches.

Included with this soil in mapping are some areas of Andover, Buchanan, Bedington, Berks, Clymer, and Meckesville soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Laidig soil is moderate or moderately rapid above the fragipan and moderately slow within it. Available water capacity is low. Runoff is very rapid. The hazard of erosion is severe. A seasonal high water table perched at a depth of 30 to 45 inches in wet seasons and a fragipan at a depth of about 33 inches can restrict the rooting depth. Unless limed, the soil is strongly acid to extremely acid throughout.

This soil is used almost exclusively for woodland.

It is not suited to cropland and improved pasture because of slope and large stones on the surface.

This soil is suited to woodland. Potential productivity of trees is moderately high. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. The stones on the surface and slope restrict the use of equipment, and machine planting generally is not practical.

Moderately slow permeability, the seasonal high water table, and slope are the main limitations of this soil for nonfarm uses. These are severe limitations for septic tank absorption fields. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIIs. The woodland ordination symbol is 4x.

LgE—Laidig cobbly loam, 25 to 35 percent slopes, extremely stony

This soil is steep, very deep, and well drained. It is on the upper side slopes of mountains and ridges. Slopes are smooth and range from 100 to 1,000 feet in length. Areas are irregular in shape and range from 10 to 500 acres. Large stones cover 3 to 15 percent of the surface.

Typically, this soil has a very dark gray cobbly loam surface layer about 2 inches thick and a light yellowish brown channery loam subsurface layer about 2 inches thick. The subsoil extends to a depth of 62 inches. It is brown channery loam to a depth of 33 inches and firm, brittle reddish brown very channery silt loam and loam to a depth of 62 inches.

Included with this soil in mapping are some small areas of soils that have slope of more than 35 percent. Also included are areas of Andover, Buchanan, Bedington, Clymer, and Meckesville soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Laidig soil is moderate or moderately rapid above the fragipan and moderately slow within it. Available water capacity is low. Runoff is very rapid. The hazard of erosion is severe. A seasonal high water table perched at a depth of 30 to 45 inches in wet seasons and a fragipan at a depth of about 33 inches can

restrict the rooting depth. Unless limed, the soil is strongly acid to extremely acid throughout.

This soil is wooded and is used for woodland, recreation areas, or wildlife habitat.

This soil is not suited to cultivated crops or improved pasture because of slope and large stones.

This soil is suited to woodland. Potential productivity is moderately high. Large stones and slope limit roadbuilding and use of equipment. Constructing logging roads and trails on the contour helps to control erosion.

Slope limits this soil for most nonfarm uses.

The capability subclass is VIIs. The woodland ordination symbol is 4x.

LkB—Leck Kill-Calvin complex, 3 to 8 percent slopes

This map unit consists of gently sloping areas of very deep to moderately deep, well drained soils. They are on hilltops and the side slopes of low ridges and hills. Slopes are uniform to slightly convex and range from 100 to 600 feet in length. Areas are irregular in shape and range from 2 to 100 acres. These soils occur as areas so intricately mixed on the landscape that it was not feasible to separate them in mapping. The Leck Kill soil makes up about 50 percent and the Calvin soil makes up about 30 percent of the map unit. Areas of the Calvin soil have more shale rock fragments on the surface than do those of the Leck Kill soil.

Typically, the surface layer of the Leck Kill soil is reddish brown silt loam about 7 inches thick. The subsoil extends to a depth of 42 inches. It is reddish brown and dark red channery silt loam to a depth of 26 inches, red and weak red very channery silt loam to a depth of 38 inches, and red very channery silt loam to a depth of 42 inches. The substratum to a depth of 50 inches is dark reddish brown very channery silt loam. Shale bedrock is at a depth of 50 inches.

Typically, the surface layer of the Calvin soil is dark reddish brown channery silt loam about 10 inches thick. The subsoil extends to a depth of 26 inches. It is reddish brown very channery silt loam. The substratum to a depth of 40 inches is reddish brown extremely channery silt loam. Shale bedrock is at a depth of 40 inches.

Included with these soils in mapping are areas of Ungers, Lehew, Meckesville, and Albrights soils. Inclusions make up about 20 percent of the map unit.

Permeability is moderate or moderately rapid in the Leck Kill soil and moderately rapid in the Calvin soil. Available water capacity is moderate for the Leck Kill soil and low for the Calvin soil. On both soils surface runoff is medium and the hazard of erosion is moderate. Depth to bedrock is more than 40 inches on the Leck Kill soil and 20 to 40 inches on the Calvin soil. In unlimed areas the Leck Kill soil ranges from neutral to very strongly acid in the solum and from very strongly acid to moderately acid in the substratum. In unlimed areas the Calvin soil ranges from moderately acid to very strongly acid throughout.

Most areas of this map unit are used for cultivated crops, hay, pasture, or woodland. A few areas are in nonfarm uses.

This map unit is suited to cultivated crops. No-till, stripcropping, conservation tillage, crop rotations that include grasses and legumes, and grassed waterways help to reduce runoff and to control erosion. The Calvin soil tends to be droughty and not as productive as the Leck Kill soil. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This map unit is suited to pasture. Rotational grazing and proper stocking rates help to maintain pasture quality and to reduce runoff. Applying plant nutrients as needed helps to maintain desired stands and to increase production.

This map unit is suited to woodland. Potential productivity is moderately high. Management limitations are few. Seedling mortality rates are increased in areas of the Calvin soil because of droughtiness. Removing undesirable species will increase the water available to the more desirable trees. Machine planting generally is practical in large areas.

Depth to bedrock is the main limitation of this soil for nonfarm use, especially for use of the soil as a site for septic tanks or buildings with basements.

The capability subclass for the Leck Kill and Calvin soils is IIe. The woodland ordination symbol is 4a on the Leck Kill soil and 4f on the Calvin soil.

LkC—Leck Kill-Calvin complex, 8 to 15 percent slopes

This map unit consists of sloping areas of very deep to moderately deep, well drained soils. They are on the side slopes of low ridges and hills. Slopes are slightly convex and range from 200 to 600 feet in length. Areas are irregular in shape and range from 5 to 100 acres in size. These soils occur as areas so intricately mixed on the landscape that it was not feasible to separate them in mapping. Leck Kill soils make up about 40 percent and Calvin soils make up about 30 percent of the map unit. Areas of Calvin soils have more shale rock fragments on the surface than Leck Kill soils.

Typically, the surface layer of the Leck Kill soil is reddish brown silt loam about 7 inches thick. The subsoil extends to a depth of 42 inches. It is reddish brown and dark red channery silt loam to a depth of 26 inches, red

and weak red very channery silt loam to a depth of 38 inches, and red very channery silt loam to a depth of 42 inches. The substratum to a depth of 50 inches is dark reddish brown very channery silt loam. Shale bedrock is at a depth of 50 inches.

Typically, the surface layer of the Calvin soil is dark reddish brown channery silt loam about 10 inches thick. The subsoil extends to a depth of 26 inches. It is reddish brown very channery silt loam. The substratum to a depth of 40 inches is reddish brown extremely channery silt loam. Shale bedrock is at a depth of 40 inches.

Included with these soils in mapping are areas of Ungers, Lehew, Meckesville, and Albrights soils. Inclusions make up about 30 percent of the map unit.

Permeability is moderate or moderately rapid in the Leck Kill soil and moderately rapid in the Calvin soil. Available water capacity is moderate for the Leck Kill soil and low for the Calvin soil. On both soils surface runoff is rapid and the hazard of erosion is severe. Depth to bedrock is more than 40 inches on the Leck Kill soil and ranges from 20 to 40 inches on the Calvin soil. In unlimed areas the Leck Kill soil ranges from neutral to very strongly acid in the solum and from very strongly acid to moderately acid in the C horizon. In unlimed areas the Calvin soil ranges from moderately acid to very strongly acid throughout.

Most areas of this map unit are used for hay, pasture, cultivated crops, or woodland. A few areas are in nonfarm uses.

This map unit is suited to cultivated crops. No-till, stripcropping, conservation tillage, crop rotations that include grasses and legumes, and grassed waterways help to reduce runoff and to control erosion. The Calvin soil tends to be droughty and not as productive as the Leck Kill soil. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This map unit is suited to pasture. Rotational grazing and proper stocking rates help to maintain pasture quality and to reduce runoff. Applying plant nutrients as needed helps to maintain desired plant stands and to increase production.

This map unit is suited to woodland. Potential productivity is moderately high. Management limitations are few. Seedling mortality rates increase in areas of Calvin soils because of droughtiness. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Machine planting generally is practical in large areas.

Slope and depth to bedrock are the main limitations of this soil for nonfarm use, especially for use of the soil as a site for septic tanks or buildings.

The capability subclass for the Leck Kill and Calvin soils is IIIe. The woodland ordination symbol is 4a on the Leck Kill soil and 4f on the Calvin soil.

LkD—Leck Kill-Calvin complex, 15 to 25 percent slopes

This map unit consists of moderately steep areas of very deep to moderately deep, well drained soils. They are on the side slopes of low ridges and hills. Slopes are uniform to slightly convex and range from 200 to 800 feet in length. Areas are irregular in shape and range from 5 to 100 acres. These soils occur as areas so intricately mixed on the landscape that it was not feasible to separate them in mapping. The Leck Kill soil makes up about 40 percent and the Calvin soil makes up about 30 percent of the map unit. More shale rock fragments are on the surface in areas of the Calvin soil than in those of the Leck Kill soil.

Typically, the surface layer of the Leck Kill soil is reddish brown silt loam about 7 inches thick. The subsoil extends to a depth of 42 inches. It is reddish brown and dark red channery silt loam to a depth of 26 inches, red and weak red very channery silt loam to a depth of 38 inches, and red very channery silt loam to a depth of 42 inches. The substratum to a depth of 50 inches is dark reddish brown very channery silt loam. Shale bedrock is at a depth of 50 inches.

Typically, the surface layer of the Calvin soil is dark reddish brown channery silt loam about 10 inches thick. The subsoil extends to a depth of 26 inches. It is reddish brown very channery silt loam. The substratum to a depth of 40 inches is reddish brown extremely channery silt loam. Shale bedrock is at a depth of 40 inches.

Included with these soils in mapping are areas of Ungers, Lehew, Meckesville, and Albrights soils. Inclusions make up about 30 percent of the map unit.

Permeability is moderate or moderately rapid in the Leck Kill soil and moderately rapid in the Calvin soil. Available water capacity is moderate for the Leck Kill soil and low for the Calvin soil. On both soils surface runoff is very rapid and the hazard of erosion is severe. Depth to bedrock is more than 40 inches on the Leck Kill soil and 20 to 40 inches on the Calvin soil. In unlimed areas the Leck Kill soil ranges from neutral to very strongly acid in the solum and from very strongly acid to moderately acid in the C horizon. In unlimed areas the Calvin soil ranges from moderately acid to very strongly acid throughout.

Most areas of this map unit are used for hay, pasture, cultivated crops, or woodland. A few areas are in nonfarm uses.

This map unit is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. No-till, stripcropping, conservation tillage, crop rotations that include grasses and legumes, and grassed waterways

help to reduce runoff and to control erosion. Areas of the Calvin soil tend to be droughty and not as productive as the Leck Kill soil. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This map unit is suited to pasture. Rotational grazing and proper stocking rates help to maintain pasture quality and to reduce runoff. Applying plant nutrients as needed helps to maintain the desired plant stands and to increase production.

This map unit is suited to woodland. Potential productivity is moderately high. Building roads and skid trails on the contour helps to control erosion and gullying. Seedling mortality rates are increased in areas of the Calvin soil because of droughtiness. Removing undesirable species will increase the water available to the more desirable trees. Machine planting is practical in larger areas.

These soils have limitations for nonfarm uses. Depth to bedrock and slope are limiting factors for septic tank absorption fields. Slope is a limitation affecting building site development. If they are disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Leck Kill and Calvin soils is IVe. The woodland ordination symbol on both soils is 4r.

Lx—Lobdell loam

This soil is very deep, level to nearly level, and moderately well drained. It is on flood plains and in narrow drainageways. Areas are long and narrow and range from 3 to 100 acres in size. Slopes range from 0 to 3 percent.

Typically, this soil has a brown loam surface layer about 9 inches thick and a very dark gray loam subsurface layer to a depth of 18 inches. The subsoil extends to a depth of 32 inches. It is stratified yellowish brown silty clay loam and sandy loam in the upper part and mottled yellowish brown gravelly clay loam in the lower part. The substratum to a depth of 60 inches is mottled yellowish brown gravelly clay loam.

Included with this soil in mapping are some areas of Penlaw, Clarksburg, and Holly soils. In some areas of this soil the substratum is more than 25 percent rock fragments. Also included are areas of soils that are similar to the Lobdell soil but that have a gravelly loam or sandy loam surface layer. Inclusions make up about 20 percent of the map unit.

Permeability in the Lobdell soil is moderate or moderately rapid. Available water capacity is high. Runoff is slow. The hazard of erosion is slight. This soil is frequently flooded by runoff from adjacent uplands or from stream overflow. A seasonal high water table is within 24 to 42 inches of the surface in wet seasons. In unlimed areas the soil ranges from moderately acid to neutral throughout.

Most areas are used for cultivated crops or pasture. Other areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Subsurface drains may be needed in some areas to drain wet spots. Cover crops grown in cultivated areas will help to protect the soil from scouring damage caused by flooding. Some small, narrow areas are flooded by runoff after heavy rains. Grassed waterways can be used to help to prevent gullies. Utilizing crop residue and including grasses and legumes in the cropping system helps to maintain the content of organic matter and the condition of the soil.

This soil is suited to pasture. Grasses and legumes that tolerate wetness are suitable for planting. Frost action may damage some deep-rooted, perennial plants. Restricted grazing when the soil is wet helps to prevent surface compaction and damage to plant stands. Rotational grazing and proper stocking rates are suitable management practices.

This soil is suited to woodland. Potential productivity is moderately high and limitations are few. Use of equipment for planting, maintaining, and harvesting trees may be restricted for brief periods because of flooding and the seasonal high water table. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. The hazard of flooding and the seasonal high water table are limitations for onsite waste disposal and homesites.

The capability subclass is IIw. The woodland ordination symbol is 4a.

McB—Meckesville gravelly loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and well drained. It is in depressions, on foot slopes, and in drainageways. Slopes are uniform to slightly convex and range from 200 to 500 feet in length. Areas are irregular in shape and range from 3 to 60 acres in size.

Typically, this soil has a dark brown gravelly loam surface layer about 9 inches thick. The subsoil extends to a depth of 60 inches. It is reddish brown gravelly loam to a depth of 28 inches and brittle, reddish brown gravelly loam to a depth of 60 inches. The substratum to a depth of 72 inches is weak red gravelly loam.

Included with this soil in mapping are areas of Leck Kill, Calvin, Albrights, and Ungers soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Meckesville soil is moderate above the fragipan and moderately slow within it. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. A fragipan at a depth of

Figure 12.—This area of Meckesville gravelly loam, 3 to 8 percent slopes, has been cleared of large stones and is suited to both cultivated crops and hayland.

about 25 to 48 inches and a seasonal high water table perched at a depth of 30 to 40 inches in wet seasons can restrict rooting depth. Depth to bedrock is more than 60 inches. In unlimed areas the soil ranges from extremely acid to strongly acid throughout.

Most areas are used for cropland, hay, or pasture (fig. 12). Some areas are wooded or are in nonfarm uses.

This soil is well suited to cropland. Practices that can be used to help to control erosion and help to reduce runoff include no-till, conservation tillage, stripcropping, grassed waterways, cover crops, crop rotation, and including grasses and legumes in the cropping system. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Proper stocking rates, periodic applications of plant nutrients, and rotational grazing help to maintain and to improve pasture.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase the water available to the more desirable trees. Machine planting is practical in large areas.

The moderately slow permeability and the seasonal high water table are the main limitations of this soil for nonfarm use. Both of these limit the soil as a site for septic tanks and the high water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe. The woodland ordination symbol is 4a.

McC—Meckesville gravelly loam, 8 to 15 percent slopes

This soil is sloping, very deep, and well drained. It is on foot slopes and benches of ridges and hills. Slopes are uniform to convex and range from 100 to 500 feet in length. Areas are irregular in shape and range from 5 to 100 acres.

Typically, this soil has a dark brown gravelly loam surface layer about 9 inches thick. The subsoil extends to a depth of 60 inches. It is reddish brown gravelly loam to a depth of 28 inches and brittle, reddish brown gravelly loam to a depth of 60 inches. The substratum to a depth of 72 inches is weak red gravelly loam.

Included with this soil in mapping are areas of Leck Kill, Calvin, Klinesville, Ungers, and Albrights soils. Also included are areas of soils that have a sandy loam subsoil. Inclusions make up about 15 percent of the map unit.

Permeability in the Meckesville soil is moderate above the fragipan and moderately slow within it. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. A fragipan at a depth of about 25 to 48 inches and a seasonal high water table perched at a depth of 30 to 40 inches in wet seasons can restrict rooting depth. Depth to bedrock is more than 60 inches. Unless limed, the soil is extremely acid to strongly acid throughout.

This soil is used for cropland, pasture, or woodland. A few areas are in nonfarm uses.

This soil is suited to cropland. Practices that can be used to help to control erosion and to reduce runoff include stripcropping, crop rotations that include grasses and legumes, no-till, conservation tillage, winter cover crops, and grassed waterways. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Proper stocking rates, periodic applications of plant nutrients, and rotational grazing help to control erosion and to improve pasture.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Machine planting is practical in larger areas.

Slope, permeability, and the seasonal high water table are the main limitations of the soil for nonfarm use. Slope limits the soil as a building site, and the seasonal high water table and permeability are limitations of the soil as a site for septic tanks and buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

MdC—Meckesville gravelly loam, 8 to 15 percent slopes, very stony

This soil is sloping, very deep, and well drained. It is on foot slopes and benches of major ridges. Slopes are convex and range from 100 to 700 feet in length. Areas are irregular in shape and range from 10 to 200 acres. Large stones cover 0.1 to 3 percent of the surface area.

Typically, the surface layer is dark reddish brown gravelly loam about 1 inch thick. The subsurface layer, to a depth of 4 inches, is reddish brown gravelly loam. The subsoil is reddish brown gravelly loam to a depth of 28 inches and brittle, reddish brown gravelly loam to a depth of 60 inches. The substratum to a depth of 72 inches is weak red gravelly loam.

Included with this soil in mapping are some areas of extremely stony soils. Also included are some areas of Ungers, Leck Kill, Calvin, and Albrights soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Meckesville soil is moderate above the fragipan and moderately slow within it. Available water capacity is moderate. Surface runoff is rapid. The erosion hazard is severe. The fragipan restricts the movement of water and growth of roots. The top of the fragipan is 25 to 48 inches beneath the surface. A seasonal high water table is perched at a depth of 30 to 40 inches in wet seasons. Depth to bedrock is more than 60 inches. Unless limed, the soil is extremely acid to strongly acid throughout.

Most areas of this soil are wooded. Some cleared acreage is used for pasture or orchards.

This soil is not well suited to cultivated crops because of stoniness, slope, and the severe hazard of erosion.

It is suited to unimproved pasture. Close-growing grasses and legumes, rotational grazing, and proper stocking rates help to control erosion and to reduce runoff.

This soil is suited to woodland. Potential productivity is moderately high. Moderately steep slopes and large stones limit use of equipment and planting. Constructing logging roads on the contour helps to control erosion.

Moderately slow permeability, slope, and the seasonal high water table are limitations for most nonfarm uses. Moderately slow permeability and the seasonal high water table limit the soil for onsite waste disposal. Slope and the seasonal high water table are limitations on sites for buildings with basements.

The capability subclass is VIs. The woodland ordination symbol is 4a.

MdD—Meckesville gravelly loam, 15 to 25 percent slopes, very stony

This soil is sloping and moderately steep, very deep, and well drained. It is on foot slopes, side slopes and benches of major ridges. Slopes are convex and range from 200 to 800 feet in length. Areas are irregular in shape and range from 3 to 100 acres. Large stones cover 0.1 to 3 percent of the surface area.

Typically, the surface layer is dark reddish brown gravelly loam about 1 inch thick. The subsurface layer, to a depth of 3 inches, is reddish brown gravelly loam. The subsoil is reddish brown gravelly loam to a depth of 28 inches and brittle, reddish brown gravelly loam to a depth of 60 inches. The substratum to a depth of 72 inches is weak red gravelly loam.

Included with this soil in mapping are some areas of extremely stony soils. Also included are some areas of Ungers, Leck Kill, Calvin, and Albrights soils. Inclusions make up about 15 percent of the map unit.

Permeabilty in the Meckesville soil is moderate above the fragipan and moderately slow within it. Available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The fragipan restricts the movement of water and the growth of roots. The fragipan is at a depth of 25 to 48 inches. A seasonal high water table is perched at a depth of 30 to 40 inches in wet seasons. Depth to bedrock is more than 60 inches. Unless limed, the soil is extremely acid to strongly acid throughout.

Most areas of this soil are wooded. Some cleared acreage is used for pasture or orchards.

This soil is not well suited to cultivated crops because of stoniness, slope, and the severe hazard of erosion.

It is suited to unimproved pasture. Close-growing grasses and legumes, rotational grazing, and proper stocking rates help to reduce runoff and to control erosion.

This soil is suited to woodland. Potential productivity is moderately high. Slope and large stones limit use of equipment and planting. Constructing logging roads on the contour helps to control erosion.

This Meckesville soil has limitations for most nonfarm uses. Moderately slow permeability, slope, and the seasonal high water table are limitations for onsite septic systems. Slope is a limitation on sites for buildings and roads. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIs. The woodland ordination symbol is 4r.

MdE—Meckesville gravelly loam, 25 to 35 percent slopes, very stony

This soil is steep, very deep, and well drained. It is on the side slopes of mountains and ridges. Slopes are uniform to convex and range from 100 to 1,000 feet in length. Areas are irregular in shape and range from 10 to 250 acres. Large stones cover 0.1 to 3 percent of the surface area.

Typically, the surface layer is dark reddish brown gravelly loam about 1 inch thick. The subsurface layer, to a depth of 3 inches, is reddish brown gravelly loam. The subsoil is reddish brown, gravelly loam to a depth of 28 inches and brittle, reddish brown gravelly loam to a depth of 60 inches. The substratum to a depth of 72 inches is weak red gravelly loam.

Included with this soil in mapping are some areas of extremely stony soils. Also included are small areas of Albrights, Ungers, and Laidig soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Meckesville soil is moderate above the fragipan and moderately slow within it. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. The fragipan is at a depth of 25 to 48 inches. The fragipan restricts the downward movement of water and the growth of roots. A seasonal high water table is perched at a depth of 30 to 40 inches in wet seasons. Depth to bedrock is more than 60 inches. Unless limed, the soil is extremely acid to strongly acid throughout.

Most areas of this soil are wooded.

This soil is not suited to cultivated crops or pasture because of large stones and steep slopes.

This soil is suited to woodland. Potential productivity is moderately high. Large stones and slope limit use of equipment. Constructing logging roads and trails on the contour helps to prevent erosion.

This soil has limitations for nonfarm uses. Slope, moderately slow permeability, and the seasonal high water table are limitations for on-site septic systems. Slope limits homesites and roads.

The capability subclass is VIIs. The woodland ordination symbol is 4r.

MhC—Mertz channery silt loam, 8 to 15 percent slopes

This soil is sloping, very deep, and well drained. It is on the side slopes and ridgetops of small intermountain ridges. Slopes are concave and convex and range from 50 to 300 feet in length. Individual areas are long and narrow or irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is brown to dark brown channery silt loam about 10 inches thick. The subsoil extends to a depth of 70 inches. It is yellowish brown to strong brown very channery clay loam and silty clay loam in the upper part and strong brown to yellowish red channery silty clay loam in the lower part. The substratum is strong brown channery clay loam to a depth of 90 inches.

Included with this soil in mapping are some areas that have stones on the surface. In some areas the lower part of the subsoil is silty clay or clay that has a few rock

fragments. Also included are areas of Elliber, Clarksburg, and Buchanan soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Mertz soil is moderately slow. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 60 inches. In unlimed areas the soil ranges from neutral to strongly acid in the solum and is strongly acid or very strongly acid below.

This soil is used for cultivated crops, hayland, pasture, or woodland. A few areas are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, grassed waterways, use of cover crops, crop rotations, including grasses and legumes in the cropping system, conservation tillage, and no-till help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Limitations are nil. Rotational grazing and proper stocking rates help to maintain pasture quality and to control erosion. Applications of lime and fertilizers as needed help to increase pasture production.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. In some areas seedling mortality is a limitation. Machine planting is practical in larger areas.

This soil has some limitations for nonfarm uses. Slope is a limitation on sites for buildings and excavations. Moderately slow permeability is a limitation for septic tank absorption fields.

The capability subclass is IIIe. The woodland ordination symbol is 4f.

MoA—Monongahela silt loam, 0 to 3 percent slopes

This soil is nearly level, deep or very deep, and moderately well drained. It is on stream terraces and high bottom flood plains. Slopes are uniform and range from 100 to 600 feet in length. Individual areas are irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is brown to dark brown silt loam about 9 inches thick. The subsoil extends to a depth of 62 inches. In the upper part it is yellowish brown silty clay loam and strong brown gravelly silty clay loam to a depth of 24 inches. In the lower part it is mottled, brittle, yellowish brown gravelly silty clay loam.

Included with this soil in mapping are small areas of Purdy, Allegheny, and Tyler soils. Also included are areas where the surface layer is gravelly silt loam. Inclusions make up about 20 percent of the map unit.

Permeability in the Monongahela soil is moderate above the fragipan and moderately slow or slow within it. Available water capacity is moderate. Surface runoff is slow. The hazard of erosion is slight. A seasonal high water table is at a depth of 18 to 36 inches in wet seasons. The root zone is restricted by a seasonal high water table and a fragipan. This soil is subject to rare flooding. In unlimed areas the soil is strongly acid or very strongly acid throughout.

Most areas of this soil are in cultivated crops, pasture, or hayland. A few areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Cover crops, crop residue management, and crop rotations help to maintain organic matter content and to improve soil condition. Plant nutrients applied as needed help to increase production. Subsurface drainage can be used to lower the water table.

This soil is suited to pasture. Proper stocking rates and rotational grazing help to maintain the desired plant species. Periodic applications of plant nutrients help to maximize production. In some areas the seasonal high water table affects the growth of deep-rooted legumes.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species is a suitable management practice. Use of equipment is restricted by the seasonal high water table. Machine planting is generally practical in large areas.

Flooding, the seasonal high water table, and slow or moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields and for buildings with basements.

The capability subclass is IIw. The woodland ordination symbol is 4a.

MoB—Monongahela silt loam, 3 to 8 percent slopes

This soil is gently sloping, deep or very deep, and moderately well drained. It is on stream terraces and high bottom flood plains. Slopes are uniform to convex and range from 50 to 500 feet in length. Individual areas are irregular in shape and range from 2 to 50 acres.

Typically, the surface layer is brown to dark brown silt loam about 9 inches thick. The subsoil extends to a depth of 62 inches. In the upper part it is yellowish brown silty clay loam and strong brown gravelly silty clay loam to a depth of 24 inches. In the lower part it is mottled, brittle, yellowish brown gravelly silty clay loam.

Included with this soil in mapping are areas where bedrock is at a depth of less than 40 inches. Also included are some areas where the surface layer consists of more than 15 percent rounded pebbles. Also included are areas of Allegheny and Tyler soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Monongahela soil is moderate

above the fragipan and moderately slow or slow within it. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. A seasonal high water table is at a depth of 18 to 36 inches in wet seasons. The root zone is restricted by the seasonal high water table and the fragipan. In unlimed areas the soil is strongly acid or very strongly acid throughout.

Most areas are used for cultivated crops and hayland. Some areas are used for pasture or woodland or are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, no-till, conservation tillage, grassed waterways, cover crops, and including grasses and legumes in the cropping system help to reduce runoff and to control erosion. Applications of plant nutrients as needed will increase production. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. The seasonal high water table and frost action affect the growth of some deep-rooted legumes. Proper stocking rates and rotational grazing help to maintain the desired plant species. Periodic applications of plant nutrients help to maintain pasture production.

This soil is suited to tree production. Potential productivity is moderately high. Removing undesirable species will increase production. In some areas the seasonal high water table limits the use of equipment, but machine planting generally is practical in large areas.

The seasonal high water table and slow or moderately slow permeability are the main limitations of this soil for nonfarm uses. Both limit the soil as a site for septic tank absorption fields. The water table is a limitation of the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe. The woodland ordination symbol is 4a.

MrB—Morrison channery sandy loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and well drained. It is on the tops and side slopes of low hills and ridges. Slopes are concave to convex and range from 100 to 800 feet in length. Areas are irregular in shape and range from 3 to 200 acres.

Typically, the surface layer is very dark grayish brown channery sandy loam about 10 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam in the upper part and brownish yellow and yellowish red gravelly sandy clay loam in the lower part. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Included with this soil in mapping are some areas of Hagerstown, Buchanan, and Murrill soils. Also included are some areas of soils that have a very channery surface layer. Inclusions make up about 15 percent of the map unit.

Permeability in the Morrison soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. Closed sinkholes and depressions are common in some areas. Depth to bedrock is more than 72 inches. Unless limed, the soil is strongly acid to slightly acid in the surface layer and extremely acid to moderately acid in the subsoil and strongly acid or moderately acid in the substratum.

Most areas are used for cultivated crops or hayland. Some areas are used for pasture or woodland or are in nonfarm uses.

This soil is suited to cultivated crops. Conservation tillage, no-till, grassed waterways, use of cover crops, stripcropping, and crop rotations that include close-growing grasses and legumes help to reduce runoff and to control erosion. Crop residue management and additions of manure help to maintain the content of organic matter and to improve soil condition.

This soil is suited to pasture. Proper stocking rates and rotational grazing help to maintain the desired plant species and to increase productivity. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. Limitations are few and machine planting is practical in larger areas.

This soil has some limitations for nonfarm uses. Moderate or moderately rapid permeability restricts onsite waste disposal.

The capability subclass is IIe. The woodland ordination symbol is 4a.

MrC—Morrison channery sandy loam, 8 to 15 percent slopes

This soil is sloping, very deep, and well drained. It is on the tops and side slopes of low hills and ridges. Slopes are concave to convex and range from 50 to 700 feet in length. Areas are irregular in shape and range from 3 to 180 acres.

Typically, the surface layer is very dark grayish brown channery sandy loam about 10 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam in the upper part and brownish yellow and yellowish red gravelly sandy clay loam in the lower part. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Included with this soil in mapping are areas of Murrill, Hagerstown, and Buchanan soils. Also included are some areas that have a very channery surface layer. Inclusions make up about 15 percent of the map unit.

Permeability in the Morrison soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. Closed sinkholes and depressions are common in some areas. Depth to bedrock is more than 72 inches. Unless limed, the soil is strongly acid to slightly acid in the surface layer, extremely acid to moderately acid in the subsoil, and strongly acid or moderately acid in the substratum.

This soil is used for cultivated crops, hayland, or orchards. Some areas are wooded or in nonfarm uses.

This soil is suited to cultivated crops. Conservation tillage, no-till, stripcropping, use of cover crops, crop rotations that include grasses and legumes, and grassed waterways help to reduce runoff and to control erosion. Crop residue management and additions of manure help to maintain the content of organic matter and to improve soil condition.

This soil is suited to pasture. Proper stocking rates and rotational grazing help to maintain the desired species and to increase productivity. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase production. Machine planting is practical in larger areas. Constructing logging roads on the contour helps to control erosion.

This soil has some limitations for nonfarm uses. Slope and the moderate or moderately rapid permeability limit use of the soil for onsite septic systems. Slope is a limitation for building sites.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

MrD—Morrison channery sandy loam, 15 to 25 percent slopes

This soil is moderately steep, very deep, and well drained. It is on the side slopes of low hills and ridges. Slopes are convex and range from 50 to 400 feet in length. Areas are irregular in shape and range from 2 to 40 acres.

Typically, the soil has a very dark grayish brown channery sandy loam surface layer about 10 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam in the upper part and brownish yellow and yellowish red gravelly sandy clay loam in the lower part. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Included with this soil in mapping are areas of Murrill, Buchanan, and Hagerstown soils. Rock outcrops are common in some areas. Some areas have a very channery surface layer. Inclusions make up about 15 percent of the map unit.

Permeability in the Morrison soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. Closed sinkholes and depressions occur in some areas. Depth to bedrock is more than 72 inches. Unless limed, the soil is strongly acid to slightly acid in the surface layer, extremely acid to moderately acid in the subsoil, and strongly acid or moderately acid in the substratum.

Most areas are used as hayland or pasture. Some areas are in cultivated crops or woodland or in nonfarm uses.

It is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Conservation tillage, grassed waterways, stripcropping, rotations that include grasses and legumes, and no-till help to reduce runoff and to control erosion. Crop residue management and additions of manure help to maintain the content of organic matter and to improve soil condition.

This soil is suited to pasture. Proper stocking rates and rotational grazing help to maintain the desired plant species and to increase production. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. Slope is a limitation in using equipment for planting or harvesting trees. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for nonfarm uses. Slope is a limitation on sites for septic tank absorption fields, buildings, roads, and streets. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is IVe. The woodland ordination symbol is 4r.

MsB—Morrison channery sandy loam, 3 to 8 percent slopes, very stony

This soil is gently sloping, very deep, and well drained. It is on the tops and side slopes of minor ridges. Slopes are uniform and range from 100 to 600 feet in length. Areas are irregular in shape and range from 5 to 115 acres. Stones cover 0.1 to 3 percent of the surface.

Typically, the surface layer is very dark grayish brown channery sandy loam about 5 inches thick. The subsurface layer is light yellowish brown loamy sand to a

depth of 21 inches. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam in the upper part and brownish yellow and yellowish red gravelly sandy clay loam in the lower part. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Included with this soil in mapping are small areas of Vanderlip, Buchanan, and Murrill soils. In some areas stones cover more than 3 percent of the surface. Inclusions make up about 15 percent of the map unit.

Permeability in the Morrison soil is moderate or moderately rapid. Available water capacity is moderate. Runoff is medium. The hazard of erosion is moderate. Closed sinkholes and depressions occur in some areas. Depth to bedrock is more than 72 inches. Unless limed, the soil is strongly acid to extremely acid in the surface layer and in the upper part of the subsoil and strongly acid or moderately acid in the lower part of the subsoil and in the substratum.

Most areas of this soil are wooded. Some small areas are in nonfarm uses.

This soil is not suited to cultivated crops, hay, or pasture. Large stones interfere with the use of tillage equipment.

The soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. In some areas large stones limit use of planting equipment.

This soil has limitations for nonfarm uses. The moderate or moderately rapid permeability restricts onsite septic systems.

The capability subclass is VIs. The woodland ordination symbol is 4a.

MsC—Morrison channery sandy loam, 8 to 15 percent slopes, very stony

This soil is sloping, very deep, and well drained. It is on the tops and side slopes of minor ridges. Slopes are concave to convex and range from 100 to 700 feet in length. Areas are irregular in shape and range from 5 to 300 acres. Stones cover 0.1 to 3 percent of the surface.

Typically, the surface layer is very dark grayish brown channery sandy loam about 5 inches thick. The subsurface layer is light yellowish brown loamy sand to a depth of 21 inches. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam in the upper part and brownish yellow and yellowish red gravelly sandy clay loam in the lower part. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Included with this soil in mapping are small areas of Vanderlip, Buchanan, and Murrill soils. In some areas stones cover more than 3 percent of the surface. Inclusions make up about 15 percent of the map unit.

Permeability in the Morrison soil is moderate or moderately rapid. Available water capacity is moderate. Runoff is rapid. The hazard of erosion is severe. Closed sinkholes and depressions occur in some areas. Depth to bedrock is more than 72 inches. Unless limed, the soil is strongly acid to extremely acid in the surface layer and in the upper part of the subsoil and strongly acid or moderately acid in the lower part of the subsoil and in the substratum.

Most areas of this soil are wooded. Some small areas are in nonfarm uses.

This soil is not suited to cultivated crops, hay, or pasture. Large stones interfere with the use of tillage equipment.

The soil is suited to woodland. Potential productivity is moderately high. In some areas large stones limit use of planting equipment. Removing undesirable species will increase production. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. Slope and moderate or moderately rapid permeability restrict onsite septic systems. Slope is a limitation for construction uses and building sites.

The capability subclass is VIs. The woodland ordination symbol is 4a.

MsD—Morrison channery sandy loam, 15 to 25 percent slopes, very stony

This soil is moderately steep, very deep, and well drained. It is on the side slopes of minor ridges. Slopes are convex and range from 100 to 400 feet in length. Areas are irregular in shape and range from 3 to 40 acres. Stones cover 0.1 to 3 percent of the surface.

Typically, the surface layer is very dark grayish brown channery sandy loam about 5 inches thick. The subsurface layer is light yellowish brown loamy sand to a depth of 21 inches. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam in the upper part and brownish yellow and yellowish red cobbly sandy clay loam in the lower part. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Included with this soil in mapping are small areas of Vanderlip, Buchanan, and Murrill soils. In some areas stones cover more than 3 percent of the surface. Inclusions make up about 15 percent of the map unit.

Permeability in the Morrison soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. Closed sinkholes and depressions occur in some areas. Depth to bedrock is more than 72 inches. Unless limed, the soil is strongly acid to extremely acid in the

upper part and moderately acid or strongly acid in the lower part.

Most areas of this soil are wooded. Some small areas are in nonfarm uses.

This soil is not suited to cultivated crops, hay, or pasture. Large stones interfere with the use of tillage equipment.

This soil is suited to woodland. Potential productivity is moderately high. Slope and large stones may limit planting and harvesting equipment. Removing undesirable species will increase production. Constructing logging roads and trails on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. Slope is a limitation for onsite septic systems and building sites. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIs. The woodland ordination symbol is 4r.

MtB—Morrison-Murrill complex, 3 to 8 percent slopes, very stony

The soils in this map unit are nearly level to gently sloping, very deep, and well drained. It is on the tops and side slopes of minor ridges. Stones cover 0.1 to 3 percent of the surface. Slopes are uniform and range from 200 to 1,000 feet in length. Areas are irregular in shape and range from 3 to 250 acres. These soils were mapped together because they occur in an intricate pattern and could not be separated at the scale used for mapping. The Morrison soil makes up about 50 percent of the map unit and the Murrill soil makes up about 35 percent.

Typically, the Morrison soil has a very dark grayish brown channery sandy loam surface layer about 5 inches thick and a light yellowish brown loamy sand subsurface layer about 16 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam to a depth of 31 inches and brownish yellow and yellowish red gravelly sandy clay loam to a depth of 50 inches. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Typically, the Murrill soil has a dark grayish brown channery sandy loam surface layer about 2 inches thick and a light yellowish brown channery sandy loam subsurface layer about 9 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown channery loam in the upper part and strong brown clay loam in the lower part.

Included with these soils in mapping are some areas in drainageways that are ponded for brief periods after heavy rains. Also included are some areas of Clarksburg, Hagerstown, Vanderlip, and Opequon soils. Inclusions make up about 15 percent of the map unit.

Permeability is moderate or moderately rapid in the Morrison soil. In the Murrill soil it is moderate in the upper part of the solum and moderate and moderately slow in the lower part. In both soils available water capacity is moderate. On both soils surface runoff is medium and the hazard of erosion is moderate. In both soils depth to bedrock is more than 60 inches. In unlimed areas the Morrison soil is extremely acid to strongly acid in the upper part and strongly acid or moderately acid in the lower part. In unlimed areas the Murrill soil is very strongly acid to moderately acid throughout.

Areas of this map unit are generally wooded. Some areas are cleared of stones and are used for farming.

This map unit has limited suitability for cultivated crops because of stones. No-till, conservation tillage, cover crops, crop residue use, crop rotations that include grasses and legumes, and stripcropping help to reduce runoff and to control erosion.

This map unit is suited to pasture. Stones interfere with cultivation and pasture renovation. Proper stocking rates and rotational grazing help to maintain pasture grasses and legumes and to control erosion. Best production requires maintaining fertility through periodic applications of lime and fertilizer.

This map unit is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase production. In some areas stones limit machine planting.

This map unit has some limitations for nonfarm uses. The hazard of seepage is a limitation for some sanitary facilities. Moderate and moderately rapid permeability restricts onsite septic systems.

The capability subclass for the Morrison and Murrill soils is VIs. The woodland ordination symbol for both soils is 4a.

MtC—Morrison-Murrill complex, 8 to 15 percent slopes, very stony

The soils in this map unit are sloping, very deep, and well drained. They are on the tops and side slopes of minor ridges. Stones cover 0.1 to 3 percent of the surface. Slopes are concave to convex and range from 100 to 800 feet in length. Areas are irregular in shape and range from 4 to 250 acres. These soils were mapped together because they occur in such an intricate pattern and could not be separated at the scale used for mapping. The Morrison soil makes up about 50 percent and the Murrill soil makes up about 35 percent of the map unit.

Typically, the Morrison soil has a very dark grayish brown channery sandy loam surface layer about 5 inches

thick and a light yellowish brown loamy sand subsurface layer about 16 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam to a depth of 31 inches and brownish yellow and yellowish red gravelly sandy clay loam to a depth of 50 inches. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Typically, the Murrill soil has a dark grayish brown channery sandy loam surface layer about 2 inches thick and a light yellowish brown channery sandy loam subsurface layer about 9 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown channery loam in the upper part and strong brown clay loam in the lower part.

Included with these soils in mapping are small areas of Clarksburg, Opequon, Hagerstown, and Vanderlip soils. Inclusions make up about 15 percent of the map unit.

Permeability is moderate or moderately rapid in the Morrison soil. In the Murrill soil it is moderate in the upper part of the solum and moderate and moderately slow in the lower part. In both soils available water capacity is moderate. On both soils surface runoff is rapid and the hazard of erosion is severe. In both soils depth to bedrock is more than 60 inches. In unlimed areas the Morrison soil is extremely acid to strongly acid in the upper part and strongly acid or moderately acid in the lower part. In unlimed areas the Murrill soil is very strongly acid to moderately acid throughout.

Areas of this map unit are generally wooded. Some areas are cleared of stones and are used for farming.

This map unit has limited suitability for cultivated crops and pasture because of stones. Conservation tillage, no-till, stripcropping, crop residue management, additions of manure, and crop rotations that include grasses and legumes help to reduce runoff and to control erosion.

This soil is suited to pasture. Stones interfere with cultivation and pasture renovation. Best production requires maintaining fertility through periodic applications of nutrients. Proper stocking rates and rotational grazing help to reduce runoff and to control erosion.

This map unit is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase production. Stones may be a problem for machine planting. Constructing logging roads on the contour helps to control erosion.

This map unit has limitations for nonfarm uses. Slope and moderate and moderately rapid permeability are limitations for onsite waste disposal.

The capability subclass for the Morrison and Murrill soils is VIs. The woodland ordination symbol for both soils is 4a.

MtD—Morrison-Murrill complex, 15 to 25 percent slopes, very stony

The soils in this map unit are moderately steep, very deep, and well drained. It is on the sides of ridges. Stones cover 0.1 to 3 percent of the surface. Slopes are uniform and range from 50 to 500 feet in length. Areas are irregular in shape and range from 3 to 60 acres in size. These soils were not separated in mapping because they occur in such an intricate pattern and could not be separated at the scale used for mapping. The Morrison soil makes up about 50 percent and the Murrill soil makes up about 30 percent of the map unit.

Typically, the Morrison soil has a very dark grayish brown channery sandy loam surface layer about 5 inches thick and a light yellowish brown loamy sand subsurface layer about 16 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown sandy loam to a depth of 31 inches and brownish yellow and yellowish red gravelly sandy clay loam to a depth of 50 inches. The substratum to a depth of 60 inches is yellowish brown gravelly sandy loam.

Typically, the Murrill soil has a dark grayish brown channery sandy loam surface layer about 2 inches thick and a light yellowish brown channery sandy loam subsurface layer about 9 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown channery loam in the upper part and strong brown clay loam in the lower part.

Included with these soils in mapping are areas of Clarksburg, Vanderlip, Opequon, and Hagerstown soils. Inclusions make up about 20 percent of the map unit.

Permeability is moderate or moderately rapid in the Morrison soil. In the Murrill soil it is moderate in the upper part of the solum and moderate or moderately slow in the lower part. In both soils available water capacity is moderate. In both soils surface runoff is very rapid and the hazard of erosion is severe. Depth to bedrock is more than 60 inches. In unlimed areas the Morrison soil is extremely acid to strongly acid in the upper part and strongly acid or moderately acid in the lower part. In unlimed areas the Murrill soil is very strongly acid to moderately acid throughout.

Most areas of this map unit are wooded. Some small areas are cleared and are used for farming.

This map unit is generally not suited to cultivated crops because of surface stones and the severe hazard of erosion.

In some areas this map unit is suited to improved pasture where the surface has been cleared of stones. Proper stocking rates and rotational grazing help to maintain desired grasses and legumes and to control

erosion. Best production requires maintaining fertility through periodic applications of nutrients.

This map unit is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. Use of equipment is limited by stoniness and moderately steep slopes. Constructing logging roads on the contour helps to control erosion.

This map unit has limitations for most nonfarm uses. Slope is a limitation affecting onsite waste disposal, buildings, roads, and streets. If these soils are disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Morrison and Murrill soils is VIs. The woodland ordination symbol for both soils is 4r.

MuB—Murrill channery loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and well drained. It is on the lower foot slopes of mountain ridges. It also is on some uplands in limestone valleys. A few small closed depressions or sinkholes are in some areas. Slopes are slightly convex and range from 150 to 800 feet in length. Areas are irregular in shape and range from 3 to 175 acres.

Typically, this soil has a brown to dark brown channery loam surface layer about 11 inches thick. The subsoil extends to a depth of 60 inches. It is strong brown channery silty clay loam in the upper part, yellowish brown channery silty clay loam in the next part, and red clay in the lower part.

Included with this soil in mapping are large areas that have a surface layer of cobbly sandy loam. Also included are some areas of Hagerstown, Clarksburg, and Opequon soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Murrill soil is moderate in the upper part of the solum and moderate and moderately slow in the lower part. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. Depth to bedrock is more than 60 inches. Unless limed, the soil is moderately acid to very strongly acid throughout.

Most areas are used for cultivated crops, hayland, or pasture. A few areas are wooded or are in nonfarm uses.

This soil is suited to cropland. Stripcropping, conservation tillage, no-till, cover crops, including grasses and legumes in the cropping system, and grassed waterways help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer can help to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Proper stocking rates and rotational grazing help to maintain the good condition of the soil and to control erosion. Applying plant nutrients as needed helps to increase production.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase production. Machine planting is practical in larger areas.

This soil has limitations for nonfarm uses. A moderate shrink-swell potential is a limitation for homes with basements. Frost action and low strength are limitations for roads and streets.

The capability subclass is IIe. The woodland ordination symbol is 4a.

MuC—Murrill channery loam, 8 to 15 percent slopes

This soil is sloping, very deep, and well drained. It is on the lower foot slopes of mountain ridges and on some uplands in limestone valleys. A few small closed depressions or sinkholes are in some areas. Slopes are convex and range from 75 to 500 feet in length. Areas are irregular in shape and range from 3 to 80 acres.

Typically, this soil has a brown to dark brown channery loam surface layer about 11 inches thick. The subsoil extends to a depth of 60 inches. It is strong brown channery silty clay loam in the upper part, yellowish brown channery silty clay loam in the next part, and red clay in the lower part.

Included with this soil in mapping are areas that have a surface layer of cobbly sandy loam. Also included are areas of Hagerstown, Opequon, Clarksburg, and Laidig soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Murrill soil is moderate in the upper part of the solum and moderate or moderately slow in the lower part. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 60 inches. Unless limed, the soil is moderately acid to very strongly acid throughout.

Most areas are used for cultivated crops, hayland, or pasture. Some areas are wooded or are in nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, conservation tillage, no-till, winter cover crops, crop rotations, the inclusion of grasses and legumes in the cropping system, and grassed waterways help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Proper stocking rates and

rotational grazing help to maintain the good condition of the soil and to control erosion. Applying plant nutrients as needed will increase production.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase production. Machine planting is practical in large areas. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for nonfarm uses. Slope is a limitation for onsite waste disposal. Moderate shrink-swell potential and slope are limitations for homes with basements. Slope, frost action, and low strength are limitations for roads and streets.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

MuD—Murrill channery loam, 15 to 25 percent slopes

This soil is moderately steep, very deep, and well drained. It is on the lower foot slopes of mountain ridges and on the side slopes of hills in limestone valleys. A few small sinkholes or closed depressions occur in some areas. Slopes are convex and range from 50 to 300 feet in length. Areas are irregular in shape and range from 3 to 40 acres.

Typically, this soil has a brown to dark brown channery loam surface layer about 10 inches thick. The subsoil extends to a depth of 60 inches. It is strong brown channery silty clay loam in the upper part, yellowish brown channery silty clay loam in the next part, and red clay in the lower part.

Included with this soil in mapping are areas of soils that have a surface layer of cobbly sandy loam. Also included are areas of Hagerstown, Clarksburg, and Opequon soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Murrill soil is moderate in the upper part of the solum and moderate or moderately slow in the lower part. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is more than 60 inches. Unless limed, the soil is moderately acid to very strongly acid throughout.

Most areas are used as hayland or pasture. Some areas are in cultivated crops or woodland or are in nonfarm uses.

This soil is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Stripcropping, conservation tillage, no-till, grasses and legumes included in the cropping system, and grassed waterways help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to maintain the content of organic matter and to improve tilth.

This soil is suited to pasture. Proper stocking rates and rotational grazing help to maintain the condition of the soil and to control erosion. Applying nutrients as needed will increase production.

This soil is suited to woodland. Potential productivity is moderately high. Removing undesirable species will increase production. Building roads and trails on the contour helps to control erosion. Machine planting is practical in large areas.

This soil has limitations for nonfarm uses. Slope is a limitation for onsite waste disposal, homes with basements, roads, and streets.

The capability subclass is IVe. The woodland ordination symbol is 4r.

Nd—Nolin silt loam

This soil is nearly level, very deep, and well drained. It is on flood plains. Areas are long and narrow and range from 3 to 40 acres.

Typically, this soil has a dark grayish brown silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 50 inches. It is yellowish brown silt loam. The substratum to a depth of 60 inches is yellowish brown gravelly silt loam.

Included with this soil in mapping are areas of Hagerstown and Clarksburg soils that are subject to standing water for short periods of time after intensive rainfall. Also included are areas of soils that are sandy or gravelly throughout. Inclusions make up about 20 percent of the map unit.

Permeability in the Nolin soil is moderate. Available water capacity is high. Runoff is slow. The hazard of erosion is slight. A seasonal high water table is at a depth of 36 to 60 inches in wet seasons. The Nolin soil is occasionally flooded by stream overflow but is often ponded by heavy rains. In unlimed areas the soil is slightly acid or neutral throughout.

Most areas of this soil are cropland, permanent hayland, or pasture. Other areas are wooded.

The soil is suited to cultivated crops. Conservation tillage, growing cover crops, utilizing crop residue, and including grasses and legumes in the cropping system help to maintain the content of organic matter and the good condition of the soil.

This soil is suited to pasture. Overgrazing is a major concern in managing pasture. Proper stocking rates to maintain key plant species, rotational grazing, and periodic applications of nutrients are suitable management practices.

This soil is suited to trees. Potential productivity is moderately high. Management problems are few. Removing undesirable species will increase production. Machine planting is practical in larger areas.

Flooding and the seasonal high water table are the main limitations for nonfarm uses, especially as a site for septic tank absorption fields or buildings with basements.

The capability subclass is IIw. The woodland ordination symbol is 4a.

OpB—Opequon-Hagerstown complex, 3 to 8 percent slopes, very rocky

This map unit consists of gently sloping, shallow to deep, well drained soils and areas of rock outcrop. It is on uplands in limestone valleys. These soils were mapped together because they occur in an intricate pattern and could not be separated at the scale used for mapping. The shallow Opequon soil makes up about 50 percent of the map unit, the deep Hagerstown soil makes up 30 percent, and rock outcrop makes up 1 to 10 percent. Slopes are uniform to concave and range from 50 to 500 feet in length. Areas are irregular in shape and range from 2 to 30 acres.

Typically, the surface layer of the Opequon soil is reddish brown silty clay loam about 8 inches thick. The subsoil is yellowish red silty clay to a depth of 18 inches. Limestone bedrock is at a depth of about 18 inches.

Typically, the surface layer of the Hagerstown soil is brown silty clay loam about 7 inches thick. The subsoil is yellowish red silty clay and clay to a depth of 60 inches. Limestone bedrock is at a depth of 60 inches.

Included with these soils in mapping are areas where the surface layer is channery to very stony and areas that have a sandy clay loam surface layer and a sandy clay subsoil. Also included are small areas of Nolin, Murrill, and Clarksburg soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Opequon soil is moderate or moderately slow. Available water capacity is very low. Surface runoff is medium. The hazard of erosion is moderate. Depth to limestone bedrock is 12 to 20 inches on the Opequon soil but varies throughout the map unit. In unlimed areas the soil ranges from slightly acid to mildly alkaline throughout.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is medium. The hazard of erosion is moderate. Depth to bedrock is more than 40 inches on the Hagerstown soil. In unlimed areas the soil ranges from strongly acid to slightly acid in the surface layer and in the upper part of the subsoil and from strongly acid to neutral in the lower part of the subsoil.

Most areas of this map unit are used for pasture. A small acreage is cropped or wooded or in nonfarm uses.

This map unit is suited to cultivated crops. Because of rock outcrops, droughtiness, and a clayey surface layer it is not used extensively for cultivated crops. Stripcropping, conservation tillage, no-till, crop rotations, and cover crops help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer help to improve the condition of the soil and tilth.

This map unit is suited to pasture. Rock outcrops interfere with tillage operations during pasture renovation. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction occurs if this soil is grazed when wet. Proper stocking rates, rotational grazing, and restricted grazing when the soil is wet help to maintain the desired plant species and to control erosion. Best production requires maintaining fertility through periodic applications of nutrients.

This map unit is suited to woodland. Potential productivity is moderate on the Opequon soil and moderately high on the Hagerstown soil. Seedling mortality is high on the Opequon soil. Removing undesirable species will increase production. Trafficability is occasionally poor during wet periods in disturbed areas. Rock outcrops may interfere with planting equipment.

This map unit has limitations for nonfarm use. Depth to bedrock and moderate and moderately slow permeability are limitations for onsite waste disposal. Depth to bedrock and shrinking and swelling are limitations for buildings with or without basements.

The capability subclass for the Opequon and Hagerstown soils is IVs. The woodland ordination symbol is 3x on the Opequon soil and 4c on the Hagerstown soil.

OpC—Opequon-Hagerstown complex, 8 to 15 percent slopes, very rocky

This map unit consists of sloping, shallow to deep, well drained soils and areas of rock outcrop. It is on uplands and side slopes in limestone valleys. These soils were mapped together because they occur in an intricate pattern and could not be separated at the scale used for mapping. The shallow Opequon soil makes up 50 percent of the map unit, the deep Hagerstown soil makes up about 30 percent, and rock outcrop makes up 1 to 10 percent. Slopes are uniform to concave and range from 50 to 700 feet in length. Areas are irregular in shape and range from 2 to 100 acres.

Typically, the surface layer of the Opequon soil is reddish brown silty clay loam about 8 inches thick. The subsoil extends to a depth of 18 inches. It is yellowish red silty clay. Limestone bedrock is at a depth of about 18 inches.

Typically, the surface layer of the Hagerstown soil is

brown silty clay loam about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish red silty clay and clay. Limestone bedrock is at a depth of about 60 inches.

Included with these soils in mapping are areas of soils that have a flaggy to very stony surface layer and areas of soils that have a sandy clay loam surface layer and a sandy clay subsoil. Also included are areas where bedrock is 20 to 40 inches below the surface and small areas of Nolin, Murrill, and Clarksburg soils. Inclusions make up about 15 percent of the map unit.

Permeability in the Opequon soil is moderate or moderately slow. Available water capacity is very low. Surface runoff is rapid. The hazard of erosion is severe. Depth to limestone bedrock is 12 to 20 inches on the Opequon soil but varies throughout the map unit. In unlimed areas the soil ranges from slightly acid to mildly alkaline throughout.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches in areas of the Hagerstown soil. In unlimed areas the soil ranges from strongly acid to slightly acid in the surface layer and in the upper part of the subsoil and from strongly acid to neutral in the lower part of the subsoil.

Areas of this map unit are used for pasture. A small acreage is in cultivated crops, hay, trees, or nonfarm uses.

This map unit is suited to cultivated crops. Because of rock outcrops, droughtiness, and a clayey surface layer it is not used extensively for cultivated crops. Stripcropping, conservation tillage, no-till, crop rotations, and cover crops help to reduce runoff and to control erosion. Incorporating crop residue into the surface layer helps to improve soil condition and tilth.

This map unit is suited to pasture. Rock outcrops interfere with tillage operations during pasture renovation. Overgrazing and grazing when the soil is wet are major concerns. Surface compaction occurs if this soil is grazed when wet. Proper stocking rates, rotational grazing, and restricting grazing during wet seasons help to maintain the desired plant species and to control erosion. Best production requires maintaining fertility through periodic applications of nutrients.

This map unit is suited to woodland. Potential productivity is moderate on the Opequon soil and moderately high on the Hagerstown soil. Seedling mortality is high on the Opequon soil. Trafficability is occasionally poor during wet periods in disturbed areas. Rock outcrops may limit the use of planting equipment. Constructing logging roads on the contour can help to control erosion.

This map unit has limitations for nonfarm uses. Depth to bedrock and moderate and moderately slow permeability are limitations for onsite waste disposal. Depth to bedrock and shrinking and swelling are restrictions for buildings.

The capability subclass for the Opequon and Hagerstown soils is IVs. The woodland ordination symbol is 3x on the Opequon soil and 4c on the Hagerstown soil.

OpD—Opequon-Hagerstown complex, 15 to 25 percent slopes, very rocky

This map unit consists of moderately steep, shallow to deep, well drained soil and areas of rock outcrop. It is on side slopes on limestone uplands. These soils were mapped together because they are in an intricate pattern and could not be separated at the scale used for mapping. The shallow Opequon soil makes up 50 percent of the map unit, the deep Hagerstown soil makes up 25 percent, and rock outcrop makes up 1 to 10 percent. Slopes are uniform to convex and range from 50 to 600 feet in length. Areas are irregular or long and narrow and range from 2 to 150 acres.

Typically, the surface layer of the Opequon soil is reddish brown silty clay loam about 8 inches thick. The subsoil is yellowish red silty clay to a depth of 18 inches. Limestone bedrock is at a depth of about 18 inches.

Typically, the surface layer of the Hagerstown soil is brown silty clay loam about 7 inches thick. The subsoil is yellowish red silty clay and clay to a depth of 60 inches. Limestone bedrock is at a depth of 60 inches.

Included with these soils in mapping are areas that have a channery to very stony surface layer and areas that have a sandy clay loam surface layer and a sandy clay subsoil. Also included are areas where bedrock is 20 to 40 inches below the surface and small areas of Murrill, Clarksburg, and Nolin soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Opequon soil is moderate or moderately slow. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is 12 to 20 inches on the Opequon soil but is variable throughout the map unit. In unlimed areas the soil ranges from slightly acid to mildly alkaline throughout.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches on the Hagerstown soil. In unlimed areas the soil ranges from strongly acid to slightly acid in the surface layer and in the upper part of the subsoil and from strongly acid to neutral in the lower part of the subsoil.

Areas of this map unit are used for pasture, hayland, or woodland. A small acreage is in crops or nonfarm uses.

This map unit is not generally suited to cultivated crops because of moderately steep slopes, the hazard of erosion, and common rock outcrops. The soils can be safely used for cropland only where outcrops are small and intensive management is used to control erosion. Diversions, crop rotations, grassed waterways, conservation tillage, or no-till help to reduce runoff and to control erosion.

This map unit is suited to pasture. Overgrazing and grazing when the soil is wet are management concerns. Surface compaction occurs if this soil is grazed when wet. Applying plant nutrients as needed will increase production. Proper stocking rates, rotational grazing, and restricted grazing during wet seasons help to maintain pasture.

This map unit is suited to woodland. Potential productivity is moderate on the Opequon soil and moderately high on the Hagerstown soil. Seedling mortality is high on the Opequon soil. Trafficability is occasionally poor during wet periods in disturbed areas. Rock outcrops may limit the use of planting equipment. Building roads and trails on the contour helps to control erosion.

This map unit has limitations for most nonfarm uses. Depth to bedrock, slope, and moderate and moderately slow permeability are limitations for onsite waste disposal. Slope, shrinking and swelling, and depth to bedrock are restrictions for buildings. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Opequon and Hagerstown soils is IVs. The woodland ordination symbol is 3x on the Opequon soil and 4r on the Hagerstown soil.

OpE—Opequon-Hagerstown complex, 25 to 45 percent slopes, very rocky

This map unit consists of steep, shallow to deep, well drained soils and bedrock outcrops. It is on side slopes of limestone uplands. These soils were mapped together because they are in an intricate pattern and could not be separated at the scale used for mapping. The shallow Opequon soil makes up 50 percent of the map unit, the deep Hagerstown soil makes up 25 percent, and rock outcrops range from 5 to 10 percent. Slopes are uniform to convex and range from 50 to 800 feet in length. Areas are irregular or long and narrow and range from 3 to 125 acres.

Typically, the surface layer of the Opequon soil is reddish brown silty clay loam about 8 inches thick. The subsoil is yellowish red silty clay to a depth of 18 inches. Limestone bedrock is at a depth of about 18 inches.

Typically, the surface layer of the Hagerstown soil is brown silty clay loam about 7 inches thick. The subsoil is yellowish red silty clay and clay to a depth of 60 inches. Limestone bedrock is at a depth of 60 inches.

Included with these soils in mapping are areas of soils that have a channery to very stony surface layer or that have a sandy clay loam surface layer and a sandy clay subsoil. Also included are areas where bedrock is 20 to 40 inches below the surface and small areas of Murrill soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Opequon soil is moderate or moderately slow. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is 12 to 20 inches in areas of the Opequon soil but is variable throughout the map unit. In unlimed areas the soil ranges from slightly acid to mildly alkaline throughout.

Permeability in the Hagerstown soil is moderate or moderately rapid. Available water capacity is high. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches in areas of the Hagerstown soil. In unlimed areas the soil ranges from strongly acid to slightly acid in the surface layer and in the upper part of the subsoil and from strongly acid to neutral in the lower part of the subsoil.

Areas of this map unit are in woodland, unimproved pasture, or nonfarm uses.

This map unit is not suited to cultivated crops or pasture because of slope, the hazard of erosion, and rock outcrops.

This map unit is suited to woodland. Potential productivity is moderate on the Opequon soil and moderately high on the Hagerstown soil. Removing undesirable species will increase production. Slope and rock outcrops are limitations for planting and harvesting equipment. Constructing logging roads on the contour helps to control erosion.

This soil has limitations for most nonfarm uses. Slope, depth to bedrock, and moderate and moderately slow permeability are limitations for onsite waste disposal. Slope, depth to bedrock, and shrink-swell potential are limitations on sites for buildings. If the soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Opequon and Hagerstown soils is VIIe. The woodland ordination symbol is 3r on the Opequon soil and 4r on the Hagerstown soil.

PeB—Penlaw silt loam, 0 to 8 percent slopes

This soil is nearly level and gently sloping, deep or very deep, and somewhat poorly drained. It is on concave foot slopes in or near limestone uplands. Slopes are concave and range from 50 to 600 feet in length. Areas are irregular in shape and range from 2 to 60 acres.

Typically, the surface layer is brown to dark brown silt loam about 9 inches thick. The subsoil extends to a depth of 63 inches thick. It is mottled, brownish yellow silt loam in the upper part and yellowish brown silty clay loam in the middle part. The lower part is a fragipan that is mottled, strong brown and light yellowish brown channery silty clay loam.

Included with this soil in mapping are small areas of moderately well drained Clarksburg and Buchanan soils. Also included are some areas where some layers have a clay texture. Also included are some places where the surface layer is thicker and the substratum contains many pebbles and cobbles. Also included are some small areas of poorly drained soils. Inclusions make up about 25 percent of the map unit.

Permeability in the Penlaw soil is moderate above the fragipan and slow within it. Available water capacity is high. Surface runoff is slow or medium. The hazard of erosion is moderate. A seasonal high water table is at a depth of 6 to 18 inches in wet seasons. The high water table and the fragipan restrict the root zone to the upper 24 inches. A few areas may be subject to brief ponding. In unlimed areas the soil ranges from moderately acid to neutral throughout.

Most areas are used for cultivated crops, hayland, pasture, or woodland. Some areas are in nonfarm uses.

This soil is suited to cultivated crops. The seasonal high water table is a serious limitation for some plants and tillage practices. If suitable outlets are available, subsurface drains can be installed to improve drainage and to allow increased production of most field crops. Stripcropping, conservation tillage, use of cover crops, and grassed waterways help to control erosion and to reduce runoff.

This soil is suited to pasture. Restricted grazing when the soil is wet will prevent surface compaction and damage to plant stands. Rotational grazing and proper stocking rates help to maintain pasture production. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. The seasonal high water table is a limitation for harvesting and machine planting. The fragipan and the seasonal high water table increase the windthrow hazard by restricting rooting depth. Removing undesirable species will increase production. Machine planting is generally practical in the larger areas.

This soil has limitations for nonfarm use. The seasonal high water table and slow permeability are limitations for onsite waste disposal and buildings. If buildings with basements are constructed on this soil, foundation drains with proper outlets should be used to prevent seepage of water into the basements.

The capability subclass is IIIw. The woodland ordination symbol is 4w.

Ph—Philo silt loam

This nearly level, deep and very deep, moderately well drained soil is on wide to narrow flood plains. Areas are long and narrow and range from 3 to 120 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is brown to dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 32 inches. It is brown silt loam in the upper part and brown, mottled silt loam in the lower part. The substratum to a depth of 60 inches is light brownish gray, mottled cobbly sandy loam.

Included with this soil in mapping are areas of Pope and Atkins soils. Also included are some areas where the surface layer is gravelly loam or sandy loam. Also included are some areas adjacent to uplands that are poorly drained and that have more clay in the subsoil. Inclusions make up about 20 percent of the map unit.

Permeability in the Philo soil is moderate in the upper part and moderately rapid in the underlying layers of gravel. Available water capacity is moderate. Surface runoff is very slow. The hazard of erosion is slight. This soil is subject to occasional flooding. A seasonal high water table is at a depth of 18 to 36 inches in wet seasons. Unless limed, the soil is moderately acid to very strongly acid throughout.

Most areas of the Philo soil are used for cropland, hayland, or pasture. A small acreage is wooded.

This soil is well suited to cropland. Growing cover crops, utilizing crop residue, and including grasses and legumes in the cropping system help to maintain the content of organic matter and the good condition of the soil. Cover crops help to protect the soil from scouring during flooding. Improving drainage allows more timely planting.

This soil is suited to hay or pasture. Limitations are few. Keeping natural drainageways open helps to remove excess surface runoff. Draining wet spots lengthens the pasture season and allows more timely field operations. Rotational grazing and proper stocking rates help to maintain pasture production.

This soil is suited to woodland. Potential productivity is moderately high. The seasonal high water table and flooding interfere with equipment use during wet periods.

Removing undesirable species will increase production. Machine planting is practical in larger areas.

Flooding and the seasonal high water table are the main limitations for nonfarm use, especially as a site for septic tank absorption fields or buildings with basements.

The capability subclass is IIw. The woodland ordination symbol is 4w.

Pm—Pits and Quarries

Areas mapped as pits and quarries are open excavations from which sand, gravel, sandstone, and limestone have been or are being removed. Materials from these pits are used for crushed stone, roads, construction materials, and lime. The soil surrounding the pits reflects the material being excavated from a particular area. Most pits have high walls where bedrock is exposed. Erosion and slumping has left a thin layer of sediments on the pit floor. Sometimes, the pit floor is wet and has small ponded areas or streams running through it. Slopes range from about 2 to 80 percent.

Pits are not suited to any type of farming. They are exploited for the material underlying the soils. In some areas they are suited to woodland, wildlife habitat, or recreation areas. Because they are variable, onsite investigations are needed to determine suitability for use. In some areas pits and quarries are hazardous because of rockfalls and landslides. Revegetating surface mined areas helps to stabilize the soil material and to control erosion.

The capability subclass is VIIIs. This map unit was not assigned a woodland ordination symbol.

Pp—Pope fine sandy loam

This soil is nearly level, very deep, and well drained. It is on flood plains. Areas are long and narrow and range from 4 to 170 acres. Slopes range from 0 to 3 percent.

Typically, this soil has a dark grayish brown fine sandy loam surface layer about 9 inches thick. The subsoil extends to a depth of 48 inches. It is light yellowish brown fine sandy loam in the upper part and strong brown fine sandy loam in the lower part. The substratum is yellowish brown sandy loam to a depth of 62 inches.

Included with this soil in mapping are small areas that are gravelly throughout. Also included are areas of Philo and Atkins soils. Some areas of this map unit have small, closed depressions that are sometimes ponded. Inclusions make up about 10 percent of the map unit.

Permeability in the Pope soil is moderate or moderately rapid. Available water capacity is moderate. Surface runoff is slow. The hazard of erosion is slight. Depth to a water table is more than 72 inches. This soil is subject to occasional flooding. Unless limed, the soil is strongly acid to extremely acid throughout.

This soil is in crops, hay, pasture, trees, or some nonfarm uses.

This soil is well suited to cultivated crops. Cover crops help to protect the soil from scouring during flooding and stabilize the soil in winter. Utilizing crop residue and including grasses and legumes in the cropping system help to maintain the content of organic matter and the good condition of the soil.

This soil is suited to pasture. Proper stocking rates to maintain desirable plant species and rotational grazing are suitable management practices. Additions of lime and fertilizer as needed help to maintain productivity.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase production. Machine planting is practical in larger areas.

Flooding is the main limitation of the soil for nonfarm uses, especially for onsite waste disposal and homesites.

The capability subclass is IIw. The woodland ordination symbol is 4r.

Ps—Purdy silty clay loam, 0 to 3 percent slopes

This soil is nearly level, very deep, and poorly drained. It is on broad flats and low terraces. Areas are irregular in shape and range from 3 to 200 acres.

Typically, the surface layer is dark grayish brown silty clay loam about 8 inches thick. The subsoil extends to a depth of 40 inches. It is mottled, grayish brown silty clay in the upper part and mottled, gray silty clay in the lower part. The substratum to a depth of 60 inches is mottled light brownish gray gravelly silty clay loam.

Included with this soil in mapping are small areas of Brinkerton soils. Also included, in shallow depressions, are soils that are similar to the Purdy soil but that are very poorly drained. Also included, in limestone areas, are soils that are similar to the Purdy soil but that are neutral throughout. Also included are a few areas that are subject to brief flooding and some areas that are better drained than the Purdy soil and that have a gravelly loam or gravelly silt loam surface layer. Inclusions make up about 20 percent of the map unit.

Permeability in the Purdy soil is very slow or slow. Available water capacity is high. Surface runoff is slow. The hazard of erosion is slight. A seasonal high water table is at or near the surface in wet seasons. Some parts of the map unit are generally ponded during wet seasons. Where unlimed, the soil is strongly acid to extremely acid throughout.

Most areas are used for cropland, hayland, pasture, or woodland. A few areas are in nonfarm uses.

This soil is suited to cropland. Because of the seasonal high water table and a high clay content, careful management is needed to maintain or improve soil condition. Timely field operations are difficult because of wetness. If the soil is worked when wet, it may form large hard clods when dry. In some areas fall plowing helps the surface to dry more quickly in spring and allow freeze-thaw cycles to break up large clods. Subsurface drains may be beneficial on this soil. Drainage also can be improved by a series of open ditches if suitable outlets are available.

This soil is suited to pasture. Grasses and legumes that tolerate wetness should be planted. Restricted grazing when the soil is wet will prevent surface compaction and damage to plant stands. Proper stocking rates and rotational grazing help to maintain the desired plant species and the good condition of the soil. Periodic applications of plant nutrients help to maintain production.

This soil is suited to woodland. Potential productivity is moderately high. The seasonal high water table is sometimes a limitation when harvesting trees and establishing stands. It also increases the windthrow hazard by restricting rooting depth. Machine planting is practical in larger areas.

This soil has limitations for most nonfarm uses. The seasonal high water table and slow permeability are limitations on sites for septic tank absorption fields and buildings.

The capability subclass is IVw. The woodland ordination symbol is 4w.

TgA—Tyler silt loam, 0 to 3 percent slopes

This soil is nearly level, very deep, and somewhat poorly drained. It is on low stream terraces and in depressions. Slopes are uniform to slightly concave and range from 100 to 700 feet in length. Areas are long and narrow or irregular in shape and range from 3 to 125 acres.

Typically, this soil has a grayish brown silt loam surface layer about 9 inches thick. The subsoil extends to a depth of 50 inches. It is mottled pale brown silty clay loam to a depth of 19 inches. Below that, it is firm, brittle, mottled, strong brown, yellowish brown, and gray silty clay loam. The substratum to a depth of 60 inches is mottled light gray to gray gravelly clay loam.

Included with this soil in mapping are areas of Monongahela and Purdy soils. Also included are a few small areas that have a gravelly surface layer. Inclusions make up about 10 percent of the map unit.

Permeability in the Tyler soil is moderate or moderately slow above the fragipan and very slow or slow within it. Available water capacity is moderate. Surface runoff is slow. In wet months water is ponded in a few small closed depressions. A seasonal high water table is at a depth of 6 to 18 inches in wet seasons. The seasonal high water table and the fragipan restrict the root zone to the upper 24 inches. In unlimed areas the soil ranges from strongly acid or very strongly acid throughout.

This soil is used for cultivated crops, hay, or pasture. Some areas are wooded.

This soil is suited to cropland. Subsurface drainage is beneficial, particularly in the small, closed depressions in this map unit. Subsurface drains will help lower the seasonal high water table, allow for earlier field operations, and make the soil more suited to some crops (fig. 13). Crop residue management and winter cover crops are also needed to minimize surface crusting and to protect the soil when it is usually bare.

This soil is suited to pasture. Grasses and legumes that tolerate wetness are suitable for planting. Proper stocking rates and rotational grazing help to keep the pasture and the soil in good condition. Restricted grazing during wet periods help to prevent soil compaction and damage to plant stands. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. The seasonal high water table and wetness may delay forestry operations during wet periods. Tree rooting depth is restricted by the fragipan and the seasonal high water table. Removing undesirable species will increase production. Machine planting is practical in larger areas.

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

The capability subclass is IIIw. The woodland ordination symbol is 4d.

TgB—Tyler silt loam, 3 to 8 percent slopes

This soil is gently sloping, very deep, and somewhat poorly drained. It is on low stream terraces. Slopes are uniform to slightly concave and range from 50 to 400 feet in length. Areas are long and narrow or irregular in shape and range from 3 to 50 acres.

Typically, this soil has a grayish brown silt loam surface layer about 9 inches thick. The subsoil extends to a depth of 50 inches. It is mottled pale brown silty clay loam to a depth of 19 inches. Below that, it is firm, brittle, mottled strong brown, yellowish brown, and gray silty clay loam. The substratum to a depth of 60 inches is mottled, light gray to gray gravelly clay loam.

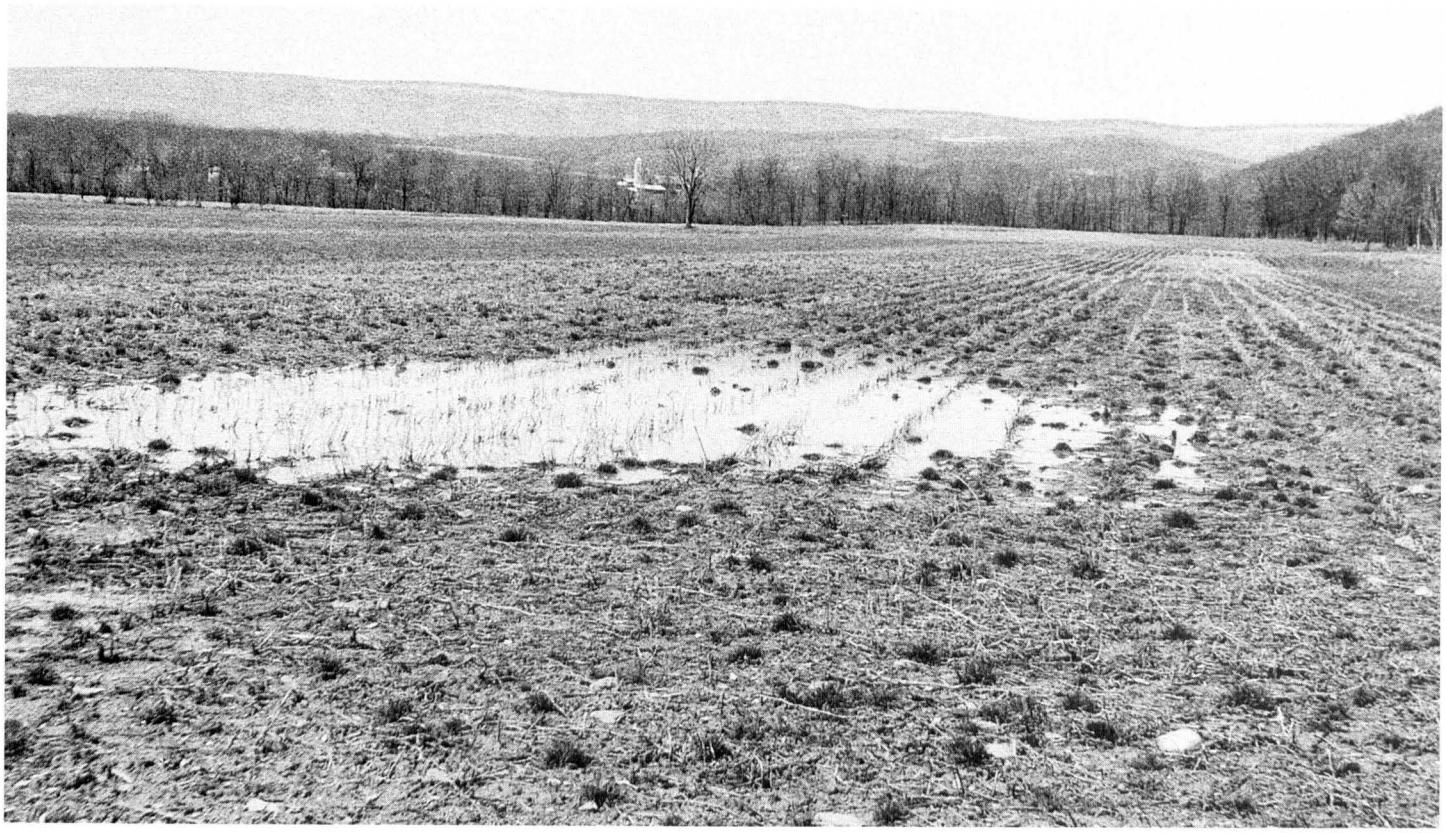

Figure 13.—Subsurface drainage is needed to prevent ponding in an area of Tyler silt loam, 0 to 3 percent slopes.

Included with this soil in mapping are areas of Brinkerton, Monongahela, and Purdy soils. Also included are some areas that have a gravelly surface layer. Inclusions make up about 10 percent of the map unit.

Permeability in the Tyler soil is moderate and moderately slow above the fragipan and very slow or slow within it. Available water capacity is moderate. Surface runoff is medium. The hazard of erosion is moderate. A seasonal high water table is at a depth of 6 to 18 inches in wet seasons. The seasonal high water table and the fragipan restrict the root zone to the upper 24 inches. In unlimed areas the soil is strongly acid or very strongly acid throughout.

This soil is used for cultivated crops, hayland, or pasture. Small areas are in trees or nonfarm uses.

This soil is suited to cultivated crops. In most years wetness delays field operations. Subsurface drains can be used to lower the water table, increase the rooting depth, and increase yields. Stripcropping, conservation tillage, cover crops, grassed waterways, and crop residue management help to reduce runoff and to control erosion. Species that tolerate wetness are suitable for planting.

This soil is suited to pasture. Grasses and legumes that tolerate wetness are suitable for planting. Proper stocking rates and rotational grazing help to keep the pasture and the soil in good condition. Restricted grazing when the soil is wet will prevent surface compaction and damage to plant stands. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. The seasonal high water table and wetness will delay forestry operations in wet seasons. Tree rooting depth is restricted because of the fragipan and the seasonal high water table. Removing undesirable species will increase production. Machine planting is practical in larger areas.

This soil has significant limitations for most nonfarm uses. The seasonal high water table and slow permeability are limitations on sites for sanitary facilities and building site development.

The capability subclass is IIIe. The woodland ordination symbol is 4d.

Ue—Udorthents, loamy

This map unit consists of loamy to very stony areas of miscellaneous earthy fill material that has been placed on

poorly drained to well drained soils. Other areas have been excavated for building sites, roadfill, or other construction fill material. Slopes range from 3 to 70 percent in cut areas and from 0 to 35 percent in fill areas. Areas are irregular in shape and range from 5 to 240 acres. The surface layer ranges from channery to extremely stony.

Typically, Udorthents have a brown to dark brown loamy surface layer about 4 inches thick. The substratum to a depth of 60 inches is yellowish brown to reddish brown clay loam.

Miscellaneous earthy fill makes up about 40 percent of the map unit and cut areas make up 30 percent. Exposed bedrock makes up 10 percent of the map unit. The rest consists of such material as building rubbish, trash, and cinders.

Permeability and available water capacity in Udorthents, loamy, are variable. Ponding is possible in some level or depressional, highly compacted areas. Runoff is variable, but in most areas the hazard of erosion is severe. Depth to bedrock or to the seasonal high water table in wet seasons is variable. In unlimed areas the soil ranges from extremely acid to neutral throughout.

Most areas are used for building sites. Some areas are idle. Without reclamation, most idle areas are not suited to cultivated crops or pasture. Vegetation is needed to control erosion in idle areas.

This map unit has variable potential productivity for woodland. Because of the poor physical condition, acidity, droughtiness, and slope of this soil, vegetation is difficult to establish.

Because of the variability of these areas, onsite investigations are needed to determine suitability for nonfarm use.

The capability subclass is VIIe. This map unit was not assigned a woodland ordination symbol.

UgF—Ungers-Lehew complex, 35 to 60 percent slopes, very stony

This very steep map unit consists of the deep or very deep, well drained Ungers soil and the moderately deep, well drained Lehew soil. It is on the upper side slopes of mountain ridges. Slopes are uniform to convex and range from 200 to 800 feet in length. Areas are elongated or irregular in shape and range from 5 to 300 acres. These soils were mapped together because they occur in an intricate pattern and could not be separated at the scale used for mapping. Large stones cover 0.1 to 3 percent of the surface. The mapped acreage of this unit is about 60 percent Ungers soil and 30 percent Lehew soil.

Typically, the Ungers soil has a very dark gray channery silt loam surface layer about 2 inches thick and a reddish brown channery loam subsurface layer about 6 inches thick. The subsoil extends to a depth of 36 inches. It is reddish brown channery loam to a depth of 18 inches. Below that it is dark reddish brown channery loam. The substratum to a depth of 62 inches is reddish brown very channery loam. Fine grained, red sandstone, siltstone, and shale is at a depth of 62 inches.

Typically, the Lehew soil has a dark gray channery sandy loam surface layer about 2 inches thick and dark reddish brown, very channery sandy loam subsurface layer about 4 inches thick. The subsoil is reddish brown very channery loam to a depth of 30 inches. Fractured reddish brown shale and sandstone bedrock is at a depth of 36 inches.

Included with these soils in mapping are small areas of Hazleton and Meckesville soils. Also included are areas of rock outcrops. Inclusions make up about 10 percent of this map unit.

Permeability is moderate in the Ungers soil and moderately rapid or rapid in the Lehew soil. Available water capacity moderate in the Ungers soil and low in the Lehew soil. On both soils surface runoff is very rapid and the hazard of erosion is severe. Depth to bedrock ranges to more than 40 inches in the Ungers soil and from 20 to 40 inches in the Lehew soil. In unlimed areas the Ungers soil is extremely acid to strongly acid throughout. In unlimed areas the Lehew soils is very strongly acid or strongly acid throughout.

Most areas of this map unit are wooded. This map unit is not suited to cropland or pasture because of slope.

This map unit is suited to woodland. Potential productivity is moderate. Building roads and trails on the contour helps to control erosion. Removing undesirable species increases the water available to the more desirable trees. Slope and large stones are limitations to use of equipment and roadbuilding.

Slope and depth to bedrock are the main limitations for most nonfarm uses, especially for septic tank absorption fields and homesites. If these soils are disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Ungers and Lehew soils is VIIs. The woodland ordination symbol for both soils is 3r.

VdF—Vanderlip-Rock outcrop complex, 35 to 60 percent slopes

This map unit consists of steep and very steep, very deep, and somewhat excessively drained Vanderlip soil and areas of Rock outcrop. It is on the upper side slopes of minor intermountain ridges. Slopes are uniform and range from 100 to 800 feet in length. Areas are long and

narrow and range from 5 to 300 acres. The Vanderlip soil and Rock outcrop are in an intricate pattern and could not be separated at the scale used for mapping. The Vanderlip soil makes up about 60 percent of the map unit. Rock outcrop makes up about 20 percent.

Typically, the Vanderlip soil has a dark gray loamy sand surface layer about 3 inches thick and a light yellowish brown loamy sand subsurface layer to a depth of 20 inches. The subsoil extends to a depth of 60 inches. It is brownish yellow and yellowish brown loamy sand in the upper part and very pale brown sand that has streaks of yellowish brown loamy sand in the lower part. The substratum to a depth of 72 inches is yellowish brown gravelly sand.

Rock outcrop consists of areas where sandstone bedrock crops out on the surface.

Included in this map unit are areas of soils that are similar to the Vanderlip soil but that are 10 to 40 inches deep over bedrock. Also included are some areas of Mertz and Buchanan soils and areas of soils that have slope of 8 to 35 percent. Inclusions make up about 20 percent of the map unit.

Permeability in the Vanderlip soil is rapid. Available water capacity is low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock varies, but on the Vanderlip soil it is more than 60 inches. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

Areas of this map unit are used for woodland or wildlife habitat. It is not suited to farming because of slope, low available water capacity, rock outcrops, and large stones.

This map unit is suitable for woodland. Potential productivity is moderate. Major limitations for equipment use and road construction are slope, large stones, and rock outcrops. Constructing logging roads on the contour helps to control erosion.

This map unit has limitations for most nonfarm uses. Slope and rapid permeability are the main limitations for septic systems. Slope limits buildings and roads. In some areas this soil and the underlying bedrock are used as a source of sand and silica. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Vanderlip soil is VIIs. The woodland ordination symbol for the Vanderlip soil is 3r.

WkC—Weikert channery silt loam, 8 to 15 percent slopes

This soil is sloping, shallow, and well drained. It is on the tops and side slopes of hills and minor ridges. Slopes are convex and range from 100 to 400 feet in length. Areas are narrow or irregular in shape and range from 2 to 70 acres.

Typically, this soil has a very dark grayish brown channery silt loam surface layer about 2 inches thick and a subsurface layer of light yellowish brown very channery silt loam to a depth of 5 inches. The subsoil extends to a depth of 18 inches. It is yellowish brown very channery silt loam. Light olive brown shale and siltstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are some areas of soils that have slope of 0 to 8 percent. Also included are areas of Berks, Brinkerton, and Ernest soils. Inclusions make up about 25 percent of the map unit.

Permeability in the Weikert soil is moderately rapid. Available water capacity is very low. Surface runoff is rapid. The hazard of erosion is severe. Bedrock at a depth of 10 to 20 inches restricts rooting depth. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

Areas of this soil are in crops, pasture, trees, or nonfarm uses.

This soil is suited to cropland. Droughtiness is a limitation. Practices to increase the content of organic matter include winter cover crops, close-growing sod crops, additions of manure, and crop residue management. Stripcropping, conservation tillage, no-till, grassed waterways, and crop rotations that include close-growing grasses and legumes help to control erosion and to reduce runoff.

This soil is suited to pasture. Production decreases during droughty periods. Proper stocking rates, rotational grazing, brush and weed control, and periodic applications of lime and fertilizer help to maintain the desired species and to increase production.

This soil is suited to woodland. Potential productivity is moderate. The very low available water capacity causes a high rate of seedling mortality. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Machine planting generally is practical in large areas.

Depth to bedrock is the main limitation of the soil for nonfarm use, especially as sites for septic tank absorption fields and buildings with basements.

The capability subclass is IVe. The woodland ordination symbol is 3d.

WkD—Weikert channery silt loam, 15 to 25 percent slopes

This soil is moderately steep, shallow, and well drained. It is on the side slopes of hills and minor ridges. Slopes are convex and range from 50 to 600 feet in length. Areas

are long and narrow or irregular in shape and range from 3 to 50 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 2 inches thick. The subsurface layer, to a depth of 5 inches, is light yellowish brown very channery silt loam. The subsoil is yellowish brown very channery silt loam to a depth of 18 inches. Light olive brown shale and siltstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are areas of Berks, Brinkerton, and Ernest soils. Also included are areas of soils that have slope of less than 15 percent. Inclusions make up about 20 percent of the map unit.

Permeability in the Weikert soil is moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Bedrock at a depth of 10 to 20 inches restricts rooting depth. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

Areas of this soil are used for hayland, pasture, cropland, or woodland. Some areas are in nonfarm uses.

This soil is not well suited to cropland because of very low available water capacity and severe hazard of erosion. Stripcropping, conservation tillage, no-till, grassed waterways, cover crops, and crop rotations that include close-growing grasses and legumes help to control erosion and to reduce runoff.

This soil is suited to pasture, but droughtiness keeps productivity low. Proper stocking rates and rotational grazing help to maintain the desired species and to control erosion. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderate. The very low available water capacity causes a high rate of seedling mortality. Removing undesirable species increases the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Slope limits use of equipment, but machine planting generally is practical in large areas.

Depth to bedrock and slope limit this soil for most nonfarm uses, including septic systems and buildings with basements. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIe. The woodland ordination symbol is 3d.

WkE—Weikert channery silt loam, 25 to 35 percent slopes

This soil is steep, shallow, and well drained. It is on the side slopes of minor ridges and knob-like hills. Slopes are uniform to convex and range from 100 to 800 feet in length. Areas are irregular in shape and range from 3 to 1,000 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 2 inches thick. The subsurface layer, to a depth of 5 inches, is light yellowish brown very channery silt loam. The subsoil extends to a depth of 18 inches. It is yellowish brown very channery silt loam. Light olive brown shale and siltstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are some narrow areas of soils that have slope of 3 to 15 percent. Also included are areas of Brinkerton, Atkins, and Blairton soils. Also included are some areas of soils that are similar to this Weikert soil but that are moderately deep or deep over bedrock. Inclusions make up about 20 percent of the map unit.

Permeability in the Weikert soil is moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is 10 to 20 inches. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

This soil is used for woodland, recreation, or wildlife habitat. It is not suited to cropland or pasture because of slope, very low available water capacity, and shallowness to bedrock.

This soil is suited to woodland. Potential productivity is moderate. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Slope limits the use of equipment and makes machine planting generally impractical.

This soil has limitations for most nonfarm uses. Depth to bedrock and slope are limitations for homesites, excavations, and septic tank absorption fields. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIIe. The woodland ordination symbol is 3d.

WkF—Weikert channery silt loam, 35 to 65 percent slopes

This soil is very steep, shallow, and well drained. It is on the side slopes of minor ridges and knob-like hills. Slopes are uniform to convex and range from 100 to 800 feet in length. Areas are irregular in shape and range from 5 to 900 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 2 inches thick. The subsurface layer, to a depth of 5 inches, is light yellowish brown very channery silt loam. The subsoil extends to a depth of 18 inches. It is yellowish brown very channery silt loam. Light olive brown shale and siltstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are some areas of soils that have slope of 3 to 25 percent. Also included are areas of Brinkerton, Atkins, and Blairton soils. Also included on the same landscape are areas of soils that are similar to this Weikert soil but that are moderately deep or deep over bedrock. Inclusions make up about 20 percent of the map unit.

Permeability in the Weikert soil is moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. Depth to bedrock is 10 to 20 inches. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

This soil is used for woodland, recreation, or wildlife habitat. It is not suited to cropland or pasture because of slope, very low available water capacity, and shallowness to bedrock.

This soil is suited to woodland. Potential productivity is moderate. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Slope limits the use of equipment and makes machine planting generally impractical.

This soil has limitations for most nonfarm uses. Depth to bedrock and slope are limitations for homesites, excavations, and septic tank absorption fields. If it is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIIe. The woodland ordination symbol is 3r.

WlF—Weikert very flaggy silt loam, 25 to 60 percent slopes

This soil is steep to very steep, shallow, and well drained. It is on the upper side slopes of ridges. Slopes are uniform to convex and range from 50 to 600 feet in length. Areas are long and narrow and range from 3 to 100 acres.

Typically, this soil has a very dark grayish brown very flaggy silt loam surface layer about 2 inches thick and a light yellowish brown very flaggy silt loam subsurface layer about 3 inches thick. The subsoil extends to a depth of 18 inches. It is yellowish brown very channery silt loam. Light olive brown shale, siltstone, and sandstone bedrock is at a depth of 18 inches.

Included with this soil in mapping are some areas of soils that have slope of 8 to 25 percent. Also included are some areas where depth to bedrock is more than 18 inches. Rock outcrops are common in some areas. Inclusions make up about 20 percent of the map unit.

Permeability in the Weikert soil is moderately rapid. Available water capacity is very low. Surface runoff is very rapid. The hazard of erosion is severe. This soil is 10 to 20 inches deep to shale, siltstone, or thin-bedded sandstone bedrock. In unlimed areas the soil ranges from moderately acid to very strongly acid throughout.

Most areas of this soil are wooded. This soil is not suited to cropland or pasture because of slope and large, flat stones that cover the surface.

This soil is suited to woodland. Potential productivity is moderate. Removing undesirable species will increase the water available to the more desirable trees. Constructing logging roads on the contour helps to control erosion. Slope limits the use of equipment and makes machine planting generally impractical.

This soil is not suited to most nonfarm uses because of slope and depth to bedrock.

The capability subclass is VIIs. The woodland ordination symbol is 3r.

WsB—Westmoreland channery silt loam, 3 to 8 percent slopes

This soil is gently sloping, deep or very deep, and well drained. It is are on side slopes and hilltops in limestone valleys. Slopes are uniform to convex and range from 100 to 600 feet in length. Areas are irregular or elongated and range from 3 to 30 acres.

Typically, this soil has a brown channery silt loam surface layer about 10 inches thick. The subsoil extends to a depth of 28 inches. It is yellowish brown channery silt loam to a depth of 16 inches and strong brown channery silty clay loam below. The substratum to a depth of 50 inches is light olive brown very channery silty clay loam. Calcareous shale is at a depth of 50 inches.

Included in mapping are some areas of soils that are similar to this Westmoreland soil but that are moderately deep or shallow over bedrock. Also included are areas of Berks, Weikert, and Edom soils. Inclusions make up about 25 percent of the map unit.

Permeability in the Westmoreland soil is moderate. Available water capacity is moderate. Runoff is medium. The hazard of erosion is moderate. In unlimed areas the soil ranges from very strongly acid to moderately acid in the subsoil and is strongly acid or moderately acid in the substratum.

Most areas are used for cultivated crops, hayland, or pasture. A few areas are in trees or nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, no-till, conservation tillage, grassed waterways, and use of cover crops help to reduce runoff and to control erosion. Utilizing crop residue and including grasses and legumes in the cropping system help to maintain the content of organic matter and the good condition of the soil.

This soil is suited to pasture. Overgrazing is a major management concern. Stocking rates to maintain key plant species, rotational grazing, and periodic applications of nutrients are suitable management practices.

This soil is suited to trees. Potential productivity is moderately high. Removing undesirable species will increase production. Management problems are few. Machine planting is practical in larger areas.

This soil has limitations for nonfarm uses. Depth to bedrock and moderate permeability are limitations on sites for septic tank absorption fields. Depth to bedrock is a limitation on sites for buildings with basements.

The capability subclass is IIe. The woodland ordination symbol is 4a.

WsC—Westmoreland channery silt loam, 8 to 15 percent slopes

This soil is sloping, deep or very deep, and well drained. It is on side slopes in limestone valleys. Slopes are uniform to convex and range from 100 to 800 feet in length. Areas are irregular or rounded in shape and range from 2 to 60 acres.

Typically, this soil has a brown channery silt loam surface layer about 8 inches thick. The subsoil extends to a depth of 28 inches. It is yellowish brown channery silt loam to a depth of 16 inches. Below that, it is strong brown channery silty clay loam. The substratum to a depth of 50 inches is light olive brown very channery silty clay loam. Calcareous shale is at a depth of 50 inches.

Included with this soil in mapping are many areas of soils that are similar to the Westmoreland soil but that are moderately deep or shallow over bedrock. Also included are areas of Berks, Weikert, and Edom soils. Inclusions make up about 25 percent of the map unit.

Permeability in the Westmoreland soil is moderate. Available water capacity is moderate. Runoff is rapid. The hazard of erosion is severe. In unlimed areas the soil ranges from very strongly acid to moderately acid in the subsoil and is strongly acid or moderately acid in the substratum.

Most areas are used for cultivated crops, hayland, or pasture. Some areas are in trees or nonfarm uses.

This soil is suited to cultivated crops. Stripcropping, no-till, conservation tillage, grassed waterways, and use of cover crops help to reduce runoff and to control erosion. Utilizing crop residue and including grasses and legumes in the cropping system help to maintain the content of organic matter and the good condition of the soil.

This soil is suited to pasture. Overgrazing is a major concern in managing pasture. Some suitable management practices are proper stocking rates to maintain key plant species, rotational grazing, and periodic application of nutrients.

This soil is suited to trees. Potential productivity is moderately high. Management problems are few. Removing undesirable species will increase production. Machine planting is practical in larger areas.

This soil has limitations for nonfarm uses. Slope, depth to bedrock, and moderate permeability are limitations on sites for sanitary facilities. Depth to bedrock and slope are limitations for excavations and buildings with basements.

The capability subclass is IIIe. The woodland ordination symbol is 4a.

WsE—Westmoreland channery silt loam, 25 to 35 percent slopes

This soil is steep, deep or very deep, and well drained. It is on side slopes and minor ridges in limestone valleys. Slopes are uniform to convex and range from 200 to 800 feet in length. Areas are irregular in shape and range from 2 to 80 acres.

Typically, this soil has a brown channery silt loam surface layer about 6 inches thick. The subsoil extends to a depth of 28 inches. It is yellowish brown channery silt loam to a depth of 18 inches. Below that, it is strong brown channery silty clay loam. The substratum to a depth of 50 inches is light olive brown very channery silty clay loam. Calcareous shale is at a depth of 50 inches.

Included with this soil in mapping are many areas of soils that are similar to the Westmoreland soil but that are moderately deep or shallow over bedrock. Also included are areas of Berks, Weikert, and Edom soils. Inclusions make up about 20 percent of the map unit.

Permeability in the Westmoreland soil is moderate. Available water capacity is moderate. Surface runoff is very rapid. The hazard of erosion is severe. In unlimed areas the soil ranges from very strongly acid to moderately acid in the subsoil and is strongly acid or moderately acid in the substratum.

This soil is used for woodland, pasture, or hayland. It is not suited to cropland because of slope. Some areas used for permanent hay cannot be easily managed because of slope.

This soil is suited to pasture. Rotational grazing, proper stocking rates to avoid overgrazing, especially during dry periods, and weed and brush control help to reduce runoff and to improve plant stands. Applying plant nutrients as needed helps to maintain good plant stands.

This soil is suited to woodland. Potential productivity is moderately high. Slope is a limitation in the use of equipment for harvesting and planting. Constructing logging roads and trails on the contour helps to prevent excessive erosion. Removing undesirable species increases moisture available to the more desirable trees.

Slope is the main limitation for most nonfarm uses. If this soil is disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass is VIe. The woodland ordination symbol is 4r.

WwD—Westmoreland-Klinesville complex, 15 to 25 percent slopes

This complex consists of the moderately steep areas of the deep or very deep, well drained Westmoreland soil and the shallow, well drained Klinesville soil. It is on minor ridges and side slopes of hills in limestone valleys. Slopes are uniform to convex and range from 100 to 800 feet in length. Areas are irregular in shape and range from 2 to 125 acres. These soils occur together in an irregular pattern or in such small areas and could not be separated at the scale used for mapping. The soils are derived from olive, calcareous shale and siltstone and red, acid siltstone and shale. Stones cover 0.1 to 3 percent of the surface in areas of the Klinesville soil. The Westmoreland soil makes up about 60 percent of the complex and the Klinesville soil makes up about 20 percent. The Klinesville soil is in some areas.

Typically, the Westmoreland soil has a brown channery silt loam surface layer about 8 inches thick. The subsoil extends to a depth of 28 inches. It is yellowish brown channery silt loam to a depth of 16 inches. Below that, it is strong brown channery silty clay loam. The substratum to a depth of 50 inches is light olive brown very channery silty clay loam. Calcareous shale bedrock is at a depth of 50 inches.

Typically, the Klinesville soil has a surface layer of dark reddish brown channery silt loam about 6 inches thick. The subsoil is reddish brown channery silt loam to a depth of 18 inches. Shale and siltstone bedrock is at a depth of 18 inches.

Included with these soils in mapping are areas where red siltstone or sandstone crops out in thin bands. Also included are areas of Edom, Weikert, Berks, and Wharton soils. Inclusions make up about 20 percent of the map unit.

Permeability is moderate in the Westmoreland soil and moderately rapid in the Klinesville soil. Available water capacity is moderate in the Westmoreland soil and very low in the Klinesville soil. On both soils runoff is very rapid and the hazard of erosion is severe. Bedrock is deep on the Westmoreland soil and shallow on the Klinesville soil. In unlimed areas the Westmoreland soil ranges from very strongly acid to moderately acid in the solum and is strongly acid or moderately acid in the substratum. In unlimed areas the Klinesville soil is strongly acid or moderately acid throughout.

Areas of this map unit are wooded or farmed. Generally, most areas of the Westmoreland soil have been cleared of stones and are farmed and areas of the Klinesville soil and rock outcrop are wooded.

This map unit is suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Stripcropping, rotations that include grasses and legumes, no-till, and conservation tillage help to control erosion. In some areas of the Westmoreland soil, clearing stones is needed before farming. The Klinesville soil is generally not suited to cultivated crops. Moderately steep slope, the severe hazard of erosion, shallowness to bedrock, large stones, and associated rock outcrops are the main limitations.

This map unit is suited to pasture. Grasses and legumes are effective in controlling erosion. Renovating and establishing pasture may be difficult on the Klinesville soil because of stoniness and rock outcrops. Proper stocking rates to avoid overgrazing and rotational grazing help to control erosion.

This map unit is suited to woodland. Potential productivity is high on the Westmoreland soil and moderate on the Klinesville soil. Moderately steep slope and rock outcrop are limitations to use of equipment. Building roads and skid trails on the contour helps to control erosion. The Klinesville soil has a limited root depth and moderate seedling mortality.

This map unit has limitations for most nonfarm uses. Slope and depth to bedrock are limitations on sites for septic tank absorption fields and homes. If the soils are disturbed for construction, management practices will be needed to control erosion and to prevent sedimentation.

The capability subclass for the Westmoreland and Klinesville soils is IVe. The woodland ordination symbol is 4r for the Westmoreland soil and 3d for the Klinesville soil.

WxB—Wharton channery silt loam, 3 to 8 percent slopes, very stony

This soil is gently sloping, deep or very deep, and moderately well drained. It is on the tops and side slopes of hills and ridges. Slopes are convex to slightly concave and range from 100 to 800 feet in length. Areas are irregular in shape and range from 3 to 160 acres. Large stones cover from 0.1 to 3 percent of the surface.

Typically, this soil has a brown to dark brown channery silt loam surface layer about 6 inches thick. The subsoil is reddish yellow channery silty clay loam to a depth of 21 inches, mottled reddish yellow channery silty clay loam to a depth of 32 inches, and mottled yellowish brown and brownish yellow channery and very channery silty clay loam to a depth of 46 inches. The substratum to a depth of 65 inches is mottled brownish yellow very channery silty clay loam.

Included with this soil in mapping are areas of Blairton, Brinkerton, and Ernest soils. Also included are areas of soils that do not have stones on the surface. Inclusions make up about 15 percent of the map unit.

Permeability in the Wharton soil is moderately slow or slow. Available water capacity is moderate. Surface runoff

is medium. The hazard of erosion is moderate. Depth to bedrock is more than 40 inches. A seasonal high water table is perched at a depth of 18 to 36 inches in wet seasons. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

This soil is used as woodland or pasture. Some areas without stones are used for cropland. A few areas are in nonfarm uses.

This soil is suited to cultivated crops if the surface has been cleared of stones. Conservation tillage, grassed waterways, cover crops, stripcropping, and crop rotations help to control erosion and to reduce runoff. Wet spots can be drained with subsurface tile.

This soil is suited to pasture. Stones obstruct renovation of pasture. Rotational grazing and proper stocking rates are suitable management practices. Plant species that tolerate wetness are suitable for planting. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase the water available to the more desirable trees. Large stones limit the use of equipment.

This soil has limitations for nonfarm uses. Slow permeability and the seasonal high water table are limitations for homesites and onsite waste disposal. If buildings with basements are constructed, foundation drains help to prevent seepage into basements.

The capability subclass is VIs. The woodland ordination symbol is 4a.

WxC—Wharton channery silt loam, 8 to 15 percent slopes, very stony

This soil is sloping, deep or very deep, and moderately well drained. It is on the side slopes and tops of hills and ridges. Slopes are convex to concave and range from 100 to 600 feet in length. Areas are irregular in shape and range from 3 to 175 acres. Large stones cover 0.1 to 3 percent of the surface.

Typically, this soil has a brown to dark brown channery silt loam surface layer about 6 inches thick. The subsoil is reddish yellow channery silty clay loam to a depth of 21 inches, mottled reddish yellow channery silty clay loam to a depth of 32 inches, and mottled yellowish brown and brownish yellow channery and very channery silty clay loam to a depth of 46 inches. The substratum to a depth of 65 inches is mottled brownish yellow very channery silty clay loam.

Included with this soil in mapping are some areas of Blairton, Brinkerton, Bedington, and Ernest soils. Also included are some areas of soils that do not have stones on the surface. Inclusions make up about 15 percent of the map unit.

Permeability in the Wharton soil is moderately slow or slow. Available water capacity is moderate. Surface runoff is rapid. The hazard of erosion is severe. Depth to bedrock is more than 40 inches. A seasonal high water table is perched at a depth of 18 to 36 inches in wet seasons. In unlimed areas reaction is strongly acid to extremely acid throughout.

Most areas of this soil are wooded. Some areas are in hay or pasture.

This soil is suited to cultivated crops if the surface has been cleared of stones. Wet spots can be drained with subsurface tile. Conservation tillage, stripcropping, crop rotations that include grasses and legumes, and grassed waterways help to control erosion and to reduce runoff.

This soil is suited to pasture. Stones can be a problem when renovating pasture. Proper stocking rates and rotational grazing are suitable management practices. Plant species that tolerate wet soil conditions are suitable for planting. Best production requires maintaining fertility through periodic applications of nutrients.

This soil is suited to woodland. Potential productivity is moderately high. Limitations are few. Removing undesirable species will increase the water available to the more desirable trees. Logging roads should be constructed on the contour to control erosion. Large stones limit the use of planting equipment.

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

The capability subclass is VIs. The woodland ordination symbol is 4a.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to

economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 78,053 acres in Bedford County, or nearly 12 percent of the total acreage, meets the soil requirements for prime farmland. The largest areas of prime farmland are in the Hagerstown-Clarksburg-Opequon, Morrison-Murrill, and Westmoreland-Edom-Opequon associations of the general soil map. These associations are in the areas of Morrison Cove, Snake Spring Valley, Friends Cove, Cumberland Valley, and Dutch Corner. Other smaller areas of prime farmland soils are on hills, terraces, and flood plains scattered throughout the rest of the valleys in Bedford County.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior (*12*).

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described (*5, 16*).

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Farming is a major land use in Bedford County. According to the 1982 National Resources Inventory, 141,100 acres was used for crops and 57,000 acres was used for pasture. The 1984 Pennsylvania Crop and Livestock Annual Summary reported 35,600 acres of corn, 8,900 acres of small grain, and 55,600 acres of alfalfa and other hay. The rest was in pasture, idle cropland, or other uses.

Soil erosion is the major soil management problem on most of the cropland and pasture in Bedford County. Hagerstown, Murrill, and Westmoreland soils are among the most productive in the county, but they are subject to severe erosion. On highly erodible soils, conservation practices help to control erosion and to increase production.

Loss of topsoil through erosion reduces soil productivity, especially on shallow or moderately deep soils, soils that have a fragipan, and soils where available water capacity is low. Ernest, Laidig, and Monongahela soils, for example, have a fragipan. Berks and Calvin soils are moderately deep and have low available water capacity.

On many sloping channery soils, many surficial erosion-exposed coarse fragments impede seedbed preparation and tillage. Soils of this kind include Berks channery silt loam and Weikert channery silt loam.

Erosion control practices establish or maintain a protective surface cover, help to reduce runoff and sedimentation, and increase the rate of water infiltration. Maintaining a vegetative cover increases the productivity of the soils. On pasture and hayland, deferred grazing, rotational grazing, and the use of grasses and legumes in the cropping system help to help to control erosion, provide nitrogen, and improve soil condition. Contour farming and terraces, conservation tillage, the use of cover crops, no-till farming, and returning crop residue to the soil increase water infiltration and reduce soil erosion; however, terraces are not suitable on soils that have steep, irregular slopes.

Terraces and diversions reduce the length of slopes and thus help to reduce runoff and to control erosion. They are most practical on deep, well drained soils that have moderate, uniform slopes. Soils that have steep or irregular slopes, excessive wetness, or a clayey subsoil or that are shallow over bedrock are less suitable for terraces and diversions. Most soils in Bedford County have irregular slopes and are generally not suitable for terraces.

Contour farming and stripcropping are other erosion control practices commonly used in the survey area. Soils on uniform slopes, such as Murrill and Calvin soils, are suited to contour farming and stripcropping.

Drainage is needed on many soils in Bedford County. Some soils are so wet that, unless artificial drained, crop production is neither practical nor economically feasible. Examples are the poorly drained Andover and Brinkerton soils.

The somewhat poorly drained soils are so wet that, without artificial drainage, crop damage occurs in most years. Examples are Penlaw and Tyler soils.

Small areas of wet soils are in some drainageways and swales. These wet soils generally are mapped as inclusions in map units of the moderately well drained Blairton and Ernest soils. Artificial drainage will improve the productivity of these soils, but 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 tile drainage generally is needed on poorly drained soils that are intensively cropped. Tile drains must be more closely spaced in slowly permeable soils than in more rapidly permeable soils. Generally, finding adequate outlets for a tile drainage system is difficult. Clarksburg and Buchanan soils are examples of soils where finding outlets for drainage is a problem.

Soil fertility is naturally low in many soils in the survey area. Many soils on uplands are naturally strongly acid and require applications of lime to supply calcium and to raise the pH sufficiently for good growth of alfalfa and other crops. The content of available phosphorus and magnesium is naturally low in most soils. For all soils, lime and fertilizers should be applied on the basis of soil tests, the needs of the crop, and the expected or desired yield. The Cooperative Extension Service can help to determine the kind and amount of fertilizer and lime to apply.

Soil tilth is an important factor in seed germination, plant growth, and water infiltration. Soils that have good soil condition are granular and porous. Birdsboro soils are an example of soils that have good soil condition.

Many soils used for crops are relatively low in organic matter content. Generally, in structure the surface layer of these soils is weak and intensive rainfall generally results in crusting of the surface. The crust generally is hard and nearly impervious to water when the soil is dry; this crust generally reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material improve soil structure and reduce crust formation.

Generally, fall plowing is not considered a good practice on soils that have a surface layer of silt loam low in organic matter content. Fall plowing commonly results in the formation of a crust in winter and spring, and many soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. Also, sloping soils are subject to accelerated erosion if plowed in fall.

Special crops produced in the survey area are apples, vegetables, and nursery plants. Soils that are deep, that have good natural drainage, and that warm up early in spring are best suited to special crops, such as tree fruits. Good air drainage is needed to reduce frost damage to apples and peaches. Generally, Elliber, Mertz, and Morrison soils have the best soil properties for tree fruits. Elliber soils on Chestnut Ridge have good air drainage.

The latest information on growing special crops is available at the local offices of the Cooperative Extension Service and the Natural Resources 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 6. 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. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; 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 residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each principal crop. 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 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, woodland, and engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by 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 miscellaneous areas 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 hazard is the 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 very cold or very 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. 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 shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

William H. Clifton, forester, Natural Resources Conservation Service, helped to prepare this section.

Forest land in Bedford County covers about 436,700 acres (*10*). It makes up 67 percent of the total land area in the county. Of the 421,700 acres of commercial forest land, about 83 percent is privately owned and 17 percent publicly owned. About 3 percent of the forest land is noncommercial.

Stands of second- and third-growth trees make up the forest land. The principal forest types (*11*) that make up the present forest land in the county and the extent of each, according to the U.S. Forest Service, are as follows:

Softwood types make up 1 percent of the total commercial forest land in the county. This type group consists of the white pine and hemlock group and the Scotch and Virginia pine group. Common associates of the white pine and hemlock group are red maple, red oak, white oak, beech, black cherry, and aspen. Common associates of the Scotch and Virginia pine group are pitch pine, eastern redcedar, white pine, oak, yellow-poplar, and white ash.

The oak type covers 81 percent of the commercial forest land. This type group consists of the oak and pine, oak and hickory, and oak and gum groups. White, scarlet, chestnut, northern red, or black oak comprises most of the stocking; Scotch, Virginia, and pitch pine and eastern

redcedar comprises 25 to 50 percent. Red maple, black cherry, and hickory are common associates.

Northern hardwood types make up about 18 percent of the total commercial forest land. In this type group sugar maple, beech, and yellow birch are component species. Red maple, sweet birch, black cherry, white ash, northern red oak, basswood, aspen, white oak, hickory, hemlock, and white pine are common associates.

In Bedford County, 78 percent of the forest land is on soils of moderately high productivity and 22 percent on soils of moderate productivity.

Sawtimber makes up about 45 percent and poletimber 32 percent of the acreage in commercial forest land. The rest is in seedling and sapling stands or in stands classified as having less than 10 percent stocked with growing stock trees.

In general, the soils in the county are capable of supporting good stands of red oak, sugar maple, yellow-poplar, and white pine. Trees grow better on soils that are deeper and well drained soils than on those that are shallow over bedrock and poorly drained.

A forest landowner can encourage the growth of desirable trees by using good forest land management practices on the areas where the soils are rated moderately high (upland oaks site index 68+) for potential productivity. Site index is a measure of site quality based on the average height, in feet, of the dominant and codominant commercial species at 50 years of age. A professional forester can provide assistance for a forest land improvement program.

Soils that are rated moderate (upland oaks site index 40-67) are difficult to appraise for management of wood crops. A thorough inventory of quantity and quality of the growing stock on the site is needed. The market potential for the species and whether the soils rated moderate are mixed with larger areas of more productive soils will help to determine if management is economically feasible.

The forest land in Bedford County has watershed protection, recreation, and wildlife values and esthetic values. It is a source of income for wood crops. The better sites likely will return a good profit to the owner if properly managed for wood crops and if protected from fire, disease, insects, and livestock grazing.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general 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 an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce in a pure stand under natural conditions. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *D*, restricted rooting depth; *F*, a high content of rock fragments in the soil; *L*, low strength; and *N*, snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, D, F, L, and N.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight*

indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site 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. Commonly grown trees are those that woodland managers generally favor for wood crop production. They are selected on the basis of growth rate, quality, value, and marketability. In this survey area, however, tree species that commonly grow in the soil are listed regardless of potential value or potential growth rate.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

Bedford County has abundant recreational activities. They attract thousands of tourists and residents each year and provide an important source of revenue in the county. Among the major recreation facilities are Raystown Lake National Recreation Area, Blue Knob Ski Resort, Bedford Springs Resort, Blue Knob State Park, Shawnee State Park, and Old Bedford Village Historical Park. Most woodland and most other lands that have streams are privately owned; however, a large acreage is publicly owned or controlled. The Pennsylvania Game Commission manages about 47,000 acres. The Bureau of Forestry manages about 30,000 acres. State parks take in about 10,000 acres. The diverse landscapes, lakes, streams, and woodlands provide such activities as hunting, camping, horseback riding, fishing, hiking, canoeing, boating, and nature study. Vacation home developments and church and summer camps attract many visitors.

Best for most recreation uses are soils that are deep and well drained and have few or no stones on the surface. Many soils that have a extremely stony surface layer are severely limited for intensive recreation uses; however, these soils have potential for some recreation uses that require only slight land alteration, for example, paths and trails. Poorest in potential for recreation use are poorly drained and very poorly drained soils and steep and very steep soils.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that 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 a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the 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 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 campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for 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 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 and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and 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 have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

The main game species are white-tailed deer, squirrel, cottontail rabbit, ruffed grouse, ringnecked pheasant, and wild turkey. Furbearers such as beaver, mink, muskrat, raccoon, and fox are abundant. A large variety of songbirds, reptiles, amphibians, and small mammals also inhabit the county.

The distribution of wildlife species in the county is related to land use. White-tailed deer inhabit all areas of the county, especially woodland that consists of mixed brush or young trees, a few mature trees, and some small open areas. Many deer seek protection in forests, but prefer to feed on farm crops. Ruffed grouse inhabit both woodland and field edges.

Ringnecked pheasant, dove, and cottontail rabbit are plentiful in areas that have been farmed; these areas are on Hagerstown, Murrill, Westmoreland, Berks, Edom, Calvin, Opequon, Leck Kill, and Meckesville soils. Abandoned farmland with overgrown brush generally supports a large population of cottontail rabbit.

Gray squirrel and wild turkey prefer the mature wooded areas on Clymer, Hazleton, Wharton, Morrison, and Buchanan soils. Squirrel mainly inhabits woodland that consists of mature oak and hickory.

Raccoon and fox inhabit all areas of the county. Beaver, mink, and muskrat inhabit streams, ponds, and the adjacent Basher and Philo soils on flood plains.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in 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* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

Elements of Wildlife Habitat

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features 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 flooding. 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. Soil properties and features 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, flooding, 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. Soil properties and features 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 flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features 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, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

Habitat for Various Kinds of Wildlife

Habitat for openland wildlife 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. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section.

Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of year that excavations can be made is affected by depth to a seasonal high water table and susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons,

and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. Unsaturated soil material must be in place beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the 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.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer

generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, the severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils (*15*).

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*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 and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups 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 (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on

laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, more than 6 percent; and *very high*, greater than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that

can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive 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 mainly of deep, well drained to excessively drained sands or gravelly sands. 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 having a layer that impedes the downward movement of water or soils of 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 clays that have a high shrink-swell potential, soils that have a 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, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

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 (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated

zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of erosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*17, 19*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is Hagerstown soils.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon is a small, three-dimensional area of soil. One that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (*20*). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (*17*) and in "Keys to Soil Taxonomy" (*19*). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Albrights Series

Soils of the Albrights series are fine-loamy, mixed, mesic Aquic Fragiudalfs. These are very deep, moderately well drained and somewhat poorly drained soils on uplands. They formed in colluvium and valley fill weathered from acid, red shale, siltstone, and sandstone. Slopes range from 3 to 15 percent.

Albrights soils are near the moderately deep, well drained Calvin soils, the shallow, well drained Klinesville soils, and the very deep, well drained Meckesville soils.

Typical pedon of Albrights silt loam, 3 to 8 percent

slopes, in Monroe Township, 800 feet east of Pennsylvania Route 2013 and 1,700 feet north of the intersection with Pennsylvania Township Route T 344:

Ap—0 to 5 inches; reddish brown (5YR 4/3) silt loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; many medium roots; about 10 percent rock fragments; moderately acid; abrupt smooth boundary.

BA—5 to 18 inches; reddish brown (5YR 4/4) silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; about 5 percent rock fragments; slightly acid; clear smooth boundary.

Bt—18 to 26 inches; reddish brown (5YR 4/4) silty clay loam; common medium prominent pinkish gray (5YR 6/2) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common faint clay films on faces of peds; about 5 percent rock fragments; moderately acid; abrupt smooth boundary.

Btx—26 to 50 inches; reddish brown (5YR 4/4) silty clay loam; common coarse prominent pinkish gray (7.5YR 6/2) and yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly brittle, sticky, plastic; few fine roots along prism faces; common faint clay films on faces of peds; about 10 percent rock fragments; moderately acid; gradual wavy boundary.

C—50 to 60 inches; reddish gray (5YR 5/2) channery clay loam; few coarse prominent yellowish red (5YR 5/8) mottles; massive; firm, slightly sticky, slightly plastic; about 25 percent rock fragments; moderately acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 18 to 32 inches. Subrounded to angular rock fragments range, by volume, from 5 to 30 percent above the Bx horizon, from 10 to 50 percent in the Bx horizon, and from 25 to 75 percent in the C horizon. In unlimed areas reaction ranges from extremely acid to strongly acid in the upper part of the solum and from slightly acid to very strongly acid in the lower part and in the C horizon.

The A horizon has hue of 5YR or 7.5YR, value of 2 to 5, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam.

The BA and Bt horizons have hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6. Depth to low chroma mottles ranges from 12 to 20 inches. Texture of the fine-earth fraction is silt loam, clay loam, or silty clay loam.

The Bx horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. It is mottled. Texture of the fine-earth fraction is loam, silt loam, clay loam, or silty clay loam.

The C horizon has hue of 5YR, value of 4 or 5, and chroma of 2 to 6. It is mottled. Texture of the fine-earth fraction is loam, silt loam, clay loam, or silty clay loam.

Allegheny Series

Soils of the Allegheny series are fine-loamy, mixed, mesic Typic Hapludults. They are very deep and well drained. They formed in old alluvium or colluvium derived from uplands underlain by acid sandstone, siltstone, and shale. Slopes range from 0 to 15 percent.

Allegheny soils are near the moderately well drained Philo and Monongahela soils, the somewhat poorly drained Tyler soils, and the poorly drained Purdy soils.

Typical pedon of Allegheny loam, 3 to 8 percent slopes, in West Providence Township, 25 feet north of Pennsylvania Route 1012 and 1,300 feet east of the intersection with the Raystown Branch of the Juniata River:

Ap—0 to 10 inches; brown to dark brown (10YR 4/3) loam; moderate medium granular structure; very friable, slightly sticky, slightly plastic; about 10 percent rock fragments; many medium roots; strongly acid; abrupt smooth boundary.

Bt1—10 to 22 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 10 percent rock fragments; many fine roots; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—22 to 36 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 10 percent rock fragments; common fine roots; few distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

C—36 to 60 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; few medium distinct very pale brown (10YR 7/3) mottles; single grained; loose, nonsticky, nonplastic; about 20 percent rock fragments; few faint clay films on sand grains and pebbles; very strongly acid.

Thickness of the solum ranges from 30 inches to more than 60 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded pebbles and cobbles range from 0 to 15 percent in the solum and from 0 to 35 percent in the C horizon. In unlimed areas soil reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 7.5YR to 2.5Y, value of 4 or

5, and chroma of 2 to 4. Texture of the fine-earth fraction is dominantly loam, but is silt loam or fine sandy loam in some areas.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Texture of the fine-earth fraction is loam, silt loam, silty clay loam, clay loam, or sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 8. Texture of the fine-earth fraction is clay loam to fine sandy loam.

Andover Series

Soils of the Andover series are fine-loamy, mixed, mesic Typic Fragiaquults. These are very deep, poorly drained soils on uplands. They formed in colluvium weathered from acid sandstone and shale. Slopes range from 0 to 15 percent.

Andover soils are near the well drained Laidig and Berks soils and the moderately well drained Buchanan soils.

Typical pedon of Andover cobbly loam, in an area of Andover cobbly sandy loam, 3 to 8 percent slopes, very stony, in Monroe Township, 1 mile northeast of the intersection of Pennsylvania Route 2015 and Pennsylvania Route 326, 200 yards north of Pennsylvania Route 2015 and 100 yards south of State Gamelands trail:

Oe—1 to 0 inches, partly decomposed organic matter from hardwoods.

E—0 to 6 inches; grayish brown (10YR 5/2) cobbly loam; many medium distinct light gray (10YR 7/1) and yellow (10YR 7/6) mottles; moderate coarse subangular blocky structure; friable, slightly sticky, nonplastic; many medium roots; about 15 percent rock fragments; strongly acid; clear smooth boundary.

Btg—6 to 20 inches; light gray to gray (10YR 6/1) cobbly sandy clay loam; many coarse prominent yellowish brown (10YR 5/6) and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable to slightly firm, sticky, plastic; common medium roots; few faint clay films on faces of peds; about 20 percent rock fragments; strongly acid; clear smooth boundary.

Btgx—20 to 30 inches; light brownish gray (10YR 6/2) cobbly sandy clay loam; ped interiors are strong brown (7.5YR 5/6); moderate coarse prismatic structure parting to moderate medium platy; firm, brittle, sticky, plastic; few fine roots along prism faces; few faint clay films on faces of peds; about 20 percent rock fragments; strongly acid; clear smooth boundary.

Btx—30 to 40 inches; light yellowish brown (10YR 6/4) cobbly sandy clay loam; few fine distinct light gray (10YR 7/2) mottles; weak coarse prismatic structure parting to weak medium platy; firm, slightly brittle, slightly sticky, slightly plastic; few fine flattened roots on prism faces; few faint clay films on faces of peds; about 25 percent rock fragments; strongly acid; clear smooth boundary.

2C—40 to 60 inches; brown (7.5YR 5/4) cobbly sandy loam; few fine distinct light gray (10YR 7/2) mottles; massive; friable, slightly sticky, nonplastic; about 25 percent rock fragments; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 18 to 25 inches. Subrounded to angular rock fragments range from 10 to 40 percent in the A and B horizons and from 10 to 50 percent in the C horizon. In unlimed areas reaction is strongly acid or very strongly acid throughout.

Some pedons have an A horizon that has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 2 or 5. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The E horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 6. It is mottled. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is mottled. Texture of the fine-earth fraction is loam, clay loam, or sandy clay loam.

The Bx horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 6. It is mottled. Texture of the fine-earth fraction is loam, clay loam, or sandy clay loam.

The C horizon has hue of 7.5YR to 2.5YR, value of 4 to 6, and chroma of 1 to 4. It is mottled. Texture of the fine-earth fraction is clay loam, sandy loam, or loam.

Atkins Series

Soils of the Atkins series are fine-loamy, mixed, acid, mesic Typic Fluvaquents. They are very deep and poorly drained. They formed in stratified alluvium washed from uplands underlain by acid sandstone, shale, and siltstone. Slopes range from 0 to 3 percent.

Atkins soils are near the well drained Berks and Weikert soils, the moderately well drained Philo soils, and the poorly drained Brinkerton soils. Unlike Atkins soils, Brinkerton soils have a fragipan.

Typical pedon of Atkins silt loam, in an area of Atkins-Ernest complex, 0 to 8 percent slopes, in Monroe Township, 6 miles south of Everett on Pennsylvania Route 2015, 500 feet southwest of intersection of Pennsylvania Route 2012 and Pennsylvania Route 2015:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; many medium roots; neutral; abrupt smooth boundary.

Bwg—6 to 11 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent dusky red (10R 3/4) mottles;

moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; moderately acid; clear smooth boundary.

Bwg1—11 to 22 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent dusky red (10R 3/4) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; moderately acid; clear smooth boundary.

Bwg2—22 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent gray (10YR 5/1) and reddish yellow (7.5YR 6/8) mottles; weak fine subangular blocky structure; firm, slightly sticky, slightly plastic; strongly acid; clear smooth boundary.

C—40 to 60 inches; gray (N 5/0) stratified sandy loam and silty clay loam; massive; friable, nonsticky, nonplastic; very strongly acid.

The thickness of the solum ranges from 30 to 45 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded pebbles range from 0 to 15 percent in the solum and from 0 to 40 percent in the C horizon. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Texture of the fine-earth fraction is silt loam or silty clay loam.

The B horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 0 to 2. It is mottled. Texture of the fine-earth fraction is dominantly silty clay loam but includes loam, sandy loam, and silt loam.

The C horizon has hue of 10YR or 2.5Y or is neutral, value of 4 to 7, and chroma of 0 to 6. It is mottled. Texture of the fine-earth fraction ranges from silty clay loam, silt loam, loam, or sandy loam.

Basher Series

Soils of the Basher series are coarse-loamy, mixed, mesic, Fluvaquentic Dystrochrepts. They are very deep and moderately well drained. They formed in alluvial sediments washed from uplands underlain by red shale, siltstone, and sandstone. Slopes range from 0 to 3 percent.

Basher soils are near the well drained Calvin, Klinesville, and Leck Kill soils and the moderately well drained Albrights soils. Unlike Basher soils, Albrights soils have a fragipan.

Typical pedon of Basher silt loam in Bedford Township, 500 yards southwest of the intersection of Pennsylvania Township Route T 525 and Business US 220:

Ap—0 to 8 inches; dark brown (10YR 3/3) silt loam; light brownish gray (10YR 6/2) dry; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; moderately acid; clear smooth boundary.

Bw1—8 to 14 inches; reddish brown (5YR 4/4) loam; very weak medium subangular blocky structure parting to weak medium granular; friable, nonsticky, nonplastic; many fine roots; strongly acid; clear wavy boundary.

Bw2—14 to 24 inches; yellowish red (5YR 4/6) loam; common medium distinct reddish gray (5YR 5/2) mottles; weak medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; strongly acid; clear wavy boundary.

Bw3—24 to 40 inches; reddish brown (5YR 5/4) loam; common medium distinct dark reddish gray (5YR 4/2) mottles; weak medium subangular blocky structure; friable, nonsticky, nonplastic; few fine roots; very strongly acid; clear wavy boundary.

C1—40 to 52 inches; reddish brown (5YR 5/4) sandy loam; common medium distinct pinkish gray (5YR 6/2) mottles; massive; very friable, nonsticky, nonplastic; few fine roots; strongly acid; clear irregular boundary.

C2—52 to 64 inches; variegated yellowish red (5YR 5/8) and pinkish gray (7.5YR 6/2) loam; few medium prominent dark reddish brown (5YR 3/2) mottles; massive; friable, nonsticky, nonplastic; about 5 percent rock fragments; slightly acid.

The thickness of the solum ranges from 16 to 40 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded pebbles and cobbles range from 0 to 20 percent above a depth of 40 inches and from 0 to 60 percent below. In unlimed areas reaction ranges from extremely acid to moderately acid in the solum and from very strongly acid to slightly acid in the substratum.

The A horizon has hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam to sandy loam.

The Bw horizon has hue of 2.5YR to 5YR, value of 3 to 5, and chroma of 3 to 6. Depth to low chroma mottles ranges from 12 to 24 inches. Texture of the fine-earth fraction is silt loam to sandy loam.

The C horizon has hue of 2.5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 4. It is mottled. Texture of the fine-earth fraction is loam to sandy loam.

Bedington Series

Soils of the Bedington series are fine-loamy, mixed, mesic Typic Hapludults. These are deep and very deep, well drained soils on uplands. They formed in material weathered from acid shale and interbedded sandstone and siltstone. Slopes range from 3 to 35 percent.

Bedington soils are near the moderately deep Berks soils, the moderately well drained Blairton and Wharton soils, and the well drained Laidig soils. Unlike Bedington soils, Laidig soils have a fragipan.

Typical pedon of Bedington channery loam, in an area

of Bedington-Berks complex, 25 to 35 percent slopes, very stony, in Snake Spring Township, 0.5 mile east of the intersection of Pennsylvania Township Route T 433 and Pennsylvania Route 2023:

Oe—1 inch to 0; undecomposed to partly decomposed organic matter.
A—0 to 2 inches; dark grayish brown (10YR 4/2) channery loam; weak fine granular structure; very friable, slightly sticky, nonplastic; many medium roots; about 20 percent rock fragments; very strongly acid; clear smooth boundary.
BA—2 to 9 inches; light yellowish brown (10YR 6/4) channery loam; weak medium subangular blocky structure; very friable, slightly sticky, nonplastic; many medium roots; about 20 percent rock fragments; very strongly acid; gradual wavy boundary.
Bt1—9 to 16 inches; yellowish brown (10YR 5/4) channery loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many medium roots; few faint clay films on faces of peds; about 20 percent rock fragments; very strongly acid; clear smooth boundary.
Bt2—16 to 24 inches; strong brown (7.5YR 5/6) channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common faint clay films on faces of peds; about 30 percent rock fragments; very strongly acid; clear smooth boundary.
Bt3—24 to 28 inches; yellowish red (5YR 5/8) very channery silt loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; common faint clay films on faces of peds; many black stains on faces of peds and shale rock fragments; about 40 percent rock fragments; very strongly acid; clear wavy boundary.
BC—28 to 50 inches; strong brown (7.5YR 5/8) very channery loam; massive; firm in place; slightly sticky, slightly plastic; few thin clay films and many black stains on rock fragments; about 50 percent rock fragments; very strongly acid; gradual smooth boundary.
C—50 to 60 inches; yellowish brown (10YR 5/8) extremely channery loam; massive; firm in place, slightly sticky, slightly plastic; about 90 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Depth to bedrock is more than 40 inches. Fragments of shale, siltstone, and sandstone range from 10 to 40 percent in the upper part of the solum and from 20 to 80 percent in the lower part. Those in the C horizon range from 60 to 90 percent. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam or loam.

The BA horizon has hue of 10YR to 7.5YR, value of 5 or 6, and chroma of 4 to 6. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is loam, silt loam, or silty clay loam.

The BC horizon has colors and textures similar to those of the B horizon.

The C horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam, silty clay loam, or loam.

Berks Series

Soils of the Berks series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These are moderately deep, well drained soils on uplands. They formed in material weathered from acid shale, siltstone, and some sandstone. Slopes range from 3 to 35 percent.

Berks soils are near the shallow Weikert soils, the moderately well drained Blairton soils, and the deep Ernest and Bedington soils.

Typical pedon of Berks channery silt loam, 8 to 15 percent slopes, in Monroe Township, 5,000 feet northeast of the intersection of Pennsylvania Township Route T 351 and Pennsylvania Township Route T 352, 10 yards east of Pennsylvania Township Route T 352:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) channery silt loam; moderate medium granular structure; very friable, nonsticky, nonplastic; many medium roots; about 25 percent rock fragments; extremely acid; abrupt smooth boundary.
BA—3 to 7 inches; light yellowish brown (10YR 6/4) channery silt loam; moderate medium granular structure; very friable, nonsticky, nonplastic; many medium roots; about 25 percent rock fragments; strongly acid; clear wavy boundary.
Bw1—7 to 12 inches; yellowish brown (10YR 5/4) very channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; about 40 percent rock fragments; very strongly acid; clear wavy boundary.
Bw2—12 to 29 inches; yellowish brown (10YR 5/6) very channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; about 50 percent rock fragments; extremely acid; gradual wavy boundary.
C—29 to 34 inches; yellowish brown (10YR 5/6) extremely channery silt loam; massive; friable, slightly sticky, slightly plastic; few roots; about 80 percent rock fragments; extremely acid; diffuse irregular boundary.

R—34 inches; very dark gray (10YR 3/1) and dark grayish brown (2.5Y 4/2) siltstone that has some yellowish brown (10YR 5/6) and light gray to gray (10YR 6/1) silt on rock fragments.

Thickness of the solum ranges from 20 to 40 inches. Depth to bedrock ranges from 20 to 40 inches. Shale fragments range from 10 to 50 percent in the A horizon, from 15 to 70 percent in the B horizon, and from 35 to 90 percent in the C horizon. In unlimed areas reaction ranges from extremely acid to slightly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam or loam.

The BA horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. Texture of the fine-earth fraction is silt loam, loam, or silty clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6. Texture of the fine-earth fraction is loam or silt loam.

Birdsboro Series

Soils of the Birdsboro series are fine-loamy, mixed mesic Typic Hapludults. They are very deep, well drained and moderately well drained soils. They formed in old alluvial and alluvial fan deposits derived from uplands underlain by red shale, siltstone, and sandstone. Slopes range from 0 to 15 percent.

Birdsboro soils are near moderately deep Calvin, shallow Klinesville, and poorly drained Purdy soils.

Typical pedon of Birdsboro silt loam, in an area of Birdsboro silt loam, rarely flooded, in East Saint Clair Township, 1 mile west of St. Clairsville, 200 feet southeast of Pennsylvania Route 4019 and Pennsylvania Township Route T 540:

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam; light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; about 2 percent rock fragments; slightly acid; abrupt smooth boundary.

Bt1—10 to 19 inches; reddish brown (5YR 4/3) silty clay loam; moderate fine blocky structure; firm, slightly sticky, plastic; common fine roots; common faint clay films on faces of peds; extremely acid; clear wavy boundary.

Bt2—19 to 28 inches; reddish brown (5YR 4/4) loam; moderate medium and fine blocky structure; firm, slightly sticky, plastic; common fine roots; continuous faint clay films on faces of peds and in pores; about 5 percent rock fragments; extremely acid; clear wavy boundary.

Bt3—28 to 39 inches; reddish brown (5YR 4/4) loam; common medium prominent yellowish brown (10YR 5/6) and pale brown (10YR 6/3) mottles; moderate coarse blocky structure; firm, slightly sticky, plastic; continuous faint clay films on faces of peds and in pores; about 2 percent rock fragments; extremely acid; clear wavy boundary.

Bt4—39 to 46 inches; brown to dark brown (7.5YR 4/4) sandy clay loam; many coarse prominent yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure; firm, slightly sticky, slightly plastic; few faint clay films on faces of peds and in pores; very strongly acid; abrupt smooth boundary.

C—46 to 70 inches; reddish brown (5YR 5/4) very gravelly clay loam, common medium prominent yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; massive; friable, slightly sticky, slightly plastic; about 50 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches. Depth to gravelly layers is more than 40 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded pebbles and cobbles range from 0 to 20 percent in the solum and from 10 to 70 percent in the C horizon. In unlimed areas reaction ranges from extremely acid to strongly acid throughout.

The A horizon has hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 2 or 4. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 7.5YR to 2.5YR, value of 3 to 5, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam, loam, clay loam, or silty clay loam.

The C horizon has hue of 2.5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. Texture of the fine-earth fraction is sand to clay loam.

Blairton Series

Soils of the Blairton series are fine-loamy, mixed, mesic Aquic Hapludults. They are moderately deep, moderately well drained soils on uplands. They formed in material weathered from acid siltstone and shale. Slopes range from 3 to 25 percent.

Blairton soils are near the well drained Berks soils and the poorly drained Brinkerton and Atkins soils.

Typical pedon of Blairton channery silt loam, 8 to 15

percent slopes, in West St. Clair Township, 1.2 miles northeast of Alum Bank on Pennsylvania Route 96 and 600 feet southeast of Pennsylvania Route 96:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) channery silt loam; moderate medium granular structure; very friable, slightly sticky, nonplastic; many fine roots; about 30 percent rock fragments; mildly alkaline; abrupt smooth boundary.

Bt1—10 to 20 inches; light olive brown (2.5Y 5/4) channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; very few faint clay films on faces of peds; about 20 percent rock fragments; slightly acid; clear smooth boundary.

Bt2—20 to 24 inches; yellowish brown (10YR 5/4) channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; very few faint clay films on faces of peds; about 20 percent rock fragments; strongly acid; clear smooth boundary.

Bt3—24 to 27 inches; yellowish brown (10YR 5/4) channery silt loam; common medium prominent light olive gray (5Y 6/2), light gray (10YR 7/1), and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few faint clay films on faces of peds; about 30 percent rock fragments; very strongly acid; abrupt smooth boundary.

C—27 to 32 inches; yellowish brown (10YR 5/4) extremely channery silt loam; common medium distinct light gray (10YR 7/1) and strong brown (7.5YR 5/6) mottles; massive; slightly firm, slightly sticky, slightly plastic; few fine roots; about 75 percent rock fragments; very strongly acid; abrupt wavy boundary.

R—32 inches; dark grayish brown (2.5Y 4/2) siltstone and shale bedrock.

The thickness of the solum and depth to bedrock range from 20 to 40 inches. Shale fragments range from 5 to 30 percent in the A horizon, from 5 to 50 percent in the B horizon, and from 30 to 90 percent of the C horizon. In unlimed areas reaction ranges from extremely acid to strongly acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 10YR, 2.5Y, or 7.5YR, value of 4 to 6, and chroma of 2 to 6. Depth to low chroma mottles is between 12 and 30 inches. Texture of the fine-earth fraction is loam, silt loam, or silty clay loam.

The C horizon has hue of 10YR, 2.5Y, or 7.5YR, value of 4 to 6, and chroma of 2 to 6. It is mottled. Texture of the fine-earth fraction is silt loam or loam.

Brinkerton Series

Soils of the Brinkerton series are fine-silty, mixed, mesic Typic Fragiaqualfs. They are very deep, poorly drained soils on uplands. They formed in residuum and colluvium weathered from acid shale, siltstone, and sandstone. Slopes range from 0 to 15 percent.

Brinkerton soils are near the better drained Blairton, Berks, Bedington, and Ernest soils and the clayey Purdy soils.

Typical pedon of Brinkerton silt loam, 0 to 3 percent slopes, in West Saint Clair Township, 800 feet west of Pennsylvania Route 96 and about 1.5 miles northwest of its intersection with Pennsylvania Route 56:

Ap—0 to 8 inches; grayish brown (2.5Y 5/2) silt loam; moderate medium granular structure; friable, sticky, slightly plastic; about 10 percent rock fragments; many fine roots; moderately acid; abrupt smooth boundary.

Btg1—8 to 15 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent reddish yellow (7.5YR 6/8) mottles; moderate coarse subangular blocky structure; friable, sticky, slightly plastic; about 10 percent rock fragments; common fine roots; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—15 to 22 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent light gray (10YR 7/1) and reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 10 percent rock fragments; few fine roots; common faint clay films on faces of peds; very strongly acid; abrupt smooth boundary.

Btgx—22 to 30 inches; light brownish gray (10YR 6/2) channery silt loam; many medium prominent light gray to gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; moderate very coarse prismatic structure parting to moderate thin platy; firm, slightly sticky, slightly plastic; about 15 percent rock fragments; few fine roots; common distinct clay films on faces of peds; common black (10YR 2/1) coatings on faces of peds; very strongly acid; clear wavy boundary.

Btx—30 to 45 inches; pale brown (10YR 6/3) channery silt loam; common medium distinct light gray to gray (10YR 6/1) mottles; moderate very coarse prismatic structure parting to moderate medium platy; firm, brittle; slightly sticky, slightly plastic; about 20 percent rock fragments; few prominent clay films on faces of peds; common black (10YR 2/1) coatings; very strongly acid; clear wavy boundary.

C—45 to 60 inches; pale brown (10YR 6/3) very channery silt loam; massive; firm, slightly sticky, nonplastic;

about 35 percent rock fragments; few black (10YR 2/1) coatings on rock fragments; strongly acid.

The thickness of the solum ranges from 40 to 65 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 15 to 30 inches. Subrounded to angular rock fragments range from 0 to 10 percent above the fragipan, 0 to 25 percent in the fragipan, and 10 to 80 percent in the C horizon. In unlimed areas reaction ranges from moderately acid to very strongly acid in the solum and is strongly acid or moderately acid in the C horizon.

The A horizon is neutral or has hue of 10YR to 2.5Y, value of 3 to 6, and chroma of 0 to 3. Texture of the fine-earth fraction is silt loam or silty clay loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is mottled. Texture of the fine-earth fraction is silt loam or silty clay loam.

The Bx horizon has hue of 10YR or 2.5Y or is neutral, value of 5 or 6, and chroma of 0 to 3. It is mottled. Texture of the fine-earth fraction is silty clay loam, loam, or silt loam.

The C horizon has hue of 10YR, 2.5Y or is neutral, value of 4 to 6, and chroma of 0 to 4. It is mottled. Texture of the fine-earth fraction is silt loam or silty clay loam.

Buchanan Series

Soils of the Buchanan series are fine-loamy, mixed, mesic Aquic Fragiudults. They are very deep, moderately well drained soils on uplands. They formed in colluvium weathered from acid sandstone, siltstone, and shale. Slopes range from 3 to 25 percent.

Buchanan soils are near the well drained Dystrochrepts and Laidig, Clymer, and Hazleton soils and the poorly drained Andover soils.

Typical pedon of Buchanan cobbly loam, 8 to 15 percent slopes, extremely stony, in West St. Clair Township, 50 feet east of Pennsylvania Route 4013 and about 900 feet northeast of its intersection with Pennsylvania Township Route T 565:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) cobbly loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; about 20 percent rock fragments; many fine and medium roots; very strongly acid; clear smooth boundary.

E—3 to 11 inches; light yellowish brown (10YR 6/4) gravelly loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; about 20 percent rock fragments; many fine and medium roots; very strongly acid; gradual smooth boundary.

BE—11 to 20 inches; yellowish brown (10YR 5/6) gravelly loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 20 percent rock fragments; many fine roots; very strongly acid; gradual smooth boundary.

Bt—20 to 30 inches; pale brown (10YR 6/3) gravelly clay loam; common medium faint light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few faint clay films on faces of peds; about 30 percent rock fragments; common fine roots; very strongly acid; abrupt wavy boundary.

Bx—30 to 60 inches; light brown (7.5YR 6/4) very gravelly clay loam; common coarse prominent light gray (10YR 7/2) and strong brown (7.5YR 5/8) mottles; weak very coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle, slightly sticky, slightly plastic; common distinct clay films on faces of peds; few roots along prism faces; about 35 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 25 to 36 inches. Fragments of sandstone and shale range from 10 to 40 percent in horizons above the fragipan and from 10 to 60 percent in the fragipan. In unlimed areas reaction ranges from extremely acid to strongly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 1 to 4. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 or 4. Texture of the fine-earth fraction is silt loam, loam, or sandy loam.

The BE and Bt horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. The Bt horizon is mottled within the upper 10 inches. Texture of the fine-earth fraction is loam, clay loam, or silt loam.

The Bx horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 6. It is mottled. Texture of the fine-earth fraction is loam or clay loam.

Some pedons have a C horizon that has hue of 10YR to 5YR, value of 5 or 6, and chroma of 2 to 6. It is mottled in most pedons. Texture of the fine-earth fraction is clay loam, loam, or sandy clay loam.

Calvin Series

Soils of the Calvin series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These are moderately deep, well drained soils on uplands. They formed in material weathered from acid, red to reddish brown shale, siltstone, and sandstone. Slopes range from 0 to 50 percent.

Calvin soils are on the landscape near Klinesville, Berks, Weikert, Basher, and Albrights soils. Klinesville and Weikert soils are shallow over bedrock. Berks soils have

reddish hues. Basher and Albrights soils are moderately well drained.

Typical pedon of Calvin channery silt loam, 8 to 15 percent slopes, in Monroe Township, 1,600 feet northwest of Grace Church and 30 feet south of Pennsylvania Township Route T 344:

Ap—0 to 10 inches; dark reddish brown (5YR 3/3) channery silt loam; light reddish brown (5YR 6/3) dry; moderate medium granular structure; very friable, slightly sticky, slightly plastic; about 20 percent rock fragments; common fine roots; slightly acid; abrupt smooth boundary.

Bw—10 to 26 inches; reddish brown (5YR 4/4) very channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few black (N 2/0) stains on faces of peds; about 35 percent rock fragments; few fine roots; moderately acid; clear wavy boundary.

C—26 to 40 inches; reddish brown (5YR 4/4) extremely channery silt loam; massive; friable, slightly sticky, slightly plastic; about 80 percent rock fragments; few fine roots; very strongly acid; diffuse wavy boundary.

R—40 inches; dark reddish brown (5YR 3/4) somewhat fractured shale, siltstone, and fine grained sandstone bedrock.

The thickness of the solum ranges from 20 to 35 inches. Depth to bedrock is 20 to 40 inches. Fragments of red shale, siltstone, and sandstone range from 5 to 25 percent in the A horizon, from 25 to 50 percent in the B horizon, and from 40 to 80 percent in the C horizon. In unlimed areas reaction ranges from moderately acid to very strongly acid throughout.

The A horizon has hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam, silty clay loam, or loam.

The C horizon has hue of 10R to 5YR, value of 3 to 5, and chroma of 3 or 4. Texture of the fine-earth fraction is silt loam or loam.

Cedarcreek Series

Soils of the Cedarcreek series are loamy-skeletal, mixed, acid, mesic Typic Udorthents. They are very deep and well drained. They formed in mixed soil material and rock fragments that have been disturbed by stripmining. Rock fragments consist mainly of acid shale, siltstone, and sandstone and small amounts of coal. Slopes range from 3 to 80 percent.

Cedarcreek soils are near Wharton, Hazleton, Clymer, and Buchanan soils. Cedarcreek soils do not have the distinct horizonation of any of these adjacent soils and generally have greater amounts of rock fragments.

Typical pedon of Cedarcreek extremely channery loam, 3 to 25 percent slopes, very stony, in Broad Top Township, 600 feet south of Pennsylvania Route 1025 and 1 mile east of its intersection with Pennsylvania Township Route T 532:

A—0 to 4 inches; dark brown (10YR 3/3) extremely channery loam; very weak fine granular structure; friable, nonsticky, nonplastic; many fine medium roots; about 60 percent rock fragments; very strongly acid; gradual wavy boundary.

C—4 to 70 inches; olive brown (2.5Y 4/4) extremely channery loam; massive; firm, nonsticky, nonplastic; very few fine and medium roots; about 70 percent rock fragments; very strongly acid.

Depth to bedrock is more than 60 inches. Rock fragments range from 35 to 80 percent throughout. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 7.5YR to 5Y, value of 2 to 5, and chroma of 1 to 6. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The C horizon has hue of 7.5YR to 5Y, value of 2 to 6, and chroma of 1 to 8. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

Clarksburg Series

Soils of the Clarksburg series are fine-loamy, mixed, mesic Typic Fragiudalfs. These are very deep, moderately well drained soils on uplands. They formed in valley fill, colluvium, or material weathered from limestone, calcareous shale, and sandstone. Slopes range from 0 to 8 percent.

Clarksburg soils are on the landscape near Hagerstown and Buchanan soils. They are not as well drained as Hagerstown soils and have a fragipan. They are similar to Buchanan soils but have a higher base saturation and fewer rock fragments throughout the solum.

Typical pedon of Clarksburg silt loam, 3 to 8 percent slopes, in South Woodbury Township, 2,500 feet south of the intersection of Pennsylvania Route 0867 and Pennsylvania Route 1028:

Ap—0 to 8 inches; brown to dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; common fine roots; about 2 percent rock fragments; slightly acid; abrupt smooth boundary.

BA—8 to 14 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure;

friable, slightly sticky, slightly plastic; common fine roots; about 2 percent rock fragments; slightly acid; clear smooth boundary.

Bt1—14 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common faint clay films on faces of peds; about 3 percent rock fragments; slightly acid; clear smooth boundary.

Bt2—20 to 30 inches; yellowish brown (10YR 5/6) silty clay loam, common medium prominent light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common faint clay films on faces of peds; about 3 percent rock fragments; slightly acid; abrupt smooth boundary.

Bx—30 to 45 inches; yellowish brown (10YR 5/6) silt loam, many medium prominent light gray (10YR 7/1) mottles; weak very coarse prismatic structure parting to moderate thin platy; firm and brittle, sticky, plastic; a few roots along prism faces; common faint clay films in pores; about 5 percent rock fragments; slightly acid; clear wavy boundary.

C—45 to 60 inches; yellowish brown (10YR 5/6) silty clay loam that has thin silt loam and silty clay strata; few prominent distinct light gray (10YR 7/1) mottles; massive; firm, sticky, plastic; about 5 percent rock fragments; slightly acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to bedrock is more than 60 inches. The fragipan ranges from 20 to 36 inches. Fragments of sandstone, chert, or limestone range from 0 to 20 percent in the A horizon, from 0 to 20 percent in the B horizon, and from 5 to 60 percent in the C horizon. In unlimed areas reaction is strongly acid to slightly acid throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The fine-earth fraction is silt loam.

The BA and Bt horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. Depth to low chroma mottles is between 20 and 32 inches. The fine-earth fraction is silt loam, silty clay loam, loam, or clay loam.

The Bx horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 6. It is mottled. The fine-earth fraction is silt loam or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 6. It is mottled. The fine-earth fraction ranges from silt loam to clay.

Clymer Series

Soils of the Clymer series are fine-loamy, mixed, mesic Typic Hapludults. They are deep or very deep, well drained soils on uplands. They formed in material weathered from acid sandstone interbedded with some siltstone and shale. Slopes range from 3 to 25 percent.

Clymer soils are near Dystrochrepts and Hazleton, Buchanan, and Bedington soils. Clymer soils have more sand, less silt, and a thinner solum than Bedington soils. Clymer soils have fewer rock fragments and more clay in the solum than Hazleton soils and Dystrochrepts. Buchanan soils are moderately well drained.

Typical pedon of Clymer channery sandy loam, in an area of Hazleton-Clymer association, 8 to 25 percent slopes, extremely stony, in Broad Top Township, 650 feet south of the intersection of Pennsylvania Route 915 and Pennsylvania Township Route T 350:

Oi—2 inches to 1 inch; undecomposed hardwood leaf litter.

Oe—1 to 0 inch; very dark gray (N 3/0) partly decomposed organic material.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) channery sandy loam; moderate medium granular structure; very friable, nonsticky, nonplastic; many medium and coarse roots; about 20 percent rock fragments; very strongly acid; clear smooth boundary.

E—2 to 6 inches; yellowish brown (10YR 5/4) channery sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; many medium roots; about 20 percent rock fragments; very strongly acid; clear smooth boundary.

Bt1—6 to 24 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; few faint clay films on faces of peds; about 5 percent rock fragments; very strongly acid; clear smooth boundary.

Bt2—24 to 36 inches; strong brown (7.5YR 5/6) channery sandy loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few faint clay films on faces of peds; about 25 percent rock fragments; very strongly acid; clear smooth boundary.

C—36 to 60 inches; light yellowish brown (10YR 6/4) very channery sandy loam; massive; very friable, nonsticky, nonplastic; about 35 percent rock fragments; few fine roots; very strongly acid.

The thickness of the solum is 26 to 40 inches. Depth to bedrock is more than 40 inches. Fragments of sandstone and siltstone range from 5 to 50 percent in the solum and from 10 to 85 percent in the C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 2 to 4. Texture of the fine-earth fraction is sandy loam or loam.

Some pedons have an E horizon that has hue of 10YR, value of 5 or 6, and chroma of 1 to 6. Texture of the fine-earth fraction is sandy loam or loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is sandy loam, loam, sandy clay loam, or clay loam.

The C horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. Texture of the fine-earth fraction is sandy loam, sandy clay loam, clay loam, or loam.

Dystrochrepts

Soils mapped as Dystrochrepts are shallow to very deep and well drained to somewhat excessively drained. They formed in residuum and colluvium derived from acid sandstone, orthoquartzite, and shale. Slopes range from 3 to 70 percent.

Dystrochrepts are commonly near Ungers, Lehew, Laidig, Buchanan, Hazleton, and Clymer soils. Clymer, Buchanan, Laidig, and Ungers soils have more clay in the solum. Dystrochrepts are similar to Hazleton soils but are more variable in depth to bedrock and generally have more sand. Lehew soils have reddish colors.

Because of the extreme variability of these soils a typical pedon is not given.

The thickness of the solum ranges from 10 to 50 inches. Depth to bedrock ranges from less than 20 to more than 60 inches. Fragments of sandstone and orthoquartzite range from 20 to 90 percent throughout the soil and are commonly concentrated on the surface. Reaction is extremely acid or very strongly acid throughout.

The A horizon has hue of 7.5YR to 2.5Y, value of 2 to 7, and chroma of 1 to 4. Texture of the fine-earth fraction ranges from loamy sand to loam.

Some pedons have an E horizon that has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2. Texture of the fine-earth fraction ranges from loamy sand to loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. Texture of the fine-earth fraction ranges from loamy sand to loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. Texture of the fine-earth fraction ranges from loamy sand to loam.

Edom Series

Soils of the Edom series are fine, illitic, mesic Typic Hapludalfs. They are deep or very deep, well drained soils on uplands. They formed in material weathered from thin-bedded limestone and calcareous shale. Slopes range from 3 to 25 percent.

Edom soils are on the landscape near Opequon, Hagerstown, and Westmoreland soils. Edom soils are deeper over bedrock than Opequon soils. Edom soils have a solum less than 40 inches deep. Hagerstown soils have a solum more than 40 inches deep. Edom soils have more clay than Westmoreland soils.

Typical pedon of Edom silty clay loam, 8 to 15 percent slopes, in Napier Township, 800 feet northeast of the intersection of US Route 30 and Pennsylvania Route 0031 and 300 feet south of the Pennsylvania Turnpike:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate coarse and very coarse granular structure; firm, slightly sticky, slightly plastic; about 5 percent rock fragments; neutral; abrupt smooth boundary.

B1t—7 to 14 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium angular blocky structure; firm, slightly sticky, slightly plastic; about 10 percent rock fragments; common faint clay films on faces of peds; neutral; gradual wavy boundary.

B2t—14 to 35 inches; strong brown (7.5YR 5/6) channery silty clay; moderate medium angular blocky structure; firm, sticky, plastic; about 15 percent rock fragments; many distinct clay films on faces of peds; neutral; gradual wavy boundary.

C—35 to 40 inches; yellowish brown (10YR 5/4) very channery silty clay loam; weak medium angular blocky structure; firm, slightly sticky, slightly plastic; about 50 percent rock fragments; neutral; gradual wavy boundary.

Cr—40 to 60 inches; light olive brown (2.5Y 5/4) weathered, interbedded, soft, calcareous shale and siltstone, and thin-bedded, grayish brown (2.5Y 5/2) hard fossiliferous limestone; slight effervescence.

Thickness of the solum ranges from 20 to 40 inches. Depth to bedrock ranges from 40 to 72 inches. Fragments of shale and limestone range from 2 to 35 percent in the solum and from 20 to 90 percent in the C horizon. In unlimed areas reaction is slightly acid to mildly alkaline throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 3 or 4. Texture of the fine-earth fraction is silt loam or silty clay loam.

The B horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6. Texture of the fine-earth fraction is silty clay, silty clay loam, or clay.

The C horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 2 to 4. Texture of the fine-earth fraction is clay, clay loam, silty clay loam, or silty clay.

Elliber Series

Soils of the Elliber series are loamy-skeletal, mixed, mesic Typic Hapludults. They are very deep, well drained soils on uplands. They formed in residuum and colluvium

weathered from very cherty limestone. Slopes range from 3 to 45 percent.

Elliber soils are near the clayey Opequon and Hagerstown soils. They are also near Morrison and Mertz soils, which contain fewer rock fragments throughout.

Typical pedon of Elliber very channery loam, 15 to 25 percent slopes, in Bedford Township, 2,700 feet east of microwave tower on Pennsylvania Route 1001, 1 mile southeast of Imlertown:

A—0 to 1 inch; very dark gray (10YR 3/1) very channery loam; moderate medium granular structure; very friable, nonsticky, nonplastic; many roots; about 55 percent rock fragments; extremely acid; clear smooth boundary.

E—1 to 5 inches; pale brown (10YR 6/3) very channery loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; many roots; about 40 percent rock fragments; extremely acid; clear smooth boundary.

BE—5 to 21 inches; light yellowish brown (10YR 6/4) very channery loam; moderate medium subangular blocky structure; very friable, nonsticky, nonplastic; many roots; about 40 percent rock fragments; extremely acid; clear wavy boundary.

Bt—21 to 44 inches; brownish yellow (10YR 6/6) extremely channery loam; moderate medium subangular blocky structure; very friable, slightly sticky, nonplastic; common roots; few faint clay films on faces of peds and in pores; about 65 percent rock fragments; very strongly acid; gradual irregular boundary.

BC—44 to 60 inches; brownish yellow (10YR 6/6) extremely channery loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; few roots; about 80 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. A weak argillic horizon is at a depth of 15 to 40 inches. Depth to bedrock is more than 60 inches. Chert fragments make up 40 to 80 percent of individual horizons in the solum and the C horizon. They average more than 50 percent in the top 20 inches of the Bt horizon. In unlimed areas the reaction is extremely acid or very strongly acid throughout.

The A horizon of undisturbed pedons has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

Some pedons have an Ap horizon that has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Texture of the fine-earth fraction is generally loam but in some pedons is silt loam or fine sandy loam.

The E horizon has hue of 10YR, value of 6 or 7, and chroma of 2 to 4. Texture of the fine-earth fraction is generally loam but in some pedons is silt loam or fine sandy loam.

The BE and B horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. Texture of the fine-earth fraction is generally loam but in some pedons is silt loam or fine sandy loam.

Some pedons have a C horizon that has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Texture of the fine-earth fraction is loam, silt loam, or fine sandy loam.

Ernest Series

Soils of the Ernest series are fine-loamy, mixed, mesic Aquic Fragiudults. They are very deep, moderately well drained soils on uplands. They formed in colluvium weathered from acid shale, siltstone, and some sandstone. Slopes range from 0 to 15 percent.

Ernest soils are on the landscape near Berks, Blairton, Weikert, Brinkerton, and Laidig soils. Unlike Ernest soils, Berks, Weikert, and Laidig soils are well drained. Ernest soils are deeper over bedrock than Blairton soils. Brinkerton soils are poorly drained.

Typical pedon of Ernest silt loam, 8 to 15 percent slopes, in King Township, about 3,340 feet east of the intersection of Pennsylvania Township Route T 540 and Pennsylvania Township Route T 542, in St. Clairsville:

Ap—0 to 10 inches; brown to dark brown (10YR 4/3) silt loam; moderate fine and medium granular structure; very friable, slightly sticky, slightly plastic; many medium roots; about 10 percent rock fragments; slightly acid; clear smooth boundary.

BA—10 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; about 10 percent rock fragments; strongly acid; clear smooth boundary.

Bt—20 to 31 inches; light yellowish brown (10YR 6/4) silty clay loam; common medium distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky, plastic; few fine roots; few faint clay films on faces of peds; about 10 percent rock fragments; strongly acid; abrupt wavy boundary.

Btx1—31 to 43 inches; strong brown (7.5YR 5/6) channery silty clay loam; many medium and coarse prominent light gray (10YR 7/1) mottles; very coarse prismatic structure parting to strong medium angular blocky; firm and brittle, sticky, plastic; common distinct clay films on faces of peds; about 12 percent rock fragments; very strongly acid; clear irregular boundary.

Btx2—43 to 63 inches; brown (7.5YR 5/4) channery silty clay loam; few coarse prominent light gray (10YR 7/1)

mottles; weak very coarse prismatic structure parting to moderate medium platy; firm and brittle; sticky, plastic; common distinct clay films and black (10YR 2/1) stains on faces of peds; about 12 percent rock fragments; strongly acid.

The thickness of the solum ranges from 45 to 72 inches. Depth to bedrock is more than 60 inches. The fragipan is at a depth of 20 to 36 inches. Fragments of shale, siltstone, and fine grained sandstone range from 5 to 25 percent above the fragipan, from 5 to 40 percent in the Bx horizon, and from 5 to 50 percent in the C horizon. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 7.5YR to 10YR, value of 4 or 5, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam.

The BA and Bt horizons have hue of 7.5YR to 10YR, value of 5 or 6, and chroma of 3 to 6. The Bt horizon has low chroma mottles. Texture of the fine-earth fraction is silty clay loam or silt loam.

The Bx horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 8. It is mottled. Texture of the fine-earth fraction is silty clay loam, clay loam, or silt loam.

Some pedons have a C horizon that has hue of 7.5YR to 10YR, value of 4 to 7, and chroma of 2 to 6. It is mottled. Texture of the fine-earth fraction is silty clay loam, clay loam, silt loam, or loam.

Hagerstown Series

Soils of the Hagerstown series are fine, mixed, mesic Typic Hapludalfs. They are deep or very deep, well drained soils on uplands. They formed in material weathered from limestone. Slopes range from 0 to 45 percent.

Hagerstown soils are on the landscape near Murrill, Opequon, and Morrison soils. Hagerstown soils have more clay in the upper part of the solum and a higher base saturation than Murrill soils. Hagerstown soils have more clay in the B horizon than Morrison soils. They are deeper over bedrock than Opequon soils.

Typical pedon of Hagerstown silt loam, 3 to 8 percent slopes, in Woodbury Township, 300 yards east of the intersection of Pennsylvania Township Route T 638 and Pennsylvania Township Route T 644, 100 yards southeast of Pennsylvania Township Route T 644:

Ap—0 to 7 inches; brown to dark brown (7.5YR 4/4) silt loam; moderate coarse and very coarse granular structure; friable, slightly sticky, slightly plastic; about 10 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw—7 to 14 inches; yellowish red (5YR 4/6) silty clay loam; weak coarse subangular blocky structure parting to strong coarse granular; friable, slightly sticky, slightly plastic; few patchy clay films on faces of peds; about 10 percent rock fragments; strongly acid; clear wavy boundary.

Bt1—14 to 29 inches; yellowish red (5YR 4/6) silty clay; moderate medium and coarse subangular blocky structure; firm, sticky, plastic; few faint clay films on faces of peds; about 10 percent rock fragments; strongly acid; gradual wavy boundary.

Bt2—29 to 50 inches; yellowish red (5YR 5/8) clay; strong coarse subangular blocky structure; firm, sticky, plastic; common distinct clay films on faces of peds; thick black (N 2/0) coatings on faces of peds; strongly acid; clear wavy boundary.

Bt3—50 to 60 inches; strong brown (7.5YR 5/6) clay; strong coarse subangular blocky structure; firm, sticky, plastic; few distinct clay films on faces of peds; moderately acid; clear wavy boundary.

R—60 to 66 inches; light gray to gray (10YR 6/1) soft weathered limestone; neutral.

The thickness of the solum ranges from 40 to 72 inches. Depth to bedrock is more than 40 inches. Fragments of chert and limestone range from 0 to 15 percent throughout the solum. In unlimed areas reaction ranges from strongly acid to slightly acid in the upper part of the solum and from strongly acid to neutral in the lower part.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam, silty clay loam, or clay loam.

The Bw horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam, silty clay loam, silty clay, or clay.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. Texture of the fine-earth fraction is silty clay or clay.

Some pedons have a C horizon that has hue of 10YR to 2.5YR, value of 3 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction ranges from loam to silt loam to clay.

Hazleton Series

Soils of the Hazleton series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are deep or very deep, well drained soils on uplands. They formed in material weathered from acid sandstone, conglomerate, and shale. Slopes range from 8 to 45 percent.

Hazleton soils are on the landscape near Dystrochrepts and Clymer, Bedington, and Buchanan soils. Hazleton soils are less variable in depth than Dystrochrepts.

Hazleton soils have less clay in the subsoil than Clymer and Bedington soils. Unlike Hazleton soils, Buchanan soils are moderately well drained.

Typical pedon of Hazleton channery sandy loam, in an area of Hazleton-Clymer association, 25 to 45 percent slopes, extremely stony, in South Woodbury Township, 2 miles south of Texas Corner and 300 feet west of Pennsylvania Township Route T 286:

Oe—1 inch to 0; undecomposed and partly decomposed leaves and twigs.

A—0 to 1 inch; black (10YR 2/1) channery sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; about 15 percent rock fragments; many fine and medium roots; extremely acid; abrupt smooth boundary.

E—1 to 2 inches; dark gray (10YR 4/1) channery sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; about 15 percent rock fragments; many medium and fine roots; very strongly acid; abrupt smooth boundary.

Bw1—2 to 15 inches; brown (7.5YR 5/4) very channery sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; about 35 percent rock fragments; common medium and fine roots; very strongly acid; gradual wavy boundary.

Bw2—15 to 33 inches; strong brown (7.5YR 5/6) very channery sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; about 50 percent rock fragments; common fine roots; very strongly acid; gradual wavy boundary.

CB—33 to 46 inches; strong brown (7.5YR 5/6) extremely channery loamy sand; weak medium subangular structure; friable, nonsticky, nonplastic; about 60 percent rock fragments; few fine roots; very strongly acid; gradual wavy boundary.

C—46 to 60 inches; strong brown (7.5YR 5/6) extremely channery loamy sand; single grain; loose, nonsticky, nonplastic; about 75 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 25 to 50 inches. Depth to bedrock ranges from 40 to 100 inches. Sandstone fragments range from 10 to 60 percent in the solum and from 35 to 80 percent in the C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Texture of the fine-earth fraction is sandy loam or loam.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4. Texture of the fine-earth fraction is sandy loam or loam.

The B horizon has hue of 10YR to 5YR, value of 3 to 6, and chroma of 3 to 8. Texture of the fine-earth fraction is sandy loam or loam.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8. Texture of the fine-earth fraction ranges from loam to loamy sand.

Holly Series

Soils of the Holly series are fine-loamy, mixed, nonacid, mesic Typic Fluvaquents. They are very deep, poorly drained soils. They formed in nonacid alluvium washed from uplands underlain by limestone and calcareous shale. Slopes range from 0 to 3 percent.

Holly soils are on the landscape near the well drained Opequon and Hagerstown soils.

Typical pedon of Holly silt loam, in Bedford Township, 2,000 feet north-northeast of the intersection of Pennsylvania Route 1018 and Pennsylvania Route T 545:

Ap—0 to 4 inches; dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; friable, nonsticky, nonplastic; many fine and medium roots; moderately acid; clear smooth boundary.

Bg1—4 to 9 inches; dark grayish brown (2.5Y 4/2) silt loam; common fine and medium prominent brown to dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine and medium roots; slightly acid; clear wavy boundary.

Bg2—9 to 20 inches; dark grayish brown (10YR 4/2) silt loam; many medium prominent yellowish red (5YR 4/6) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; moderately acid; clear wavy boundary.

Bg3—20 to 36 inches; grayish brown (10YR 5/2) silt loam; common medium prominent reddish brown (5YR 5/4) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; moderately acid; clear wavy boundary.

Bg4—36 to 40 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium and coarse prominent yellowish brown (10YR 5/6) and bluish gray (5B 6/1) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; moderately acid; clear wavy boundary.

Cg—40 to 60 inches; light gray to gray (10YR 6/1) gravelly sandy loam; common coarse prominent light olive brown (2.5YR 5/4) mottles; massive; very friable, nonsticky, nonplastic; about 25 percent rock fragments; moderately acid.

The thickness of the solum ranges from 20 to 44 inches. Depth to bedrock is more than 60 inches. Depth

of loamy deposits over sand and gravel is 40 or more inches. Fragments of rounded pebbles and cobbles range from 0 to 10 percent in the A and B horizons and from 0 to 25 percent in the C horizon. Reaction ranges from neutral to moderately acid in the A and B horizons and from moderately acid to mildly alkaline in the C horizon.

The Ap horizon has hue of 10YR, value of 4, and chroma of 1 or 2. In undisturbed pedons it has value of 2 or 3. Texture of the fine-earth fraction is silt loam or loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or less. It is mottled. Texture of the fine-earth fraction is silt loam, loam, sandy loam, or silty clay loam.

The C horizon has hue of 10YR to 5Y or is neutral, value of 4 to 7, and chroma of 2 or less. It is mottled. Texture of the fine-earth fraction is sandy loam, loam, or loamy sand.

Klinesville Series

Soils of the Klinesville series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. They are shallow, well drained soils on uplands. They formed in material weathered from acid, red to reddish brown shale, siltstone, and sandstone. Slopes range from 8 to 80 percent.

Klinesville soils are near the moderately deep Calvin, the deep, moderately well drained Albrights soils, and the deep Meckesville soils.

Typical pedon of Klinesville channery silt loam, 15 to 25 percent slopes, in East Providence Township, 500 feet northwest of the intersection of Pennsylvania Township Route T 484 and Pennsylvania Township Route T 495:

Ap—0 to 6 inches; dark reddish brown (5YR 3/3) channery silt loam; moderate medium granular structure; very friable, slightly sticky, slightly plastic; many medium roots; about 40 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw—6 to 18 inches; reddish brown (2.5YR 4/4) very channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; about 55 percent rock fragments; very strongly acid; gradual irregular boundary.

Cr—18 inches; dusky red (10R 3/3) and dark reddish brown (5YR 3/4); fractured, thin-bedded shale and siltstone.

The thickness of the solum and depth to bedrock range from 10 to 20 inches. Fragments of red shale, siltstone, and sandstone range from 20 to 75 percent in the solum and from 45 to 90 percent in the C horizon. In unlimed areas reaction ranges from moderately acid to very strongly acid throughout.

The A horizon has hue of 10R to 5YR, value of 2 to 4, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 10R to 5YR, value of 3 to 5, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam or loam.

Some pedons have a C horizon that has hue of 10R to 5YR, value of 3 or 4, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam or loam.

Laidig Series

Soils of the Laidig series are fine-loamy, siliceous, mesic Typic Fragiudults. They are very deep, well drained soils on uplands. They formed in colluvial deposits weathered from acid shale, siltstone, and sandstone. Slopes range from 3 to 35 percent.

Laidig soils are near Dystrochrepts and Buchanan, Bedington, and Berks soils. Dystrochrepts and Bedington and Berks soils do not have a fragipan. Buchanan soils are moderately well drained.

Typical pedon of Laidig cobbly loam, in an area of Laidig cobbly loam, 15 to 25 percent slopes, extremely stony, in East Providence Township, 40 feet north of Pennsylvania Township Route T 484, 0.8 mile north of the intersection with Pennsylvania Township Route T 495:

Oe—2 inches to 0 inch; hardwood leaves and very dark gray (10YR 3/1) partly decomposed organic matter.

A—0 to 2 inches; very dark gray (10YR 3/1) cobbly loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine to coarse roots; about 35 percent rock fragments; extremely acid; clear smooth boundary.

E—2 to 6 inches; light yellowish brown (10YR 6/4) channery loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; many medium roots; 35 percent rock fragments; very strongly acid; clear wavy boundary.

BE—6 to 17 inches; brown (7.5YR 5/4) channery loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; 25 percent rock fragments; very strongly acid; gradual smooth boundary.

Bt—17 to 33 inches; brown (7.5YR 5/4) channery loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common faint clay films on faces of peds; about 20 percent rock fragments; extremely acid; abrupt wavy boundary.

Btx1—33 to 42 inches; reddish brown (5YR 4/4) very channery silt loam; weak very coarse prismatic structure parting to moderate medium platy; firm, brittle, slightly sticky, slightly plastic; common distinct clay films and black (N 2/0) coatings on faces of peds;

about 40 percent rock fragments; extremely acid; clear smooth boundary.

Btx2—42 to 62 inches; reddish brown (5YR 5/4) very channery loam; few fine distinct reddish gray (5YR 5/2) mottles; moderate medium platy structure; firm, brittle, slightly sticky, slightly plastic; few distinct clay films and black (N 2/0) coatings on faces of peds; about 50 percent rock fragments; extremely acid.

The thickness of the solum is more than 60 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan is 30 to 45 inches. Subrounded to angular rock fragments range from 10 to 50 percent above the Bx horizon and from 15 to 70 percent in the Bx horizon. Rock fragments range from 20 to 70 percent in the C horizon. Some pedons do not have a C horizon. In unlimed areas the reaction is strongly acid to extremely acid throughout.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 4. Texture of the fine-earth fraction is dominantly loam but ranges from silt loam to sandy loam.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 6. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The BE and Bt horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons low chroma mottles are below a depth of 30 inches. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The Bx horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. Texture of the fine-earth fraction is clay loam, loam, sandy loam, or silt loam.

Some pedons have a C horizon that has hue of 10YR to 5YR, value of 5 or 6, and chroma of 3 to 8. Texture of the fine-earth fraction is clay loam, loam, sandy loam, or silt loam.

Leck Kill Series

Soils of the Leck Kill series are fine loamy, mixed, mesic Typic Hapludults. They are deep or very deep, well drained soils on uplands. They formed in material weathered from acid, red shale, siltstone, and sandstone. Slopes range from 0 to 25 percent.

Leck Kill soils are on the landscape near Basher, Albrights, and Meckesville soils. Basher and Albrights soils are moderately well drained. Meckesville soils have a fragipan.

Typical pedon of Leck Kill silt loam, in an area of Leck Kill-Calvin complex, 3 to 8 percent slopes, in West St. Clair Township, 750 feet northeast of the intersection of Pennsylvania Route 4024 and Gordon Creek Road:

Ap—0 to 7 inches; reddish brown (5YR 4/3) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; about 10 percent rock fragments; many fine roots; strongly acid; abrupt smooth boundary.

B1t—7 to 13 inches; reddish brown (2.5YR 4/4) channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 15 percent rock fragments; common fine roots; few faint clay films on peds; strongly acid; clear wavy boundary.

B2t—13 to 26 inches; dark red (2.5YR 3/6) channery silt loam; moderate medium subangular structure; friable, slightly sticky, plastic; about 15 percent rock fragments; few fine roots; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

B3t—26 to 38 inches; red (2.5YR 4/6) and weak red (10R 4/4) very channery silt loam; weak medium and coarse subangular blocky structure; friable, slightly sticky, slighty plastic; about 30 percent rock fragments; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—38 to 42 inches; red (2.5YR 4/6) very channery silt loam; weak coarse subangular blocky structure parting to massive; firm, slightly sticky, slightly plastic; about 40 percent rock fragments; few faint clay films on rock fragments; strongly acid; clear wavy boundary.

C—42 to 50 inches; dark reddish brown (2.5YR 3/4) very channery silt loam; massive; firm, nonsticky, nonplastic; about 80 percent rock fragments; few faint clay films and black (5YR 2.5/1) iron and manganese coatings on rock fragments; clear wavy boundary.

R—50 inches; weak red (2.5YR 4/2) fractured acid shale bedrock.

The thickness of the solum ranges from 24 to 48 inches. Depth to bedrock is more than 40 inches. Fragments of shale, siltstone, and sandstone range from 5 to 25 percent in the A and BA horizons, from 10 to 40 percent in the Bt horizon, from 35 to 65 percent in the BC horizon, and from 60 to 90 percent in the C horizon. In unlimed areas reaction ranges from neutral to very strongly acid in the solum and from very strongly acid to moderately acid in the C horizon.

The A horizon has hue of 7.5YR to 2.5YR, value of 3 or 4, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam or loam.

The BA horizon has hue of 7.5YR to 2.5YR, value of 3 or 4, and chroma of 4 or 5. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 5YR to 10R, value of 3 to 5, and chroma of 4 to 6. Texture of the fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

The BC horizon has colors and textures similar to those of the C horizon.

The C horizon has hue of 5YR to 10R, value of 3 or 4, and chroma of 4 to 6. Texture of the fine-earth fraction is silt loam, loam, or silty clay loam.

Lehew Series

Soils of the Lehew series are loamy-skeletal, siliceous, mesic Typic Dystrochrepts. They are moderately deep, well drained soils on uplands. They formed in material weathered from red sandstone and shale. Slopes range from 35 to 60 percent.

Lehew soils are on the landscape near Dystrochrepts and Ungers and Meckesville soils. Lehew soils are reddish and Dystrochrepts are yellowish brown. Lehew soils are shallower over bedrock than Ungers and Meckesville soils.

Typical pedon of Lehew channery sandy loam, in an area of Ungers-Lehew complex, 35 to 60 percent slopes, very stony, in Snake Spring Township, 1.5 miles east of the Ashcomb limestone quarry and 900 feet southwest of the lookout tower atop Tussey Mountain:

O—1 inch to 0; hardwood leaves and very dark gray (10YR 3/1) partly decomposed organic matter.

A—0 to 2 inches; dark gray (10YR 4/1) channery sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; about 30 percent rock fragments; many fine and medium roots; very strongly acid; abrupt smooth boundary.

BA—2 to 6 inches; dark reddish brown (5YR 3/3) very channery sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; about 40 percent rock fragments; many medium roots; very strongly acid; abrupt smooth boundary.

Bw—6 to 30 inches; reddish brown (5YR 4/4) very channery loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 40 percent rock fragments; many fine roots; very strongly acid; clear wavy boundary.

Cr—30 to 36 inches; reddish brown (5YR 4/4) extremely flaggy loam; friable, nonsticky, nonplastic; about 90 percent rock fragments; few roots; very strongly acid; diffuse broken boundary.

R—36 inches; fractured reddish brown shale and sandstone.

The thickness of the solum ranges from 20 to 30 inches. Depth to bedrock ranges from 20 to 40 inches. Fragments of sandstone, siltstone, and shale range from 20 to 40 percent in the A horizon, from 20 to 40 percent in the B horizon, and from 40 to 90 percent in the C horizon. In unlimed areas reaction is very strongly acid or strongly acid throughout.

The A horizon has hue of 10YR to 7.5YR, value of 3 or 4, and chroma of 1 or 2. Texture of the fine-earth fraction is sandy loam, fine sandy loam, or loam.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Texture of the fine-earth fraction is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 to 4. Texture of the fine-earth fraction is loamy sand, sandy loam, or loam.

Lobdell Series

Soils of the Lobdell series are fine-loamy, mixed, mesic Fluvaquentic Eutrochrepts. They are very deep, moderately well drained soils. They formed in alluvium and valley fill washed from uplands underlain by limestone, calcareous shale, and some sandstone. Slopes range from 0 to 3 percent.

Lobdell soils are on the landscape near the well drained Hagerstown soils and the poorly drained Holly soils.

Typical pedon of Lobdell loam, in Snake Spring Township, 200 yards east of the intersection of Pennsylvania Township Route 459 and Pennsylvania Township Route T 286:

Ap—0 to 9 inches; brown (10YR 4/3) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; many fine roots; about 5 percent rock fragments; slightly acid; abrupt smooth boundary.

AB—9 to 18 inches; very dark gray (10YR 3/1) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; many fine roots; about 10 percent rock fragments; slightly acid; abrupt smooth boundary.

Bw1—18 to 22 inches; yellowish brown (10YR 5/4) stratified silty clay loam and sandy loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; about 10 percent rock fragments; slightly acid; clear smooth boundary.

Bw2—22 to 32 inches; yellowish brown (10YR 5/4) gravelly clay loam; many medium distinct light gray (10YR 7/2) and reddish brown (5YR 5/4) mottles; weak coarse subangular blocky structure; friable, sticky, plastic; few fine roots; about 15 percent rock fragments; slightly acid; abrupt smooth boundary.

C—32 to 60 inches; yellowish brown (10YR 5/4) gravelly clay loam; many medium distinct light gray (10YR 7/2) mottles; massive; firm, slightly sticky, slightly plastic; about 15 percent rock fragments; slightly acid.

The thickness of the solum ranges form 24 to 40 inches. Depth to bedrock is more than 60 inches. Rock

fragments range from 0 to 5 percent in the A horizon and from 0 to 15 percent in the B and C horizons. In unlimed areas reaction ranges from moderately acid to neutral.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 or 4. Mottles of low chroma are at a depth of 15 to 24 inches. Texture of the fine-earth fraction is silt loam, loam, clay loam, silty clay loam, or sandy loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. Texture of the fine-earth fraction is loam, silt loam, clay loam, or sandy loam.

Meckesville Series

Soils of the Meckesville series are fine-loamy, mixed, mesic Typic Fragiudults. They are very deep, well drained soils on uplands. They formed in colluvium weathered from acid, red sandstone, siltstone, and shale. Slopes range from 3 to 35 percent.

Meckesville soils are near Dystrochrepts and Leck Kill, Lehew, Ungers, and Hazleton soils, which do not have a fragipan, and the moderately well drained Albrights soils.

Typical pedon of Meckesville gravelly loam, in an area of Meckesville gravelly loam, 8 to 15 percent slopes, very stony, in Colerain Township, 500 feet east of the intersection of Pennsylvania Route 326 and Martin Hill Road 650:

Oe—2 inches to 0; black (5YR 2.5/1) partly decomposed organic matter.

A—0 to 1 inch; dark reddish brown (5YR 3/2) gravelly loam; weak fine granular structure; very friable, nonsticky, nonplastic; about 15 percent rock fragments; extremely acid; clear smooth boundary.

E—1 to 4 inches; reddish brown (5YR 5/3) gravelly loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 15 percent rock fragments; extremely acid; clear smooth boundary.

Bt—4 to 28 inches; reddish brown (2.5YR 4/4) gravelly loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few faint clay films on faces of peds; about 20 percent rock fragments; very strongly acid; abrupt smooth boundary.

Btx—28 to 60 inches; reddish brown (2.5YR 4/4) gravelly loam; moderate very coarse prismatic structure parting to weak thick platy; firm, brittle, slightly sticky, slightly plastic; few faint clay films on faces of peds; about 30 percent rock fragments; extremely acid; gradual wavy boundary.

C—60 to 72 inches; weak red (10YR 4/4) gravelly loam; weak thick platy structure; firm, slightly sticky, slightly plastic; about 40 percent rock fragments; extremely acid.

The thickness of the solum is 40 to 80 inches or more. Depth to the fragipan is 25 to 48 inches. Some pedons have a fragipan as thin as 10 inches. Depth to bedrock is more than 60 inches. Red sandstone and shale fragments range from 5 to 30 percent in the upper part of the solum, from 10 to 50 percent in the lower part, and from 15 to 80 percent in the C horizon. In unlimed areas reaction is strongly acid to extremely acid throughout.

The A horizon has hue of 5YR or 7.5YR, value of 2 to 4, and chroma of 2 to 4. Texture of the fine-earth fraction is dominantly loam but is silt loam or sandy loam in some areas.

The E horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. Texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The Bt horizon has hue of 5YR to 10R, value of 3 to 5, and chroma of 3 to 6. Texture of the fine-earth fraction is loam, silt loam, silty clay loam, or clay loam.

The Bx horizon has hue of 5YR to 10R, value of 3 or 4, and chroma of 3 or 4. Texture of the fine-earth fraction ranges from loam to silty clay loam. Some pedons have low chroma mottles below a depth of 30 inches.

Some pedons have a C horizon that has hue of 5YR to 10R, value of 3 or 4, and chroma of 3 or 4. Texture of the fine-earth fraction is loam, silt loam, clay, or silty clay loam.

Mertz Series

Soils of the Mertz series are loamy-skeletal, mixed, mesic Typic Hapludults. They are very deep, well drained soils on uplands. They formed in colluvium weathered from cherty limestone. Slopes range from 8 to 15 percent.

Mertz soils are on the landscape near Elliber, Opequon, and Hagerstown soils. Mertz soils are not as clayey and contain more rock fragments throughout than Opequon and Hagerstown soils. Mertz soils contain fewer rock fragments throughout than Elliber soils.

Typical pedon of Mertz channery silt loam, 8 to 15 percent slopes, in Bedford Township, 1,300 feet northeast of entrance to Bedford Memorial Cemetery on US Route 220:

Ap—0 to 10 inches; brown to dark brown (10YR 4/3) channery silt loam, moderate medium and fine granular structure; very friable, slightly sticky, slightly plastic; many fine roots; about 30 percent rock fragments; neutral; abrupt smooth boundary.

BA—10 to 17 inches; yellowish brown (10YR 5/6) very channery clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic;

common fine roots; about 40 percent rock fragments; slightly acid; clear smooth boundary.

Bt1—17 to 36 inches; strong brown (7.5YR 5/6) very channery silty clay loam; moderate medium angular blocky structure; friable, sticky, plastic; common fine roots; few faint clay films on faces of peds; about 40 percent rock fragments; moderately acid; clear smooth boundary.

Bt2—36 to 52 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate coarse prismatic structure parting to moderate medium angular blocky; firm, sticky, plastic; few fine roots; few faint clay films on faces of peds; about 20 percent rock fragments; strongly acid; clear smooth boundary.

Bt3—52 to 70 inches; yellowish red (5YR 5/6) channery silty clay loam; moderate medium angular blocky structure; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; about 20 percent rock fragments; strongly acid; clear smooth boundary.

C—70 to 90 inches; strong brown (7.5YR 5/8) channery clay loam; massive; friable, slightly sticky, slightly plastic; few faint clay films on pebbles; few fine roots; about 30 percent rock fragments; strongly acid.

Thickness of the solum ranges from 40 to 75 inches. Depth to bedrock is 60 inches or more. Chert rock fragments range from 15 to 50 percent in the upper part of the solum and from 15 to 80 percent in the lower part and in the C horizon. In unlimed areas reaction ranges from neutral to strongly acid in the solum and is strongly acid or very strongly acid below.

The A horizon has hue of 7.5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam or loam.

The BA and B horizons have hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

The C horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is clay loam, silty clay loam, or loam.

Monongahela Series

Soils of the Monongahela series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep and very deep, moderately well drained soils. They formed in very old alluvium derived from uplands underlain by acid sandstone and shale. Slopes range from 0 to 15 percent.

Monongahela soils are on the landscape near Purdy, Blairton, and Tyler soils. They are similar to Purdy and Tyler soils but are better drained, not as clayey, and have a fragipan. They are deeper over bedrock than Blairton soils.

Typical pedon of Monongahela silt loam, 3 to 8 percent slopes, in Napier Township, 50 feet northwest of the intersection of Pennsylvania Township Route T 443 and Pennsylvania Township Route T 439:

Ap—0 to 9 inches; brown to dark brown (10YR 4/3) silt loam; moderate medium granular structure; very friable, slightly sticky, slightly plastic; about 10 percent rock fragments; many medium roots; strongly acid; abrupt smooth boundary.

Bt1—9 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; about 10 percent rock fragments; many medium roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—18 to 24 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; about 20 percent rock fragments; common medium roots; common distinct clay films on faces of peds; very strongly acid; abrupt smooth boundary.

Btx1—24 to 40 inches; yellowish brown (10YR 5/6) gravelly silty clay loam; common medium prominent light gray (10YR 7/1) and yellowish red (5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly brittle, sticky, plastic; about 20 percent rock fragments; few fine roots; common distinct clay films in pores and on faces of peds; very strongly acid; clear smooth boundary.

Btx2—40 to 62 inches; yellowish brown (10YR 5/4) silty clay loam; common coarse prominent light gray (10YR 7/1) and yellowish red (5YR 5/8) mottles; weak very coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly brittle, sticky, plastic; about 10 percent rock fragments; common distinct clay films in pores and on faces of peds; very strongly acid.

The thickness of the solum ranges from 45 to more than 60 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan is 20 to 30 inches. Rock fragments of rounded pebbles and cobbles range from 0 to 25 percent in the solum above the fragipan, from 0 to 35 percent in the fragipan, and from 10 to 40 percent in the C horizon. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture of the fine-earth fraction is loam, sandy clay loam, and silt loam.

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. Texture of the fine-earth fraction is

silt loam, loam, sandy clay loam, clay loam, or silty clay loam.

The Bx horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 8. Texture of the fine-earth fraction is silt loam, loam, clay loam, sandy clay loam, or silty clay loam.

Some pedons have a C horizon that has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. Texture of the fine-earth fraction is loam, sandy loam, silt loam, clay loam, or silty clay loam.

Morrison Series

Soils of the Morrison series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are very deep, well drained soils on uplands. They formed in material weathered from calcareous sandstone and dolomitic limestone. Slopes range from 3 to 25 percent.

Morrison soils are on the landscape near Vanderlip, Hagerstown, and Murrill soils. Morrison soils have more clay in the solum than Vanderlip soils and more sand in the solum than Hagerstown soils. Morrison soils have more sand in the lower part of the B horizon than Murrill soils.

Typical pedon of Morrison channery sandy loam, in an area of the Morrison-Murrill complex, 8 to 15 percent slopes, very stony, in Snake Spring Township, 200 feet northeast of the water tower east of Memorial Hospital and 200 feet north of US Route 30:

A—0 to 5 inches; very dark grayish brown (10YR 3/2) channery sandy loam; moderate very fine granular structure; very friable, nonsticky, nonplastic; about 15 percent rock fragments; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—5 to 21 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; loose, nonsticky, nonplastic; about 10 percent rock fragments; common medium roots; very strongly acid; clear wavy boundary.

Bt1—21 to 31 inches; yellowish brown (10YR 5/6) sandy loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 10 percent rock fragments; few fine roots; few faint clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—31 to 50 inches; brownish yellow (10YR 6/8) and yellowish red (5YR 5/8) gravelly sandy clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; about 20 percent rock fragments; few fine roots; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

C—50 to 60 inches; yellowish brown (10YR 5/8) gravelly sandy loam; single grain; loose, nonsticky, nonplastic; about 30 percent rock fragments; strongly acid.

The thickness of the solum ranges from 40 to 65 inches. Depth to bedrock is more than 72 inches. Fragments of sandstone, chert, or quartzite range from 2 to 20 percent in the solum and from 20 to 40 percent in the C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid in the upper part of the solum and is strongly acid or moderately acid in the lower part of the solum and in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 2 to 4. Texture of the fine-earth fraction is sandy loam or loamy sand.

The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. Texture of the fine-earth fraction is sandy loam, fine sandy loam, or loamy sand.

The B horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. Texture of the fine-earth fraction is loam, sandy loam, sandy clay loam, or clay loam.

The C horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 6 to 8. Texture of the fine-earth fraction is sandy loam or loamy sand.

Murrill Series

Soils of the Murrill series are fine-loamy, mixed, mesic Typic Hapludults. They are very deep, well drained soils on uplands. They formed in colluvium weathered from sandstone and shale. Slopes range from 3 to 25 percent.

Murrill soils are on the landscape near the Hagerstown, Opequon, Laidig, and Bedington soils. Murrill soils are deeper over bedrock and not as clayey in the upper part of the solum as Opequon soils. They are similar to Hagerstown soils but are not as clayey in the upper part of the solum and contain coarse fragments of sandstone. Unlike Murrill soils, Laidig soils have a fragipan. Murrill soils have a clayey substratum and Bedington soils have a shaly substratum.

Typical pedon of Murrill channery loam, 15 to 25 percent slopes, in Snake Spring Township, 900 feet northeast of the intersection of US Route 30 and Pennsylvania Route 286:

Ap—0 to 11 inches; brown to dark brown (10YR 4/3) channery loam; weak medium granular structure; friable, slightly sticky, slightly plastic; many fine roots; about 15 percent rock fragments; moderately acid; abrupt smooth boundary.

Bt1—11 to 27 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common faint clay films on faces of peds; common fine roots; about 15 percent rock fragments; strongly acid; clear smooth boundary.

Bt2—27 to 39 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; about 10 percent rock fragments; common distinct clay films

and black (10YR 2/1) stains on faces of peds; few fine roots; about 15 percent rock fragments; strongly acid; abrupt irregular boundary.

2Bt3—39 to 60 inches; red (2.5YR 5/6) clay; strong fine angular blocky structure; firm, very sticky, very plastic; many distinct clay films on faces of peds; about 5 percent rock fragments; moderately acid.

The thickness of the solum is 60 inches or more. Depth to bedrock is more than 60 inches. Sandstone fragments range from 10 to 30 percent in the upper part of the solum and from 0 to 40 percent in the lower part. In unlimed areas reaction ranges from moderately acid to very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Texture of the fine-earth fraction is loam, sandy loam, or silt loam.

Some pedons have an E horizon that has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. Texture of the fine-earth fraction is loam, sandy loam, or silt loam.

The upper part of the B horizon has hue of 10YR to 5YR and value and chroma of 4 to 6. Texture of the fine-earth fraction is silty clay loam, clay loam, loam, silt loam, or sandy clay loam.

The lower part of the B horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 2 to 8. In some pedons it is mottled. Texture of the fine-earth fraction is clay, silty clay, silty clay loam, or clay loam.

Nolin Series

Soils of the Nolin series are fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts. They are very deep, well drained soils. They formed in alluvial deposits washed from uplands underlain by limestone and calcareous shale. Slopes range from 0 to 3 percent.

Nolin soils are on the landscape near Hagerstown, Opequon, and Lobdell soils. Hagerstown and Opequon soils have a clayey texture in the subsoil. Lobdell soils are moderately well drained.

Typical pedon of Nolin silt loam, in Kimmell Township, 2,000 feet southwest of King, 2,000 feet west of intersection of US 220 and Pennsylvania Route 4029, and 200 feet north of Pennsylvania Route 4029:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; very friable, nonsticky, nonplastic; many fine roots; neutral; abrupt smooth boundary.

Bw—10 to 50 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; very friable, slightly sticky, slightly plastic; common fine roots; slightly acid; clear smooth boundary.

C—50 to 60 inches; yellowish brown (10YR 5/4) gravelly silt loam; massive; friable, slightly sticky, slightly plastic; about 30 percent rock fragments; slightly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded pebbles range from 0 to 5 percent in the solum and from 0 to 35 percent in the C horizon. In unlimed areas reaction is slightly acid or neutral throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture of the fine-earth fraction is loam or silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. Texture of the fine-earth fraction is silt loam or silty clay loam.

The C horizon has hue of 2.5Y to 7.5YR, value of 4 or 5, and chroma of 2 to 4. Texture of the fine-earth fraction is sandy loam, loam, silt loam, or silty clay loam.

Opequon Series

Soils of the Opequon series are clayey, mixed, mesic Lithic Hapludalfs. They are shallow, well drained soils on uplands. They formed in material weathered from limestone. Slopes range from 3 to 45 percent.

Opequon soils are on the landscape near the deep, well drained Hagerstown soils, the deep, poorly drained Holly soils, and the deep, moderately well drained Clarksburg soils.

Typical pedon of Opequon silty clay loam, in an area of Opequon-Hagerstown complex, 8 to 15 percent slopes, very rocky, in Snake Spring Township, 450 feet west of the intersection of Pennsylvania Route 286 and US Route 30:

Ap—0 to 8 inches; reddish brown (5YR 4/3) silty clay loam; strong medium granular structure; friable, slightly sticky, slightly plastic; many fine roots; about 10 percent rock fragments; neutral; abrupt smooth boundary.

Bt1—8 to 16 inches; yellowish red (5YR 4/6) silty clay; strong medium and fine angular blocky structure; firm, sticky, plastic; common fine roots; continuous distinct clay films on faces of peds; common black (5YR 2.5/1) coatings on faces of peds; about 10 percent rock fragments; neutral; clear wavy boundary.

Bt2—16 to 18 inches; yellowish red (5YR 4/6) silty clay; moderate medium angular blocky structure; firm, sticky, plastic; common fine roots; continuous distinct clay films on faces of peds; common black (5YR 2.5/1) coatings on faces of peds; about 10 percent rock fragments; neutral; abrupt irregular boundary.

R—18 inches; gray to light gray (10YR 6/1) fractured limestone bedrock.

The thickness of the solum and depth to bedrock range from 12 to 20 inches. Fragments of limestone and chert range from 0 to 35 percent in the solum. In unlimed areas reaction ranges from slightly acid to mildly alkaline throughout.

The A horizon has hue of 10YR to 5YR, value of 3 to 5, and chroma of 2 to 4. Texture of the fine-earth fraction is silty clay loam, clay loam, or silt loam.

The B horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8. Texture of the fine-earth fraction is silty clay or clay.

Some pedons have a C horizon that has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 8. Texture of the fine-earth fraction is silty clay, clay loam, or clay. The C horizon generally is 1 to 3 inches thick and in some pedons is calcareous.

Penlaw Series

Soils of the Penlaw series are fine-silty, mixed, mesic Aquic Fragiudalfs. They are deep or very deep, somewhat poorly drained soils on uplands. They formed in colluvium weathered from limestone. Slopes range from 0 to 8 percent.

Penlaw soils are on the landscape near Clarksburg, Buchanan, Murrill, Edom, and Westmoreland soils. Clarksburg soils are moderately well drained. Buchanan soils are more acid and contain more large rock fragments than Penlaw soils. Murrill, Edom, and Westmoreland soils are well drained.

Typical pedon of Penlaw silt loam, 0 to 8 percent slopes, in South Woodbury Township, 3,300 feet east of the intersection of Pennsylvania Route 0867 and Pennsylvania Route 0869:

Ap—0 to 9 inches; brown to dark brown (10YR 4/3) silt loam; moderate medium crumb structure; friable, nonsticky, nonplastic; common fine roots; about 4 percent rock fragments; slightly acid; abrupt smooth boundary.

Bt1—9 to 14 inches; brownish yellow (10YR 6/6) silt loam; common fine distinct, yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common distinct clay films on faces of peds; about 2 percent rock fragments; slightly acid; clear wavy boundary.

Bt2—14 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; common medium prominent strong brown (7.5YR 5/8) mottles and few fine prominent, light brownish gray (10YR 6/2) mottles; strong medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; many distinct clay films on faces of peds; about 2 percent rock fragments; neutral; gradual wavy boundary.

Bt3—20 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; many medium and coarse prominent yellowish red (5YR 5/8) and pinkish gray (7.5YR 6/2) mottles; strong medium subangular blocky structure; firm, sticky, slightly plastic; many prominent clay films on faces of peds; about 5 percent rock fragments; slightly acid; gradual wavy boundary.

Btx1—28 to 56 inches; variegated strong brown (7.5YR 5/8) and light yellowish brown (10YR 6/4) channery silty clay loam; many medium prominent, light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure parting to moderate coarse platy; firm, brittle, slightly sticky, slightly plastic; many distinct clay films on faces of peds; about 25 percent rock fragments; moderately acid; gradual wavy boundary.

Btx2—56 to 72 inches; strong brown (7.5YR 5/8) channery silty clay loam; many medium prominent, light gray (7.5YR N 7/) mottles; moderate medium subangular blocky structure; firm and brittle, slightly sticky, slightly plastic; common distinct clay films on faces of peds; about 30 percent rock fragments; moderately acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to bedrock is 40 to 72 inches or more. Depth to the fragipan ranges from 15 to 30 inches. Fragments of sandstone, chert, or limestone range from 0 to 10 percent above the fragipan and from 5 to 30 percent in the fragipan and the C horizon. In unlimed areas reaction ranges from moderately acid to neutral throughout.

The Ap horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 or 3. Texture of the fine-earth fraction is silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 or 8. It has low chroma mottles at a depth of 8 to 18 inches. Texture of the fine-earth fraction is silt loam or silty clay loam.

The Bx horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. It is mottled. Texture of the fine-earth fraction is silt loam or silty clay loam.

Some pedons have a C horizon that has hue of 10YR to 5YR, value of 3 to 6, and chroma of 2 to 6. It is mottled. Texture of the fine-earth fraction is silt loam to silty clay.

Philo Series

Soils of the Philo series are coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. They are deep and very deep, moderately well drained soils. They formed in alluvial materials washed from uplands underlain by acid siltstone, shale, and some sandstone. Slopes range from 0 to 3 percent.

Philo soils are on the landscape near the well drained

Berks, Weikert, and Allegheny soils, the poorly drained Atkins soils, and the moderately well drained Ernest soils. Ernest soils have a fragipan.

Typical pedon of Philo silt loam, in Napier Township, 3,000 feet north of the intersection of Pennsylvania Route 0031 and Pennsylvania Route 0096:

Ap—0 to 8 inches; brown to dark brown (10YR 4/3) silt loam; moderate coarse granular structure; very friable, nonsticky, nonplastic; many medium roots; very strongly acid; abrupt smooth boundary.

Bw1—8 to 22 inches; brown (7.5YR 5/4) silt loam; weak coarse subangular blocky structure; very friable, nonsticky, nonplastic; common fine roots; very strongly acid; gradual wavy boundary.

Bw2—22 to 32 inches; brown (7.5YR 5/4) silt loam; common medium prominent light gray to gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; few fine roots; very strongly acid; clear smooth boundary.

C1—32 to 40 inches; light brownish gray (10YR 6/2) cobbly fine sandy loam; common medium prominent light gray (10YR 7/1) and strong brown (7.5YR 5/8) mottles; massive; friable, nonsticky, nonplastic; few fine roots; about 30 percent rock fragments; very strongly acid; clear smooth boundary.

C2—40 to 60 inches; light brownish gray (10YR 6/2) cobbly sandy loam; common medium prominent light gray (10YR 7/1) and strong brown (7.5YR 5/6) mottles; massive; friable, nonsticky, nonplastic; about 30 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. Depth to bedrock is more than 40 inches. Rock fragments of rounded pebbles range from 0 to 20 percent in the solum and from 10 to 80 percent in the C horizon. In unlimed areas reaction ranges from moderately acid to very strongly acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 5. Depth to low chroma mottles is 12 to 24 inches. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam.

The C horizon has hue of 2.5Y to 7.5YR, value of 4 to 6, and chroma of 0 to 2. It is mottled. Texture of the fine-earth fraction is sandy loam to silt loam.

Pope Series

Soils of the Pope series are coarse-loamy, mixed, mesic Fluventic Dystrochrepts. They are very deep, well drained soils. They formed in alluvium washed from uplands underlain by acid siltstone, shale, and some sandstone. Slopes range from 0 to 3 percent.

Pope soils are on the landscape near the moderately well drained Philo and Monongahela soils and the poorly drained Purdy soils.

Typical pedon of Pope fine sandy loam, in Snake Spring Township, 4,000 feet south of US Route 30 and 600 feet east of Pennsylvania Township Route T 454:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate medium granular structure; very friable, nonsticky, nonplastic; many fine roots; neutral; clear smooth boundary.

Bw1—9 to 20 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; common fine roots; moderately acid; clear smooth boundary.

Bw2—20 to 36 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; strongly acid; gradual wavy boundary.

Bw3—36 to 48 inches; strong brown (7.5YR 5/6) fine sandy loam; few medium prominent light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; very strongly acid; gradual wavy boundary.

C—48 to 62 inches; yellowish brown (10YR 5/6) sandy loam; single grain; loose, nonsticky, nonplastic; few fine roots; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded pebbles range from 0 to 15 percent in the solum and from 0 to 40 percent in the C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Texture of the fine-earth fraction is fine sandy loam, silt loam, or loam.

The B horizon has hue of 10YR of 7.5YR, value of 4 to 6, and chroma of 3 to 6. Texture of the fine-earth fraction is fine sandy loam, sandy loam, loam, or silt loam.

The C horizon has hue of 10YR to 7.5YR, value of 4 to 6, and chroma of 3 to 6. Texture of the fine-earth fraction is loam, sandy loam, or sandy clay loam.

Purdy Series

Soils of the Purdy series are clayey, mixed, mesic Typic Ochraquults. They are very deep, poorly drained soils. They formed in water-deposited materials derived from soils on uplands underlain by shale and siltstone. Slopes range from 0 to 3 percent.

Purdy soils are near the moderately well drained Monongahela, Philo, and Basher soils, the somewhat

poorly drained Tyler soils, and the poorly drained Brinkerton soils. Unlike Purdy soils, Brinkerton soils have a fragipan.

Typical pedon of Purdy silty clay loam, 0 to 3 percent slopes, in Juniata Township, 1,500 feet east of the intersection of Pennsylvania Township Route T 402 and Pennsylvania Township Route T 435 and 450 feet south of T 435:

Ap—0 to 8 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; many medium roots; strongly acid; abrupt smooth boundary.

Btg1—8 to 20 inches; grayish brown (2.5Y 5/2) silty clay; many fine or medium prominent brownish yellow (10YR 6/6) and light gray (10YR 7/1) mottles; strong fine subangular blocky structure; firm, sticky, plastic; common fine roots; common distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Btg2—20 to 40 inches; gray (10YR 5/1) silty clay; many fine prominent yellowish brown (10YR 5/6) mottles; strong medium subangular blocky structure; firm, sticky, plastic; few fine roots; about 5 percent rock fragments; continuous distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Cg—40 to 60 inches; light brownish gray (2.5Y 6/2) gravelly silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; massive; friable, sticky, plastic; about 30 percent rock fragments; strongly acid.

The thickness of the solum ranges from 30 to 50 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded sandstone and shale pebbles range from 0 to 10 percent in the solum and from 5 to 40 percent in the C horizon. In unlimed areas reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 0 to 2. Texture of the fine-earth fraction is silty clay loam or silt loam.

The B horizon has hue of 10YR, 2.5Y, 5Y or is neutral, value of 4 or 5, and chroma of 0 to 2. Texture of the fine-earth fraction is silty clay, silty clay loam, or clay.

The C horizon has hue of 10YR to 5Y or is neutral, value of 4 to 6, and chroma of 0 to 3. Texture of the fine-earth fraction is silty clay, silty clay loam, or clay loam.

Tyler Series

Soils of the Tyler series are fine-silty, mixed, mesic Aeric Fragiaquults. They are very deep, somewhat poorly drained soils. They formed in old alluvium derived from soils on uplands underlain by shale and siltstone. Slopes range from 0 to 8 percent.

Tyler soils are near the moderately well drained Monongahela soils, the well drained Allegheny soils, and the poorly drained Purdy soils.

Typical pedon of Tyler silt loam, 0 to 3 percent slopes, in Harrison Township, 500 feet east of Pennsylvania Township Route T 418 and 210 feet south of the Interstate 76:

Ap—0 to 9 inches; grayish brown (2.5Y 5/2) silt loam; moderate medium granular structure; friable, nonsticky, nonplastic; many fine roots; neutral; abrupt smooth boundary.

Bt—9 to 19 inches; pale brown (10YR 6/3) silty clay loam; common medium distinct light gray (10YR 7/1) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few faint clay films on faces of peds in lower part; slightly acid; clear smooth boundary.

Btx1—19 to 27 inches; variegated strong brown (7.5YR 5/6) and light gray to gray (10YR 6/1) silty clay loam; many coarse prominent reddish gray (5YR 5/2) mottles; strong coarse prismatic structure; firm, slightly brittle, sticky, plastic; few roots on faces of peds; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Btx2—27 to 50 inches; variegated yellowish brown (10YR 5/6) and light gray to gray (10YR 6/1) silty clay loam; many coarse prominent reddish gray (5YR 5/2) mottles; strong very coarse prismatic structure parting to moderate very thick platy; firm, slightly brittle, sticky, plastic; few flattened roots on faces of peds; common distinct clay films on horizontal plate faces; very strongly acid; gradual smooth boundary.

Cg—50 to 60 inches; light gray to gray (10YR 6/1) gravelly clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; firm, slightly sticky, slightly plastic; about 15 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 40 to 65 inches. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 15 to 24 inches. Rock fragments of rounded pebbles and cobbles range from 0 to 5 percent in the A and B horizons and from 0 to 15 percent in the C horizon. In unlimed areas reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3. Texture of the fine-earth fraction is silt loam or silty clay loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6. It is mottled. Texture of the fine-earth fraction is silty clay loam or silt loam.

The Bx horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 0 to 3. It is mottled. Texture of the fine-earth fraction is silty clay loam to clay loam.

The C horizon has hue of 10YR to 2.5Y, value of 5 or 6, and chroma of 0 to 6. It is mottled. Texture of the fine-earth fraction is loam, silt loam, clay loam, and silty clay loam.

Udorthents

Soils mapped as Udorthents are very deep to shallow and excessively well drained to poorly drained. They formed in a heterogenous mix of rock fragments and soil material that have been disturbed in earthmoving. Slopes range from 3 to 80 percent.

Udorthents are commonly near Wharton, Hazleton, Clymer, Berks, Buchanan, Calvin, and Laidig soils. Udorthents do not have the distinct horizonation of any of these soils and generally have greater amounts of rock fragments.

These soils are variable; hence, a typical pedon is not given.

The thickness of the solum ranges from 0 to 20 inches. Depth to bedrock ranges from less than 10 inches to more than 60 inches. Rock fragments range from 30 to 95 percent throughout. In unlimed areas reaction is extremely acid to strongly acid throughout.

The A horizon has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 1 to 4. Texture of the fine-earth fraction ranges from sandy loam to silty clay loam.

The C horizon has hue of 5YR to 5Y, value of 3 to 6, and chroma of 1 to 8. Texture of the fine-earth fraction ranges from sandy loam to silty clay loam.

Ungers Series

Soils of the Ungers series are fine-loamy, mixed, mesic Typic Hapludults. They are deep or very deep, well drained soils on uplands. They formed in material weathered from red to reddish brown sandstone, siltstone, and shale. Slopes range from 35 to 60 percent.

Ungers soils are near Dystrochrepts and Lehew and Meckesville soils. Dystrochrepts are yellowish brown and Ungers soils are reddish. Ungers soils are deeper over bedrock than Lehew soils. Ungers soils are similar to Meckesville soils but do not have a fragipan.

Typical pedon of Ungers channery silt loam, in an area of Ungers-Lehew complex, 35 to 60 percent slopes, very stony, in South Woodbury Township, 4,000 feet west of Brumbaugh on PA 869 and 1,000 feet east of top of Dunning Mountain:

Oe—1 inch to 0; undecomposed and partly decomposed leaves and twigs.

A—0 to 2 inches; very dark gray (5YR 3/1) channery silt loam; weak very fine granular structure; very friable, nonsticky, nonplastic; about 15 percent rock fragments; many fine and medium roots; very strongly acid; abrupt wavy boundary.

BE—2 to 8 inches; reddish brown (5YR 5/3) channery loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; about 15 percent rock fragments; many medium roots; very strongly acid; gradual wavy boundary.

Bt1—8 to 18 inches; reddish brown (2.5YR 4/4) channery loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; very few faint clay films on faces of peds; about 20 percent rock fragments; common fine roots; very strongly acid; gradual wavy boundary.

Bt2—18 to 36 inches; dark reddish brown (2.5YR 3/4) channery loam; moderate medium subangular blocky structure; firm, nonsticky, nonplastic; few faint clay films on ped faces; about 30 percent rock fragments; common fine roots; very strongly acid; diffuse wavy boundary.

C—36 to 62 inches; reddish brown (5YR 4/4) very channery loam; massive; firm, nonsticky, nonplastic; about 50 percent rock fragments; few fine roots; very strongly acid; diffuse irregular boundary.

R—62 inches; moderately thick-bedded, fine grained, red sandstone, siltstone, and shale.

The thickness of the solum ranges from 30 to 50 inches. Depth to bedrock ranges from 40 to 80 inches. Fragments of red sandstone, siltstone, and shale range from 5 to 30 percent in the surface, from 5 to 50 percent in the B horizon, and from 40 to 90 percent in the C horizon. In unlimed areas reaction ranges from extremely acid to strongly acid throughout.

The A horizon has hue of 10YR to 5YR, value of 3 to 5, and chroma of 2 to 4. Texture of the fine-earth fraction is loam or silt loam.

The BE and B horizons have hue of 5YR to 10R, value of 3 to 5, and chroma of 3 or 4. Texture of the fine-earth fraction is loam, clay loam, or sandy clay loam.

The C horizon has hue of 5YR to 10R, value of 3 to 5, and chroma of 3 or 4. Texture of the fine-earth fraction is loam or sandy loam.

Vanderlip Series

Soils of the Vanderlip series are mesic, coated Typic Quartzipsamments. They are very deep, well drained soils on uplands. They formed in material weathered from nonacid sandstone. Slope ranges from 35 to 60 percent.

Vanderlip soils are on the landscape near Morrison,

Buchanan, Mertz, and Elliber soils. They have more sand throughout than these other soils. They are better drained than Buchanan soils and do not have a fragipan.

Typical pedon of Vanderlip loamy sand, in an area of Vanderlip-Rock outcrop complex, 35 to 60 percent slopes, in Monroe Township, 1,000 yards south of the intersection of Pennsylvania Township Route T 365 and Pennsylvania Route 2015:

A—0 to 3 inches; dark gray (10YR 4/1) loamy sand; weak coarse granular structure; very friable, nonsticky, nonplastic; about 5 percent rock fragments; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—3 to 20 inches; light yellowish brown (10YR 6/4) loamy sand; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; about 5 percent rock fragments; common fine and medium roots; very strongly acid; gradual smooth boundary.

Bw1—20 to 46 inches; brownish yellow (10YR 6/6) loamy sand; moderate medium subangular blocky structure; friable, nonsticky, nonplastic; about 5 percent rock fragments; few fine roots; very strongly acid; abrupt smooth boundary.

Bw2—46 to 48 inches; yellowish brown (10YR 5/4) loamy sand; moderate medium subangular blocky structure; friable, nonsticky, nonplastic; about 5 percent rock fragments; few fine roots; very strongly acid; abrupt smooth boundary.

BC—48 to 60 inches; very pale brown (10YR 8/4) sand; few thin lenses of yellowish brown (10YR 5/4) loamy sand lamellae 0.5 to 1 inch thick; single grain; loose, nonsticky, nonplastic; about 10 percent rock fragments; very few fine roots; very strongly acid; diffuse wavy boundary.

C—60 to 72 inches; yellowish brown (10YR 5/4) gravelly sand; massive; loose, nonsticky, nonplastic; about 30 percent rock fragments; very strongly acid.

The thickness of the solum is 45 to 72 inches. Depth to bedrock is more than 60 inches. Fragments of sandstone and quartzite range from 0 to 20 percent in the upper part of the solum, from 0 to 40 percent in the lower part, and from 0 to 70 percent in the C horizon. In unlimed areas reaction is moderately acid to very strongly acid throughout.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 3. Texture of the fine-earth fraction is loamy sand.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. Texture of the fine-earth fraction is loamy sand.

The B horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 6. Texture of the fine-earth fraction is loamy sand or sand. Some pedons have lamellae that have hue of 10YR to 7.5YR, value of 4 or 5, and chroma of 3 to 6.

The BC horizon has hue of 2.5Y or 10YR, value of 5 to 8, and chroma of 4 to 8. Texture of the fine-earth fraction is sand or loamy sand. Thin lenses of lamellae have hue of 10YR to 7.5YR, value of 4 or 5, and chroma of 3 to 6. Texture of the fine-earth fraction is loamy sand or sand. Lamellae have texture of loamy sand or sandy loam.

The C horizon has hue of 2.5Y or 10YR, value of 5 to 8, and chroma of 4 to 8. Texture of the fine-earth fraction is sand or loamy sand.

Weikert Series

Soils of the Weikert series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. They are shallow, well drained soils on uplands. They formed in material derived from weathered acid shale, siltstone, and some sandstone. Slopes range from 8 to 65 percent.

Weikert soils are near the moderately deep Berks soils, the moderately well drained Blairton soils, and the poorly drained Brinkerton and Atkins soils. They also are near the reddish brown Calvin and Klinesville soils.

Typical pedon of Weikert channery silt loam, 8 to 15 percent slopes, in a wooded area of Hopewell Township, 600 yards southeast of the intersection of Pennsylvania Township Route T 466 and Pennsylvania Township Route T 877:

Oe—1 inch to 0; undecomposed hardwood leaf litter and partly decomposed organic matter.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; very friable, nonsticky, nonplastic; about 25 percent coarse fragments; many fine and medium roots; very strongly acid; clear smooth boundary.

E—2 to 5 inches; light yellowish brown (10YR 6/4) very channery silt loam; weak fine granular structure; friable, nonsticky, slightly plastic; about 45 percent rock fragments; many fine and medium roots; very strongly acid; clear smooth boundary.

Bw—5 to 18 inches; yellowish brown (10YR 5/6) very channery silt loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 50 percent rock fragments; common fine roots; very strongly acid; diffuse irregular boundary.

Cr—18 inches; light olive brown (2.5Y 5/4) fractured, thin-bedded shale and siltstone; very strongly acid.

The solum is 8 to 20 inches thick. Depth to bedrock is 10 to 20 inches. Fragments of shale, siltstone, or sandstone range from 20 to 50 percent in the A horizon, from 35 to 60 percent in the B horizon, and from 60 to 85 percent in the C horizon. In unlimed areas reaction is moderately acid to very strongly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. Texture of the fine-earth fraction is silt loam or loam.

The E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam or loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam or loam.

Some pedons have a C horizon that has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam or loam.

Westmoreland Series

Soils of the Westmoreland series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are deep or very deep, well drained soils on uplands. They formed in material weathered from calcareous shale and interbedded limestone. Slopes range from 3 to 25 percent.

Westmoreland soils are on the landscape near the shallow Opequon soils, the clayey Edom soils, and the moderately deep Berks soils.

Typical pedon of Westmoreland channery silt loam, 8 to 15 percent slopes, in Bedford Township, 0.5 mile north of Belden and 180 feet east of Pennsylvania Route 1001:

Ap—0 to 8 inches; brown (10YR 5/3) channery silt loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; many medium roots; about 15 percent coarse fragments; strongly acid; abrupt smooth boundary.

BE—8 to 16 inches; yellowish brown (10YR 5/4) channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; about 15 percent rock fragments; moderately acid; abrupt smooth boundary.

Bt—16 to 28 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common distinct clay films on faces of peds; about 15 percent rock fragments; moderately acid; gradual wavy boundary.

C—28 to 50 inches; light olive brown (2.5Y 5/4) very channery silty clay loam; massive; very friable, slightly sticky, slightly plastic; few fine roots; about 50 percent rock fragments; moderately acid; gradual irregular boundary.

Cr—50 to 60 inches; thin-bedded calcareous shale that has some interbedded limestone.

The thickness of the solum ranges from 20 to 40 inches. Depth to bedrock is 40 to more than 60 inches. Fragments of shale and limestone range from 2 to 30 percent in the A and B horizons, from 5 to 70 percent in the BC horizon, and from 45 to 90 percent in the C horizon. Some pedons do not have a BC horizon. In unlimed areas reaction ranges from very strongly acid to moderately acid in the solum and is strongly acid or moderately acid in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma 2 or 3. Texture of the fine-earth fraction is silt loam or silty clay loam.

Some pedons have an E horizon that has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture of the fine-earth fraction is loam or silt loam.

The BE and Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. Texture of the fine-earth fraction is silt loam to silty clay loam.

The C horizon has hue of 2.5Y to 10YR, value of 4 or 5, and chroma of 4 to 6. Texture of the fine-earth fraction is silt loam or silty clay loam.

Wharton Series

Soils of the Wharton series are fine-loamy, mixed, mesic Aquic Hapludults. They are deep or very deep, moderately well drained soils on uplands. They formed in material weathered from acid clay shale interbedded with siltstone and sandstone. Slopes range from 3 to 15 percent.

Wharton soils are on the landscape near Blairton, Bedington, Hazleton, and Berks soils. Wharton soils are deeper over bedrock than Blairton and Berks soils. Bedington and Hazleton soils are well drained.

Typical pedon of Wharton channery silt loam, 8 to 15 percent slopes, very stony, in Broad Top Township, 2,400 feet south of Kearney on Pennsylvania Township Route T 550 and 200 feet west of Pennsylvania Township Route T 550:

Ap—0 to 6 inches; brown to dark brown (10YR 4/3) channery silt loam; moderate medium granular structure parting to subangular blocky; friable, slightly sticky, slightly plastic; about 15 percent rock fragments; many fine and medium roots; very strongly acid; abrupt smooth boundary.

Bt1—6 to 21 inches; reddish yellow (7.5YR 6/6) channery silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; about 15 percent rock fragments; many fine and medium roots; many distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—21 to 32 inches; reddish yellow (7.5YR 6/6) channery silty clay loam; common medium prominent light gray (10YR 7/1) mottles; moderate medium and coarse angular blocky structure; firm, slightly sticky,

slightly plastic; about 20 percent rock fragments; common medium roots; common distinct clay films on faces of peds; extremely acid; clear wavy boundary.

Bt3—32 to 39 inches; yellowish brown (10YR 5/6) channery silty clay loam; few fine prominent light gray (10YR 7/1) mottles; moderate medium and coarse subangular blocky structure; firm, slightly sticky, slightly plastic; about 20 percent rock fragments; few medium roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

BC—39 to 46 inches; brownish yellow (10YR 6/6) very channery silty clay loam; few fine prominent light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few medium roots; about 40 percent rock fragments; very few faint clay films on faces of peds; extremely acid; clear wavy boundary.

C—46 to 65 inches; brownish yellow (10YR 6/6) very channery silty clay loam; few fine prominent light gray (10YR 7/1) mottles; massive; firm, slightly sticky, slightly plastic; about 40 percent rock fragments; many black (10YR 2/1) stains on faces of peds; extremely acid.

The thickness of the solum ranges from 30 to 60 inches. Depth to bedrock is more than 40 inches. Fragments of shale and fine grained sandstone range from 5 to 20 percent in the upper part of the solum, from 10 to 50 percent in the lower part, and from 20 to 90 percent in the C horizon. In unlimed areas reaction ranges from extremely acid to strongly acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 8. It is mottled. Texture of the fine-earth fraction is silt loam or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6. It is generally mottled. Texture of the fine-earth fraction is silt loam or silty clay loam.

Formation of the Soils

This section describes the factors and processes of soil formation and relates them to the soils of Bedford County.

Factors of Soil Formation

Soils consist of mixed weathered rocks, minerals, organic matter, water, and air. Soils formed through the chemical and physical weathering of geologic materials. The extent of the weathering and the characteristics of any soil depend on the nature of the parent rock; the climate; the relief, or lay of the land; the plant and animal life in and on the soil; and the length of time these factors have affected development.

In an area of the size of Bedford County, vegetation, climate, and time factors vary only slightly. The parent material and relief are responsible for most differences in soil properties.

Parent rock determines the texture and mineral content of soils. Relief affects drainage, aeration, runoff, erosion, and exposure to sun and wind. Plant and animal life influence soil characteristics by physical and chemical changes. Climate influences the nature and extent of the weathering processes. Time is required for the processes responsible for soil development. Long periods generally are needed for soil development.

Parent Material

Parent material is the unconsolidated mass from which soils formed. It determines the mineralogical and chemical composition of the soil and, to a large extent, the rate at which soil-forming processes take place. In the early stages of soil formation, the mineralogical, physical, and chemical properties of the soil closely resemble those of the parent material. Weikert soils, for example, are similar in composition to the acid shale from which they formed. As soils age, processes of soil formation alter rocks and minerals and the resulting soils generally have quite different characteristics. The properties of Hagerstown soils, for example, differ greatly from the original limestone parent material.

Many soils in Bedford County formed in place in residuum directly over the original bedrock. Soils mapped as Dystrochrepts on major ridges formed in hard orthoquartzite and sandstone. Vanderlip soils formed in sandstone on lower ridges. Elliber soils formed in very cherty limestone on other low ridges. Berks and Weikert soils formed in olive, gray, and yellow, acid shale, siltstone, and sandstone. Calvin and Klinesville soils, which are similar, formed in red, acid siltstone, shale, and sandstone. Westmoreland soils formed in calcareous shale and interbedded limestone. Hagerstown and Opequon soils formed in mostly pure limestone.

Murrill soils formed in transported sandstone and shale colluvium deposited over limestone. Laidig, Buchanan, and Andover soils formed in colluvium from mixed, acid shale, siltstone, and sandstone. Pope, Philo, and Atkins soils formed in acid alluvial materials and Holly and Lobdell soils formed in calcareous alluvium.

Parent material and rock types have also had a major effect and influence on topography in Bedford County. Some rock types are much more susceptible to erosion and weathering than others. Quartzite and sandstone generally underlie mountains and ridges, and shale and limestone underlie lower hills and valleys.

Relief

Relief in Bedford County is dominated by steep ridges and narrow to broad, rolling valleys. Relief in the county has been influenced by strongly folded sedimentary rocks that vary in their rate of physical and chemical weathering and erosion.

Dystrochrepts and Hazleton, Clymer, Lehew, and Ungers soils are on the highest ridges and formed in sandstone that is highly resistant to weathering. On lower hills and ridges, Berks and Weikert soils formed in shale and siltstone intermediate in resistance to weathering. Ernest and Brinkerton soils formed in soil material at the base of steep slopes accumulated through washing, slippage, and gravity. Soils in broad, rolling valleys, such as Hagerstown soils, formed in readily weathered limestone bedrock. Holly, Atkins, and Philo soils formed in recently deposited alluvium adjacent to streams, and Birdsboro and Allegheny soils formed in older water deposits on terraces.

Climate

Climate in Bedford County is humid-temperate and continental. Some characteristics of the soils in the county indicate that the climate is the same now as when the soils were forming and that climate therefore has affected

soil formation. Many soils are acid and strongly leached. The effect of climate on soil formation has been nearly uniform throughout the county. The formation of some soils, however, may have been affected by a microclimate caused by differences in relief. More information on the climate of Bedford County can be found under "Climate" in the section "General Nature of the County."

Plant and Animal Life

Vegetation, animals, bacteria, and fungi affect soil formation. Vegetation is generally responsible for the amount of nutrients in the soil. Such animals as earthworms, cicadas, and other burrowing animals help to keep the soil open and porous. Bacteria and fungi decompose the vegetation, thus releasing nutrients for plant food. The native forests in Bedford County have been a greater influence on soil formation than have any other living organism. Human activities such as clearing the forests and plowing the land, however, have been a great influence on the surface layer. Other human activities have been adding fertilizers, mixing some soil layers, and moving some soil materials from place to place.

Time

The length of time the factors of soil formation have acted on the weathered mineral material is indicated to some extent by the degree of development in the soil profile. For example, Pope, Philo, and Holly soils, which formed in alluvium, are considered young or recent because their parent material has been in place for less time than other soils in the county. These soils have less distinct horizonation than some older soils on uplands.

Berks, Weikert, and Hazleton soils, which formed on uplands, show some horizon development; however, weathering and profile development were slowed by the effects of relief and by the kind of parent material.

Bedington, Hagerstown, and Edom soils have a well developed profile. The parent material of these soils has been in place long enough for the development of distinct horizons.

Processes of Soil Formation

As weathering proceeds and plants grow on a young soil, several soil-forming processes take place that help to differentiate the layers, or horizons, in a soil. These processes are gains, losses, transfers, and transformations.

Gains occur as leaves and other organic material are deposited on the surface. Gains of organic matter and minerals, including some plant nutrients, also are brought about by animals, floods, wind, and gravity.

Losses occur as minerals are decomposed and some products of weathering are leached from the soil by percolating water. Losses also include the removal of nutrients from the soil when crops, forage, and trees are harvested. Other losses are the removal of fine particles of soil by erosion and the escape of gases from decaying organic matter.

Transfers of material from one part of the soil to another are common in most soils. Organic matter is transferred in suspension or in solution from the upper part of the profile to the lower part. Calcium is leached from the surface layer, and some calcium is held for a while by a clayey subsoil. Silt and clay coatings in the B horizon of Allegheny and Leck Kill soils indicate the transfer of silt and clay from horizons higher in the profile. Bases and other nutrients are absorbed by plant roots and rise in stems to be stored in leaves and twigs. When the plants die and decay, the nutrients are returned to the soil.

Transformations in a soil occur through chemical weathering. For example, iron, aluminum, calcium, and other elements are released from the primary and secondary minerals in the soil and changed into other compounds. In the well drained Hagerstown and Opequon soils, the gray and white colors of the parent material gradually are replaced by red, brown, and yellow as iron compounds are weathered and oxidized. Red, brown, and yellow indicate the release of iron or the oxidation of ferrous oxides to ferric oxides in the presence of an adequate supply of oxygen.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map 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 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more that 12

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to

make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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 depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in

diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. 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 that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by 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 human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

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.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

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 (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

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 as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Head out. To form a flower head.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon 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.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

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 overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

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.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

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. 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).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of

three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

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 (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

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 semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or 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 (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Reaction, soil. A measure 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 because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly 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

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. An area that consists of cobbles, stones, and boulders. Most areas are commonly at the base of mountains, but some areas are deposits of cobbles, stones, and boulders left on mountainsides by glacial or periglacial processes.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil 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-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). 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.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

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.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

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. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 3 percent
Gently sloping	3 to 8 percent
Sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 35 percent
Very steep	35 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It 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.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or 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).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. 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."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

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 water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

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 loam, silt, 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 (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

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.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-88 at Everett, Pennsylvania)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	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-----	35.7	17.9	26.8	62	10	13	2.19	.93	3.26	6	7.6
February----	39.3	20.5	29.9	64	10	19	2.34	.87	3.46	6	9.5
March-------	48.2	27.9	38.1	79	10	67	3.07	1.68	4.06	7	7.5
April-------	61.0	37.6	49.3	86	21	293	3.57	1.52	5.09	8	.3
May---------	72.5	47.2	59.9	92	29	617	3.63	1.98	5.05	8	.0
June--------	80.3	54.9	67.6	95	38	828	3.39	1.45	4.87	7	.0
July--------	84.3	59.1	71.7	99	45	983	3.27	1.08	4.96	6	.0
August------	83.1	57.9	70.5	97	40	946	3.07	1.55	4.14	6	.0
September---	76.4	50.8	63.6	94	31	708	2.94	1.54	4.07	6	.0
October-----	64.9	39.6	52.3	85	21	386	3.04	.73	4.62	5	.0
November----	51.6	31.2	41.4	76	12	103	2.89	1.59	3.92	6	1.0
December----	39.8	23.1	31.5	63	1	42	2.48	1.14	3.64	6	5.0
Yearly:											
Average---	61.4	39.0	50.2	---	---	---	---	---	---	---	---
Extreme---	---	---	---	100	1	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,005	35.88	31.09	40.14	77	30.9

* 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 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-88 at Everett, 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--	Apr. 18	May 9	May 24
2 years in 10 later than--	Apr. 13	May 3	May 18
5 years in 10 later than--	Apr. 4	Apr. 21	May 6
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 13	Oct. 1	Sep. 15
2 years in 10 earlier than--	Oct. 19	Oct. 7	Sep. 22
5 years in 10 earlier than--	Oct. 31	Oct. 18	Oct. 4

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-88 at Everett, 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	185	154	125
8 years in 10	193	162	134
5 years in 10	209	179	149
2 years in 10	226	196	165
1 year in 10	234	205	174

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AbB	Albrights silt loam, 3 to 8 percent slopes	2,794	0.4
AbC	Albrights silt loam, 8 to 15 percent slopes	4,750	0.7
AeB	Allegheny loam, 3 to 8 percent slopes	1,059	0.2
AeC	Allegheny loam, 8 to 15 percent slopes	668	0.1
ArB	Andover cobbly loam, 3 to 8 percent slopes	1,986	0.3
ArC	Andover cobbly loam, 8 to 15 percent slopes	528	0.1
AvB	Andover cobbly sandy loam, 0 to 8 percent slopes, very stony	2,474	0.4
AvC	Andover cobbly sandy loam, 8 to 15 percent slopes, very stony	600	0.1
Aw	Atkins silt loam	3,285	0.5
Ax	Atkins-Ernest complex, 0 to 8 percent slopes	5,195	0.8
Ba	Basher silt loam	4,838	0.7
BbB	Basher-Birdsboro complex, 0 to 8 percent slopes	5,387	0.8
BcC	Bedington-Berks complex, 8 to 15 percent slopes	3,383	0.5
BcD	Bedington-Berks complex, 15 to 25 percent slopes	4,618	0.7
BdC	Bedington-Berks complex, 8 to 15 percent slopes, very stony	3,630	0.6
BdD	Bedington-Berks complex, 15 to 25 percent slopes, very stony	6,312	1.0
BdE	Bedington-Berks complex, 25 to 35 percent slopes, very stony	12,487	1.9
BkB	Berks channery silt loam, 3 to 8 percent slopes	7,098	1.1
BkC	Berks channery silt loam, 8 to 15 percent slopes	21,148	3.2
BkD	Berks channery silt loam, 15 to 25 percent slopes	19,303	3.0
BkE	Berks channery silt loam, 25 to 35 percent slopes	14,618	2.2
Bm	Birdsboro silt loam, rarely flooded	2,639	0.4
BrB	Blairton channery silt loam, 3 to 8 percent slopes	4,105	0.6
BrC	Blairton channery silt loam, 8 to 15 percent slopes	11,169	1.7
BrD	Blairton channery silt loam, 15 to 25 percent slopes	3,826	0.6
BtA	Brinkerton silt loam, 0 to 3 percent slopes	1,187	0.2
BtB	Brinkerton silt loam, 3 to 8 percent slopes	5,065	0.8
BtC	Brinkerton silt loam, 8 to 15 percent slopes	1,511	0.2
BuB	Buchanan cobbly loam, 3 to 8 percent slopes	5,098	0.8
BuC	Buchanan cobbly loam, 8 to 15 percent slopes	5,904	0.9
BwB	Buchanan cobbly loam, 3 to 8 percent slopes, extremely stony	6,372	1.0
BwC	Buchanan cobbly loam, 8 to 15 percent slopes, extremely stony	21,627	3.3
BwD	Buchanan cobbly loam, 15 to 25 percent slopes, extremely stony	16,014	2.5
CaB	Calvin channery silt loam, 3 to 8 percent slopes	7,747	1.2
CaC	Calvin channery silt loam, 8 to 15 percent slopes	17,642	2.7
CaD	Calvin channery silt loam, 15 to 25 percent slopes	6,019	0.9
CeC	Cedarcreek extremely channery loam, 3 to 25 percent slopes, very stony	913	0.1
CeF	Cedarcreek extremely channery loam, 25 to 80 percent slopes, very stony	2,238	0.3
CkB	Clarksburg silt loam, 3 to 8 percent slopes	5,293	0.8
DkC	Dystrochrepts-Rock outcrop complex, 3 to 15 percent slopes	4,915	0.8
DkE	Dystrochrepts-Rock outcrop complex, 15 to 35 percent slopes	6,716	1.0
DkF	Dystrochrepts-Rock outcrop complex, 35 to 70 percent slopes	32,560	5.0
EdB	Edom silty clay loam, 3 to 8 percent slopes	607	0.1
EdC	Edom silty clay loam, 8 to 15 percent slopes	2,260	0.3
EdD	Edom silty clay loam, 15 to 25 percent slopes	1,146	0.2
ElB	Elliber very channery loam, 3 to 8 percent slopes	994	0.2
ElC	Elliber very channery loam, 8 to 15 percent slopes	3,230	0.5
ElD	Elliber very channery loam, 15 to 25 percent slopes	3,520	0.5
ElE	Elliber very channery loam, 25 to 45 percent slopes	5,067	0.8
ErB	Ernest silt loam, 0 to 8 percent slopes	4,173	0.6
ErC	Ernest silt loam, 8 to 15 percent slopes	8,727	1.3
HeB	Hagerstown silt loam, 3 to 8 percent slopes	13,047	2.0
HeC	Hagerstown silt loam, 8 to 15 percent slopes	3,134	0.5
HgC	Hagerstown silty clay loam, 8 to 15 percent slopes	4,347	0.7
HgD	Hagerstown silty clay loam, 15 to 25 percent slopes	952	0.1
HnB	Hagerstown silty clay loam, 3 to 8 percent slopes, very rocky	506	0.1
HnC	Hagerstown silty clay loam, 8 to 15 percent slopes, very rocky	2,091	0.3
HnD	Hagerstown silty clay loam, 15 to 25 percent slopes, very rocky	859	0.1
HTC	Hazleton-Clymer association, 8 to 25 percent slopes, extremely stony	21,072	3.2
HTE	Hazleton-Clymer association, 25 to 45 percent slopes, extremely stony	14,288	2.2
Hy	Holly silt loam	2,936	0.5
KlC	Klinesville channery silt loam, 8 to 15 percent slopes	1,653	0.3
KlD	Klinesville channery silt loam, 15 to 25 percent slopes	3,617	0.6
KmE	Klinesville and Calvin soils, 25 to 50 percent slopes	24,859	3.8

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
KoF	Klinesville-Rock outcrop complex, 35 to 80 percent slopes	7,642	1.2
LdB	Laidig cobbly loam, 3 to 8 percent slopes	573	0.1
LdC	Laidig cobbly loam, 8 to 15 percent slopes	2,304	0.4
LdD	Laidig cobbly loam, 15 to 25 percent slopes	1,069	0.2
LgC	Laidig cobbly loam, 8 to 15 percent slopes, extremely stony	2,272	0.3
LgD	Laidig cobbly loam, 15 to 25 percent slopes, extremely stony	6,538	1.0
LgE	Laidig cobbly loam, 25 to 35 percent slopes, extremely stony	10,498	1.6
LkB	Leck Kill-Calvin complex, 3 to 8 percent slopes	2,333	0.4
LkC	Leck Kill-Calvin complex, 8 to 15 percent slopes	4,918	0.8
LkD	Leck Kill-Calvin complex, 15 to 25 percent slopes	4,436	0.7
Lx	Lobdell loam	2,533	0.4
McB	Meckesville gravelly loam, 3 to 8 percent slopes	348	0.1
McC	Meckesville gravelly loam, 8 to 15 percent slopes	2,831	0.4
MdC	Meckesville gravelly loam, 8 to 15 percent slopes, very stony	7,410	1.1
MdD	Meckesville gravelly loam, 15 to 25 percent slopes, very stony	11,036	1.7
MdE	Meckesville gravelly loam, 25 to 35 percent slopes, very stony	9,514	1.5
MhC	Mertz channery silt loam, 8 to 15 percent slopes	1,793	0.3
MoA	Monongahela silt loam, 0 to 3 percent slopes	1,284	0.2
MoB	Monongahela silt loam, 3 to 8 percent slopes	2,763	0.4
MrB	Morrison channery sandy loam, 3 to 8 percent slopes	1,926	0.3
MrC	Morrison channery sandy loam, 8 to 15 percent slopes	4,039	0.6
MrD	Morrison channery sandy loam, 15 to 25 percent slopes	1,184	0.2
MsB	Morrison channery sandy loam, 3 to 8 percent slopes, very stony	561	0.1
MsC	Morrison channery sandy loam, 8 to 15 percent slopes, very stony	2,112	0.3
MsD	Morrison channery sandy loam, 15 to 25 percent slopes, very stony	1,671	0.3
MtB	Morrison-Murrill complex, 3 to 8 percent slopes, very stony	1,364	0.2
MtC	Morrison-Murrill complex, 8 to 15 percent slopes, very stony	5,241	0.8
MtD	Morrison-Murrill complex, 15 to 25 percent slopes, very stony	1,780	0.3
MuB	Murrill channery loam, 3 to 8 percent slopes	3,991	0.6
MuC	Murrill channery loam, 8 to 15 percent slopes	4,122	0.6
MuD	Murrill channery loam, 15 to 25 percent slopes	955	0.1
Nd	Nolin silt loam	667	0.1
OpB	Opequon-Hagerstown complex, 3 to 8 percent slopes, very rocky	691	0.1
OpC	Opequon-Hagerstown complex, 8 to 15 percent slopes, very rocky	3,762	0.6
OpD	Opequon-Hagerstown complex, 15 to 25 percent slopes, very rocky	5,289	0.8
OpE	Opequon-Hagerstown complex, 25 to 45 percent slopes, very rocky	8,746	1.3
PeB	Penlaw silt loam, 0 to 8 percent slopes	3,009	0.5
Ph	Philo silt loam	5,679	0.9
Pm	Pits and Quarries	208	*
Pp	Pope fine sandy loam	1,473	0.2
Ps	Purdy silty clay loam, 0 to 3 percent slopes	3,145	0.5
TgA	Tyler silt loam, 0 to 3 percent slopes	1,904	0.3
TgB	Tyler silt loam, 3 to 8 percent slopes	1,567	0.2
Ue	Udorthents, loamy	2,014	0.3
UgF	Ungers-Lehew complex, 35 to 60 percent slopes, very stony	8,218	1.3
VdF	Vanderlip-Rock outcrop complex, 35 to 60 percent slopes	2,944	0.5
WkC	Weikert channery silt loam, 8 to 15 percent slopes	8,737	1.3
WkD	Weikert channery silt loam, 15 to 25 percent slopes	8,164	1.3
WkE	Weikert channery silt loam, 25 to 35 percent slopes	13,438	2.1
WkF	Weikert channery silt loam, 35 to 65 percent slopes	26,252	4.0
WlF	Weikert very flaggy silt loam, 25 to 60 percent slopes	1,760	0.3
WsB	Westmoreland channery silt loam, 3 to 8 percent slopes	807	0.1
WsC	Westmoreland channery silt loam, 8 to 15 percent slopes	3,042	0.5
WsE	Westmoreland channery silt loam, 25 to 35 percent slopes	645	0.1
WwD	Westmoreland-Klinesville complex, 15 to 25 percent slopes	4,913	0.8
WxB	Wharton channery silt loam, 3 to 8 percent slopes, very stony	1,885	0.3
WxC	Wharton channery silt loam, 8 to 15 percent slopes, very stony	2,291	0.4
	Water	1,943	0.3
	Total	652,040	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
AbB	Albrights silt loam, 3 to 8 percent slopes
AeB	Allegheny loam, 3 to 8 percent slopes
Ba	Basher silt loam
BbB	Basher-Birdsboro complex, 0 to 8 percent slopes
Bm	Birdsboro silt loam, rarely flooded
BuB	Buchanan cobbly loam, 3 to 8 percent slopes
CkB	Clarksburg silt loam, 3 to 8 percent slopes
EdB	Edom silty clay loam, 3 to 8 percent slopes
ElB	Elliber very channery loam, 3 to 8 percent slopes
ErB	Ernest silt loam, 0 to 8 percent slopes
HeB	Hagerstown silt loam, 3 to 8 percent slopes
LdB	Laidig cobbly loam, 3 to 8 percent slopes
LkB	Leck Kill-Calvin complex, 3 to 8 percent slopes
Lx	Lobdell loam
McB	Meckesville gravelly loam, 3 to 8 percent slopes
MoA	Monongahela silt loam, 0 to 3 percent slopes
MrB	Morrison channery sandy loam, 3 to 8 percent slopes
MuB	Murrill channery loam, 3 to 8 percent slopes
Nd	Nolin silt loam
Ph	Philo silt loam
Pp	Pope fine sandy loam
WsB	Westmoreland channery silt loam, 3 to 8 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield 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	Land capability	Corn	Corn silage	Wheat	Oats	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
AbB---------- Albrights	IIe	100	20	40	70	3.5	3.0	6.5
AbC---------- Albrights	IIIe	90	18	40	65	3.5	3.0	6.5
AeB---------- Allegheny	IIe	115	23	45	80	4.5	3.5	7.0
AeC---------- Allegheny	IIIe	105	21	40	65	3.5	3.5	7.0
ArB---------- Andover	IVw	85	17	30	60	---	2.5	5.0
ArC---------- Andover	IVw	85	17	30	60	---	2.5	5.0
AvB---------- Andover	VIIs	---	---	---	---	---	---	---
AvC---------- Andover	VIIs	---	---	---	---	---	---	---
Aw---------- Atkins	IIIw	100	20	30	60	---	3.0	5.5
Ax---------- Atkins-Ernest	IIIw	100	20	35	63	---	3.0	6.0
Ba---------- Basher	IIw	120	22	45	80	4.5	3.5	8.5
BbB---------- Basher-Birdsboro	IIw	130	24	45	80	4.5	3.5	9.0
BcC---------- Bedington-Berks	IIIe	105	21	40	65	4.0	3.0	7.5
BcD---------- Bedington-Berks	IVe	95	19	35	55	3.5	2.5	6.5
BdC, BdD-------- Bedington-Berks	VIs	---	---	---	---	---	---	---
BdE---------- Bedington-Berks	VIe	---	---	---	---	---	---	---
BkB---------- Berks	IIe	80	16	30	60	3.5	3.0	6.5
BkC---------- Berks	IIIe	75	15	35	55	3.0	2.5	5.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Wheat	Oats	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
BkD---------- Berks	IVe	70	14	30	50	3.0	2.5	5.5
BkE---------- Berks	VIe	---	---	---	---	---	---	---
Bm---------- Birdsboro	I	140	29	50	80	5.0	3.5	9.5
BrB---------- Blairton	IIIw	75	15	35	60	2.5	2.5	5.0
BrC---------- Blairton	IVe	70	14	30	55	2.5	2.0	4.0
BrD---------- Blairton	VIe	65	13	25	45	2.5	2.0	4.0
BtA---------- Brinkerton	IVw	90	18	30	60	---	2.5	5.0
BtB---------- Brinkerton	IVw	90	18	30	60	---	2.5	5.0
BtC---------- Brinkerton	IVw	85	17	25	45	---	2.5	5.0
BuB---------- Buchanan	IIe	100	20	40	65	3.5	3.0	6.5
BuC---------- Buchanan	IIIe	90	18	35	60	3.5	3.0	6.5
BwB, BwC, BwD--- Buchanan	VIIs	---	---	---	---	---	---	---
CaB---------- Calvin	IIe	80	17	35	60	3.5	3.0	6.5
CaC---------- Calvin	IIIe	75	15	35	55	3.0	2.5	6.0
CaD---------- Calvin	IVe	70	14	30	50	3.0	2.0	5.5
CeC---------- Cedarcreek	VIs	---	---	---	---	---	---	---
CeF---------- Cedarcreek	VIIs	---	---	---	---	---	---	---
CkB---------- Clarksburg	IIe	100	20	40	70	3.5	3.0	6.5
DkC**, DkE**---- Dystrochrepts-Rock outcrop	VIIs	---	---	---	---	---	---	---
DkF**---------- Dystrochrepts-Rock outcrop	VIIs	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Wheat	Oats	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
EdB---------- Edom	IIe	100	20	40	70	4.0	3.0	7.5
EdC---------- Edom	IIIe	90	18	35	65	3.5	3.0	6.5
EdD---------- Edom	IVe	80	16	35	60	3.0	2.5	5.5
ElB---------- Elliber	IIe	110	22	40	70	4.0	3.0	4.5
ElC---------- Elliber	IIIe	105	21	40	65	4.0	3.0	4.5
ElD---------- Elliber	VIe	100	20	40	65	3.5	2.5	4.0
ElE---------- Elliber	VIIe	---	---	---	---	---	---	---
ErB---------- Ernest	IIe	100	20	40	65	3.5	3.0	6.5
ErC---------- Ernest	IIIe	95	19	35	60	3.5	3.0	6.0
HeB---------- Hagerstown	IIe	135	27	50	80	5.5	3.5	9.0
HeC---------- Hagerstown	IIIe	125	25	45	75	5.0	3.5	8.5
HgC---------- Hagerstown	IIIe	120	24	40	70	4.5	3.5	8.5
HgD---------- Hagerstown	IVe	110	22	35	65	4.0	3.0	8.0
HnB---------- Hagerstown	IIIe	120	24	45	70	5.0	3.5	9.0
HnC, HnD-------- Hagerstown	IVe	110	22	35	65	4.0	3.0	8.5
HTC**:								
Hazleton-------	VIIs	---	---	---	---	---	---	---
Clymer---------	VIIs	---	---	---	---	---	---	---
HTE**:								
Hazleton-------	VIIs	---	---	---	---	---	---	---
Clymer---------	VIIs	---	---	---	---	---	---	---
Hy---------- Holly	IIIw	100	20	30	70	---	3.5	5.0
KlC---------- Klinesville	IVe	60	12	20	50	2.5	2.0	5.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Wheat	Oats	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
KlD---------- Klinesville	VIe	55	11	20	45	2.0	2.0	4.5
KmE---------- Klinesville and Calvin	VIIe	---	---	---	---	---	---	---
KoF**---------- Klinesville-Rock outcrop	VIIe	---	---	---	---	---	---	---
LdB---------- Laidig	IIe	100	20	40	70	4.0	3.0	4.5
LdC---------- Laidig	IIIe	95	19	35	65	4.0	3.0	4.5
LdD---------- Laidig	IVe	85	17	30	60	3.5	2.5	4.0
LgC, LgD, LgE--- Laidig	VIIs	---	---	---	---	---	---	---
LkB---------- Leck Kill-Calvin	IIe	105	22	45	60	4.0	3.0	6.5
LkC---------- Leck Kill-Calvin	IIIe	100	20	40	55	3.5	2.5	6.0
LkD---------- Leck Kill-Calvin	IVe	70	14	30	50	3.0	2.0	5.0
Lx---------- Lobdell	IIw	100	20	40	70	---	3.5	5.5
McB---------- Meckesville	IIe	100	20	40	70	5.0	4.0	7.5
McC---------- Meckesville	IIIe	95	19	35	65	4.5	4.0	7.5
MdC, MdD-------- Meckesville	VIs	---	---	---	---	---	---	---
MdE---------- Meckesville	VIIs	---	---	---	---	---	---	---
MhC---------- Mertz	IIIe	105	21	40	65	4.5	3.5	8.5
MoA---------- Monongahela	IIw	110	22	40	65	3.5	3.0	8.5
MoB---------- Monongahela	IIe	100	20	40	65	3.5	3.0	8.5
MrB---------- Morrison	IIe	100	20	40	60	4.5	3.5	5.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Wheat	Oats	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
MrC---------- Morrison	IIIe	95	19	35	55	4.5	3.5	5.5
MrD---------- Morrison	IVe	90	18	30	50	3.5	3.0	4.5
MsB, MsC, MsD--- Morrison	VIs	---	---	---	---	---	---	---
MtB, MtC, MtD--- Morrison-Murrill	VIs	---	---	---	---	---	---	---
MuB---------- Murrill	IIe	120	24	45	75	4.5	3.5	8.5
MuC---------- Murrill	IIIe	110	22	40	70	4.0	3.0	7.5
MuD---------- Murrill	IVe	95	19	35	60	4.0	3.0	7.5
Nd---------- Nolin	IIw	115	23	40	70	5.0	4.0	9.0
OpB---------- Opequon-Hagerstown	IVs	95	19	40	55	4.5	3.5	6.0
OpC, OpD-------- Opequon-Hagerstown	IVs	80	16	35	50	3.5	3.0	5.0
OpE---------- Opequon-Hagerstown	VIIe	---	---	---	---	---	---	---
PeB---------- Penlaw	IIIw	90	18	40	60	3.0	3.0	6.0
Ph---------- Philo	IIw	130	26	45	80	4.5	3.5	8.5
Pm**---------- Pits and Quarries	VIIIs	---	---	---	---	---	---	---
Pp---------- Pope	IIw	130	26	45	80	4.5	4.0	8.0
Ps---------- Purdy	IVw	80	16	30	55	---	2.5	6.0
TgA---------- Tyler	IIIw	95	19	35	60	---	3.0	7.0
TgB---------- Tyler	IIIe	85	18	35	60	---	3.0	7.0
Ue---------- Udorthents	VIIe	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Wheat	Oats	Alfalfa hay	Grass-legume hay	Pasture
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
UgF---------- Ungers-Lehew	VIIs	---	---	---	---	---	---	---
VdF**---------- Vanderlip-Rock outcrop	VIIs	---	---	---	---	---	---	---
WkC---------- Weikert	IVe	60	12	20	45	2.0	2.0	4.0
WkD---------- Weikert	VIe	55	11	20	40	2.0	2.0	4.0
WkE, WkF-------- Weikert	VIIe	---	---	---	---	---	---	---
WlF---------- Weikert	VIIs	---	---	---	---	---	---	---
WsB---------- Westmoreland	IIe	110	22	45	75	4.5	3.5	8.5
WsC---------- Westmoreland	IIIe	100	20	40	70	4.0	3.0	7.5
WsE---------- Westmoreland	VIe	---	---	---	---	---	---	---
WwD---------- Westmoreland-Klinesville	IVe	70	14	30	50	3.0	2.0	5.0
WxB, WxC-------- Wharton	VIs	---	---	---	---	---	---	---

* 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 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--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	2,639	---	---	---
II	82,512	60,651	21,861	---
III	120,749	100,315	20,434	---
IV	83,317	73,575	13,422	9,742
V	---	---	---	---
VI	66,183	29,919	---	36,264
VII	281,067	100,505	---	1 ,562
VIII	208	---	---	208

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
AbB---------- Albrights	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	4	Red pine, eastern white pine, Japanese larch, Norway spruce, white spruce.
							Yellow-poplar-------	75	4	
							White ash----------	---	--	
							Red maple----------	---	--	
AbC---------- Albrights	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	4	Red pine, eastern white pine, Japanese larch, Norway spruce, white spruce.
							Yellow-poplar-------	75	4	
							White ash----------	---	--	
							Red maple----------	---	--	
AeB, AeC---------- Allegheny	4A	Slight	Moderate	Slight	Slight	Severe	Northern red oak----	80	4	Eastern white pine, yellow-poplar, black walnut, shortleaf pine, white oak, white ash, northern red oak.
							Shortleaf pine------	80	9	
							Yellow-poplar-------	93	7	
							Virginia pine-------	72	8	
							Sugar maple---------	---	--	
							White ash----------	---	--	
							American elm--------	---	--	
							Red maple----------	---	--	
							Pignut hickory------	---	--	
							Black oak----------	78	4	
							White oak----------	70	4	
							Eastern redcedar----	---	--	
							Black cherry--------	---	--	
ArB---------- Andover	4W	Slight	Severe	Severe	Moderate	Severe	Northern red oak----	75	4	Eastern white pine, red maple, Norway spruce.
							Yellow-poplar-------	83	5	
ArC---------- Andover	4W	Moderate	Severe	Severe	Moderate	Severe	Northern red oak----	75	4	Eastern white pine, red maple, Norway spruce.
							Yellow-poplar-------	83	5	
AvB---------- Andover	4W	Slight	Severe	Severe	Moderate	Severe	Northern red oak----	70	4	Eastern white pine, red maple, Norway spruce.
							Yellow-poplar-------	75	4	
AvC---------- Andover	4W	Moderate	Severe	Severe	Moderate	Severe	Northern red oak----	70	4	Eastern white pine, red maple, Norway spruce.
							Yellow-poplar-------	75	4	

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
Aw---------- Atkins	4W	Slight	Severe	Severe	Moderate	Severe	Pin oak---------- Loblolly pine------- Sweetgum---------- Eastern cottonwood-- Red maple---------- American sycamore---	100 83 95 105 --- ---	4 8 8 10 -- --	Eastern white pine, white spruce.
Ax**: Atkins----------	4W	Slight	Severe	Severe	Moderate	Severe	Pin oak---------- Loblolly pine------- Sweetgum---------- Eastern cottonwood-- Red maple---------- American sycamore---	100 83 95 105 --- ---	4 8 8 10 -- --	Eastern white pine, white spruce.
Ernest----------	4W	Slight	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- White ash---------- Black walnut-------- Sugar maple--------- Black cherry--------	80 89 80 --- 80 80	4 6 4 -- 4 4	Eastern white pine, Norway spruce, Japanese larch.
Ba---------- Basher	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Sugar maple--------- American basswood---	80 70 85	4 3 4	Eastern white pine, black walnut, Norway spruce, European larch.
BbB**: Basher----------	3A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Sugar maple--------- American basswood---	80 70 85	4 3 4	Eastern white pine, black walnut, Norway spruce, European larch.
Birdsboro---------	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- Virginia pine------- Shortleaf pine------	80 90 80 80	4 6 8 9	Eastern white pine, European larch, yellow-poplar, Virginia pine.
BcC**: Bedington---------	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar-------	75 85	4 6	Black walnut, yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Virginia pine.

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
BcC**:										
Berks	4F	Slight	Slight	Moderate	Slight	Moderate	Northern red oak	70	4	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
							Black oak	70	4	
							Virginia pine	70	8	
BcD**:										
Bedington	4R	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	75	4	Black walnut, yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Virginia pine.
							Yellow-poplar	85	6	
Berks	4F	Slight	Moderate	Moderate	Slight	Moderate	Northern red oak	70	4	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
							Black oak	70	4	
							Virginia pine	70	8	
BdC**:										
Bedington	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak	75	4	Black walnut, yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Virginia pine.
							Yellow-poplar	85	6	
Berks	4F	Slight	Slight	Moderate	Slight	Moderate	Northern red oak	70	4	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
							Black oak	70	4	
							Virginia pine	70	8	
BdD**, BdE**:										
Bedington	4R	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	75	4	Black walnut, yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Virginia pine.
							Yellow-poplar	85	6	
Berks	4F	Slight	Moderate	Moderate	Slight	Moderate	Northern red oak	70	4	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
							Black oak	70	4	
							Virginia pine	70	8	
BkB, BkC---------- Berks	4F	Slight	Slight	Moderate	Slight	Moderate	Northern red oak	70	4	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
							Black oak	70	4	
							Virginia pine	70	8	

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
BkD, BkE---------- Berks	4F	Slight	Moderate	Moderate	Slight	Moderate	Northern red oak----	70	4	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
							Black oak----------	70	4	
							Virginia pine-------	70	8	
Bm---------- Birdsboro	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak----	80	4	Eastern white pine, European larch, yellow-poplar, Virginia pine.
							Yellow-poplar-------	90	6	
							Virginia pine-------	80	8	
							Shortleaf pine------	80	9	
BrB---------- Blairton	4W	Slight	Moderate	Slight	Slight	Severe	Northern red oak----	70	4	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
							White ash----------	70	3	
							Sugar maple---------	70	3	
							Yellow-poplar-------	80	5	
BrC---------- Blairton	4W	Slight	Moderate	Slight	Slight	Severe	Northern red oak----	70	4	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
							White ash----------	70	3	
							Sugar maple---------	70	3	
							Yellow-poplar-------	80	5	
BrD---------- Blairton	4R	Moderate	Moderate	Slight	Slight	Severe	Northern red oak----	70	4	Yellow-poplar, Japanese larch, eastern white pine, Norway spruce.
							White ash----------	70	3	
							Sugar maple---------	70	3	
							Yellow-poplar-------	80	5	
BtA, BtB, BtC------ Brinkerton	4W	Slight	Severe	Severe	Moderate	Severe	Northern red oak----	77	4	Eastern white pine, white spruce, red maple, yellow-poplar.
BuB, BuC---------- Buchanan	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak----	80	4	Northern red oak, yellow-poplar, sugar maple, eastern white pine, Japanese larch, Norway spruce.
							Yellow-poplar-------	90	6	
BwB, BwC---------- Buchanan	4X	Slight	Moderate	Slight	Slight	Severe	Northern red oak----	80	4	Northern red oak, yellow-poplar, sugar maple, eastern white pine, European larch.
							Yellow-poplar-------	90	6	
BwD---------- Buchanan	4X	Moderate	Moderate	Slight	Slight	Severe	Northern red oak----	80	4	Northern red oak, yellow-poplar, sugar maple, eastern white pine, European larch.
							Yellow-poplar-------	90	6	

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
CaB, CaC---------- Calvin	4F	Slight	Slight	Moderate	Slight	Moderate	Northern red oak----	71	4	Eastern white pine, red pine, Virginia pine.
							Yellow-poplar-------	71	4	
CaD---------- Calvin	4R	Slight	Moderate	Moderate	Slight	Moderate	Northern red oak----	77	4	Eastern white pine, red pine, Virginia pine.
							Yellow-poplar-------	80	5	
CeC---------- Cedarcreek	4X	Slight	Slight	Severe	Slight	Moderate	Northern red oak----	80	4	Eastern white pine, Virginia pine, shortleaf pine, black locust, American sycamore.
							Eastern white pine--	94	12	
							Yellow-poplar-------	105	8	
							American sycamore---	90	--	
							Black locust--------	---	--	
CeF---------- Cedarcreek	4R	Severe	Severe	Severe	Slight	Moderate	Northern red oak----	80	4	Eastern white pine, Virginia pine, shortleaf pine, black locust, American sycamore.
							Eastern white pine--	94	12	
							Yellow-poplar-------	105	8	
							American sycamore---	90	--	
							Black locust--------	---	--	
CkB---------- Clarksburg	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	75	4	Eastern white pine, yellow-poplar, Japanese larch, Norway spruce.
							Yellow-poplar-------	85	6	
DkC**: Dystrochrepts-----	3X	Slight	Severe	Moderate	Slight	Moderate	Northern red oak----	57	3	Japanese larch, eastern white pine, Norway spruce, Austrian pine, red pine.
Rock outcrop.										
DkE**: Dystrochrepts-----	3X	Slight	Severe	Moderate	Moderate	Moderate	Northern red oak----	53	3	Japanese larch, eastern white pine, Norway spruce, Austrian pine, red pine.
Rock outcrop.										

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
DkF**:										
Dystrochrepts-----	3R	Moderate	Severe	Moderate	Moderate	Moderate	Northern red oak----	53	3	Japanese larch, eastern white pine, Norway spruce, Austrian pine, red pine.
Rock outcrop.										
EdB, EdC---------- Edom	4A	Slight	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	4 6	Eastern white pine, yellow-poplar, Norway spruce, Virginia pine.
EdD--------------- Edom	4R	Moderate	Moderate	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	4 6	Eastern white pine, yellow-poplar, Norway spruce, Virginia pine.
ElB, ElC---------- Elliber	4F	Slight	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar-------	80 90	4 6	Eastern white pine, European larch, Norway spruce, black walnut, yellow-poplar, black locust.
ElD, ElE---------- Elliber	4F	Slight	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow-poplar-------	85 95	4 7	Eastern white pine, European larch, Norway spruce, black walnut, yellow-poplar, black locust.
ErB--------------- Ernest	4W	Slight	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- White ash---------- Black walnut-------- Sugar maple--------- Black cherry--------	80 89 80 --- 80 80	4 6 4 -- 4 4	Eastern white pine, Norway spruce, Japanese larch.
ErC--------------- Ernest	4W	Moderate	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- White ash---------- Black walnut-------- Sugar maple--------- Black cherry--------	80 89 80 --- 80 80	4 6 4 -- 4 4	Eastern white pine, Norway spruce, Japanese larch.

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
HeB, HeC, HgC------ Hagerstown	4C	Slight	Moderate	Slight	Slight	Severe	Northern red oak----	85	4	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
							Yellow-poplar-------	95	7	
HgD---------- Hagerstown	4C	Moderate	Severe	Slight	Slight	Severe	Northern red oak----	85	4	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
							Yellow-poplar-------	95	7	
HnB, HnC---------- Hagerstown	4C	Slight	Moderate	Slight	Slight	Severe	Northern red oak----	85	4	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
							Yellow-poplar-------	95	7	
HnD---------- Hagerstown	4C	Moderate	Severe	Slight	Slight	Severe	Northern red oak----	85	4	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
							Yellow-poplar-------	95	7	
HTC**:										
Hazleton----------	4X	Slight	Moderate	Slight	Slight	Moderate	Northern red oak----	70	4	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
							Yellow-poplar-------	80	5	
Clymer----------	4X	Slight	Moderate	Slight	Slight	Severe	Northern red oak----	83	4	Eastern white pine, black cherry, yellow-poplar, Virginia pine.
							Yellow-poplar-------	95	7	
							Eastern white pine--	---	--	
HTE**:										
Hazleton----------	4R	Moderate	Severe	Slight	Slight	Moderate	Northern red oak----	70	4	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
							Yellow-poplar-------	80	5	
Clymer----------	4R	Moderate	Severe	Slight	Slight	Severe	Northern red oak----	83	4	Eastern white pine, black cherry, yellow-poplar, Virginia pine.
							Yellow-poplar-------	95	7	
							Eastern white pine--	---	--	
Hy---------- Holly	4W	Slight	Severe	Moderate	Moderate	Severe	Pin oak----------	90	4	Red maple, sweetgum, eastern cottonwood, green ash, American sycamore, pin oak, swamp white oak, silver maple, baldcypress.
							Swamp white oak-----	---	--	
							Red maple----------	---	--	
							Green ash----------	---	--	
							Black cherry--------	---	--	
							Eastern cottonwood--	---	--	

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
KlC---------- Klinesville	3D	Slight	Slight	Moderate	Moderate	Moderate	Northern red oak----	60	3	Virginia pine, eastern white pine, red pine, pitch pine.
							Virginia pine-------	60	6	
KlD---------- Klinesville	3D	Slight	Moderate	Moderate	Moderate	Moderate	Northern red oak----	60	3	Virginia pine, eastern white pine, red pine, pitch pine.
							Virginia pine-------	60	6	
KmE:										
Klinesville-------	3R	Moderate	Severe	Moderate	Moderate	Moderate	Northern red oak----	60	3	Virginia pine, eastern white pine, red pine, pitch pine.
Calvin------------	4R	Moderate	Severe	Moderate	Slight	Moderate	Northern red oak----	77	4	Eastern white pine, red pine, Virginia pine.
							Yellow-poplar-------	80	5	
KoF**:										
Klinesville-------	3R	Moderate	Severe	Moderate	Moderate	Moderate	Northern red oak----	60	3	Virginia pine, eastern white pine, red pine, pitch pine.
							Virginia pine-------	60	6	
Rock outcrop.										
LdB, LdC---------- Laidig	4A	Slight	Slight	Slight	Slight	Slight	Northern red oak----	71	4	Eastern white pine, yellow-poplar, black walnut, Virginia pine, black locust.
							Yellow-poplar-------	89	6	
							Eastern white pine--	80	10	
							Black oak----------	68	4	
							Scarlet oak---------	66	3	
LdD---------- Laidig	4R	Slight	Moderate	Slight	Slight	Slight	Northern red oak----	80	4	Eastern white pine, yellow-poplar, black walnut, Virginia pine, black locust.
							Yellow-poplar-------	90	6	
							Eastern white pine--	90	12	
							Black oak----------	76	4	
							Scarlet oak---------	76	4	
LgC---------- Laidig	4X	Slight	Moderate	Slight	Slight	Slight	Northern red oak----	80	4	Eastern white pine, yellow-poplar, black walnut, Norway spruce, black locust, black cherry.
							White oak----------	80	4	
							Yellow-poplar-------	90	6	
							White ash----------	80	4	
							Sugar maple---------	80	4	
							Black cherry--------	80	4	
							Black locust--------	80	--	

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
LgD, LgE---------- Laidig	4X	Slight	Moderate	Slight	Slight	Slight	Northern red oak---- White oak---------- Yellow-poplar------- White ash---------- Sugar maple--------- Black cherry-------- Black locust--------	80 80 90 80 80 80 80	4 4 6 4 4 4 --	Eastern white pine, yellow-poplar, black walnut, Norway spruce, black locust, black cherry.
LkB**, LkC**: Leck Kill----------	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	68	4	Eastern white pine, Virginia pine.
Calvin------------	4F	Slight	Slight	Moderate	Slight	Moderate	Yellow-poplar------- Northern red oak----	71 71	4 4	Eastern white pine, red pine, Virginia pine.
LkD**: Leck Kill----------	4R	Slight	Moderate	Slight	Slight	Moderate	Northern red oak----	68	4	Eastern white pine, Virginia pine.
Calvin------------	4R	Slight	Moderate	Moderate	Slight	Severe	Northern red oak---- Yellow-poplar-------	77 80	4 5	Eastern white pine, red pine, Virginia pine.
Lx---------- Lobdell	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- Sugar maple--------- White ash---------- White oak---------- Black cherry--------	86 96 --- --- --- ---	4 7 -- -- -- --	Eastern white pine, white oak, yellow-poplar, white ash, red pine, northern red oak.
McB, McC, MdC------ Meckesville	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar-------	80 90	4 6	Eastern white pine, Japanese larch, yellow-poplar, black cherry, Norway spruce.
MdD, MdE---------- Meckesville	4R	Slight	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow-poplar-------	80 90	4 6	Eastern white pine, Japanese larch, yellow-poplar, black cherry, Norway spruce.
MhC---------- Mertz	4F	Slight	Slight	Moderate	Slight	Severe	Northern red oak---- Virginia pine------- Yellow-poplar-------	80 75 90	4 8 6	Yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Virginia pine.

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
MoA, MoB---------- Monongahela	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- White ash---------- Black walnut--------	70 85 72 66 --- ---	4 6 9 7 -- --	Eastern white pine, Virginia pine, yellow-poplar, black cherry, Japanese larch.
MrB, MrC---------- Morrison	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar-------	71 85	4 6	Eastern white pine, yellow-poplar, Norway spruce, red pine, Virginia pine, Japanese larch.
MrD---------- Morrison	4R	Slight	Moderate	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar-------	71 85	4 6	Eastern white pine, yellow-poplar, Norway spruce, red pine, Virginia pine, Japanese larch.
MsB, MsC---------- Morrison	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar-------	71 85	4 6	Eastern white pine, yellow-poplar, Norway spruce, red pine, Virginia pine, Japanese larch.
MsD---------- Morrison	4R	Slight	Moderate	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar-------	71 85	4 6	Eastern white pine, yellow-poplar, Norway spruce, red pine, Virginia pine, Japanese larch.
MtB**, MtC**: Morrison----------	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar-------	71 85	4 6	Eastern white pine, yellow-poplar, Norway spruce, red pine, Virginia pine, Japanese larch.
Murrill----------	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar------- White ash---------- Eastern white pine-- Black walnut--------	72 94 70 80 ---	4 7 3 10 --	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
MtD**:										
Morrison	4R	Slight	Moderate	Slight	Slight	Moderate	Northern red oak	71	4	Eastern white pine, yellow-poplar, Norway spruce, red pine, Virginia pine, Japanese larch.
							Yellow-poplar	85	6	
Murrill	4R	Slight	Moderate	Slight	Slight	Moderate	Northern red oak	72	4	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
							Yellow-poplar	94	7	
							White ash	70	3	
							Eastern white pine	80	10	
							Black walnut	---	--	
MuB, MuC Murrill	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak	72	4	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
							Yellow-poplar	94	7	
							White ash	70	3	
							Eastern white pine	80	10	
							Black walnut	---	--	
MuD Murrill	4R	Slight	Moderate	Slight	Slight	Moderate	Northern red oak	72	4	Eastern white pine, yellow-poplar, black walnut, Norway spruce, Japanese larch.
							Yellow-poplar	94	7	
							White ash	70	3	
							Eastern white pine	80	10	
							Black walnut	---	--	
Nd Nolin	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak	80	4	Yellow-poplar, eastern white pine, eastern cottonwood, white ash, cherrybark oak, sweetgum, black walnut.
							Yellow-poplar	107	8	
							Sweetgum	92	8	
							Cherrybark oak	97	10	
							Eastern cottonwood	---	--	
							Black walnut	---	--	
							American sycamore	---	--	
							River birch	---	--	
OpB**, OpC**:										
Opequon	3X	Moderate	Severe	Severe	Severe	Moderate	Northern red oak	60	3	Virginia pine, eastern white pine.
							White oak	60	3	
							Sugar maple	---	--	
OpB**, OpC**:										
Hagerstown	4C	Slight	Moderate	Slight	Slight	Moderate	Northern red oak	85	4	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
							Yellow-poplar	95	7	

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
OpD**:										
Opequon	3R	Severe	Severe	Severe	Severe	Moderate	Northern red oak	60	3	Virginia pine, eastern white pine.
							White oak	60	3	
							Sugar maple	---	--	
Hagerstown	4R	Moderate	Severe	Slight	Slight	Moderate	Northern red oak	85	4	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
							Yellow-poplar	95	7	
OpE**:										
Opequon	3R	Severe	Severe	Severe	Severe	Moderate	Northern red oak	60	3	Virginia pine, eastern white pine.
							White oak	60	3	
							Sugar maple	---	--	
Hagerstown	4R	Moderate	Severe	Slight	Slight	Moderate	Northern red oak	85	4	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
							Yellow-poplar	95	7	
PeB Penlaw	4W	Slight	Moderate	Moderate	Moderate	Severe	Northern red oak	80	4	Yellow-poplar, Japanese larch, Norway spruce, white spruce, eastern white pine.
							White ash	80	4	
							Sugar maple	80	4	
							Red maple	80	4	
							Yellow-poplar	90	6	
Ph Philo	4W	Slight	Moderate	Slight	Slight	Severe	Northern red oak	86	4	Eastern white pine, yellow-poplar.
							Yellow-poplar	102	8	
							Virginia pine	74	8	
							Black oak	85	4	
							White oak	85	4	
							White ash	85	4	
Pp Pope	4R	Slight	Slight	Slight	Slight	Severe	Northern red oak	80	4	Eastern white pine, yellow-poplar, black walnut, white oak, northern red oak, white ash, shortleaf pine.
							Yellow-poplar	96	7	
							American beech	---	--	
							White oak	80	4	
							Blackgum	---	--	
							American sycamore	---	--	
							American basswood	---	--	
							Eastern hemlock	---	--	
							Bitternut hickory	---	--	
Ps Purdy	4W	Slight	Severe	Severe	Severe	Severe	Pin oak	85	4	Virginia pine, eastern white pine, loblolly pine.
							Shortleaf pine	75	8	
							Virginia pine	75	8	
							Yellow-poplar	90	6	
							Sweetgum	85	6	

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
TgA, TgB---------- Tyler	4D	Slight	Slight	Moderate	Severe	Severe	Northern red oak---- White oak---------- Slippery elm-------- American beech------ White ash---------- Sugar maple--------- American sycamore--- Yellow-poplar-------	80 --- --- --- 86 --- --- 100	4 -- -- -- 8 -- -- 8	White ash, yellow-poplar, red pine, Virginia pine, eastern white pine, black oak.
Ue---------- Udorthents	---	Slight	Moderate	Severe	Slight	Moderate	Northern red oak---- Red maple----------	--- ---	-- --	Red pine, Virginia pine, Austrian pine, eastern white pine.
UgF**: Ungers----------	3R	Moderate	Severe	Slight	Slight	Moderate	Northern red oak---- Virginia pine-------	67 65	3 7	Eastern white pine, Virginia pine, Japanese larch, Norway spruce.
Lehew----------	3R	Moderate	Severe	Slight	Slight	Moderate	Northern red oak---- Virginia pine------- Eastern white pine--	67 60 ---	3 6 --	Eastern white pine, Virginia pine, Japanese larch.
VdF**: Vanderlip---------	3R	Moderate	Severe	Moderate	Slight	Moderate	Eastern white pine-- Northern red oak---- Black oak---------- Virginia pine-------	60 60 60 60	7 3 3 6	Eastern white pine, Virginia pine, red pine, Japanese larch.
Rock outcrop.										
WkC---------- Weikert	3D	Slight	Slight	Severe	Moderate	Moderate	Northern red oak---- Virginia pine-------	59 56	3 6	Virginia pine, shortleaf pine, red pine, eastern white pine.
WkD, WkE---------- Weikert	3D	Slight	Moderate	Severe	Moderate	Moderate	Northern red oak---- Virginia pine-------	64 60	3 6	Eastern white pine, shortleaf pine, Virginia pine.
WkF, WlF---------- Weikert	3R	Moderate	Severe	Severe	Moderate	Moderate	Northern red oak---- Virginia pine-------	64 60	3 6	Eastern white pine, shortleaf pine, Virginia pine.
WsB, WsC---------- Westmoreland	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- Eastern white pine--	75 85 70	4 6 9	Eastern white pine, yellow-poplar, Virginia pine.

See footnote at end of table.

TABLE 8.--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	Plant competition	Common trees	Site index	Productivity class*	
WsE---------- Westmoreland	4R	Moderate	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- Eastern white pine--	81 90 75	4 6 10	Black walnut, yellow-poplar, eastern white pine.
WwD**: Westmoreland------	4R	Moderate	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow-poplar------- Eastern white pine--	81 90 75	4 6 10	Black walnut, yellow-poplar, eastern white pine.
Klinesville-------	3D	Slight	Moderate	Moderate	Moderate	Moderate	Northern red oak---- Virginia pine-------	60 60	3 6	Virginia pine, eastern white pine, red pine, pitch pine.
WxB, WxC---------- Wharton	4A	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Yellow-poplar-------	76 90	4 6	Eastern white pine, yellow-poplar.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL 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	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AbB---- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AbC---- Albrights	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.
AeB---- Allegheny	Slight----	Slight----	Moderate: slope, small stones.	Slight----	Slight.
AeC---- Allegheny	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----	Moderate: slope.
ArB---- Andover	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
ArC---- Andover	Severe: wetness.	Severe: wetness.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness.
AvB---- Andover	Severe: wetness.	Severe: wetness.	Severe: large stones, small stones.	Severe: wetness.	Severe: wetness.
AvC---- Andover	Severe: wetness.	Severe: wetness.	Severe: large stones, slope, small stones.	Severe: wetness.	Severe: wetness.
Aw---- Atkins	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ax*:					
Atkins----	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ernest----	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: large stones, small stones.
Ba---- Basher	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
BbB*:					
Basher----	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Birdsboro----	Severe: flooding.	Moderate: wetness.	Moderate: slope, small stones.	Severe: erodes easily.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BcC*:					
Bedington	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
Berks	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
BcD*:					
Bedington	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Berks	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
BdC*:					
Bedington	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, large stones, slope.
Berks	Severe: small stones.	Severe: small stones.	Severe: small stones, slope.	Slight	Severe: small stones.
BdD*:					
Bedington	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.	Moderate: slope.	Severe: slope, small stones.
BdE*:					
Bedington	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
BkB Berks	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
BkC Berks	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
BkD Berks	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BkE---------- Berks	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Bm---------- Birdsboro	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Severe: erodes easily.	Slight.
BrB---------- Blairton	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
BrC---------- Blairton	Severe: wetness.	Severe: wetness.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness.
BrD---------- Blairton	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness, slope.
BtA, BtB---------- Brinkerton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BtC---------- Brinkerton	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.
BuB---------- Buchanan	Moderate: wetness, small stones.	Moderate: small stones, wetness.	Severe: small stones.	Slight----------	Severe: small stones.
BuC---------- Buchanan	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Severe: small stones.
BwB---------- Buchanan	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Slight----------	Severe: small stones.
BwC---------- Buchanan	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight----------	Severe: small stones.
BwD---------- Buchanan	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope, small stones.
CaB---------- Calvin	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: large stones, thin layer.
CaC---------- Calvin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: large stones, slope, thin layer.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CaD--- Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CeC, CeF--- Cedarcreek	Variable---	Variable---	Variable---	Variable---	Variable.
CkB--- Clarksburg	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: wetness.
DkC*: Dystrochrepts---	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Slight---	Severe: small stones, depth to rock.
Rock outcrop---	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight---	Severe: depth to rock.
DkE*, DkF*: Dystrochrepts---	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope, depth to rock.
Rock outcrop---	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
EdB--- Edom	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight---	Slight.
EdC--- Edom	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight---	Moderate: slope.
EdD--- Edom	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
ElB--- Elliber	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
ElC--- Elliber	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
ElD--- Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.
ElE--- Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ErB---------- Ernest	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: large stones, small stones.
ErC---------- Ernest	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, small stones, slope.
HeB---------- Hagerstown	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones.
HeC, HgC---------- Hagerstown	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope.
HgD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HnB---------- Hagerstown	Moderate: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Slight----------	Moderate: large stones.
HnC---------- Hagerstown	Moderate: slope, depth to rock.	Severe: slope.	Severe: slope.	Slight----------	Moderate: large stones, slope.
HnD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HTC*: Hazleton----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.
Clymer----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: slope.
HTE*: Hazleton----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, large stones.
Clymer----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Hy---------- Holly	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
KlC---------- Klinesville	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, thin layer.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
KlD---------- Klinesville	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, slope, thin layer.
KmE*---------- Klinesville and Calvin	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.
KoF*: Klinesville----------	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope, thin layer.
Rock outcrop---------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
LdB---------- Laidig	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
LdC---------- Laidig	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
LdD---------- Laidig	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
LgC---------- Laidig	Severe: large stones.	Severe: large stones.	Severe: slope, large stones, small stones.	Moderate: large stones.	Moderate: large stones, small stones, slope.
LgD---------- Laidig	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Moderate: large stones, slope.	Severe: slope.
LgE---------- Laidig	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
LkB*: Leck Kill----------	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
Calvin----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: large stones, thin layer.
LkC*: Leck Kill----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LkC*:					
Calvin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: large stones, slope, thin layer.
LkD*:					
Leck Kill	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Lx Lobdell	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
McB Meckesville	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: large stones.
McC Meckesville	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight	Moderate: large stones, slope.
MdC Meckesville	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, large stones, slope.
MdD Meckesville	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
MdE Meckesville	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
MhC Mertz	Moderate: small stones, percs slowly, slope.	Moderate: small stones, percs slowly, slope.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
MoA Monongahela	Severe: flooding.	Moderate: wetness.	Moderate: small stones.	Severe: erodes easily.	Slight.
MoB Monongahela	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Severe: erodes easily.	Slight.
MrB Morrison	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones.
MrC Morrison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: small stones, slope.
MrD Morrison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MsB---------- Morrison	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
MsC---------- Morrison	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
MsD---------- Morrison	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
MtB*:					
Morrison----------	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
Murrill----------	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Slight----------	Moderate: large stones, small stones.
MtC*:					
Morrison----------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
Murrill----------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones, small stones.	Slight----------	Moderate: slope, large stones, small stones.
MtD*:					
Morrison----------	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
Murrill----------	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Moderate: slope.	Severe: slope.
MuB---------- Murrill	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
MuC---------- Murrill	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: slope, small stones.
MuD---------- Murrill	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Nd---------- Nolin	Severe: flooding.	Slight----------	Slight----------	Severe: erodes easily.	Moderate: flooding.
OpB*:					
Opequon----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: erodes easily.	Severe: depth to rock.
Hagerstown----------	Moderate: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Slight----------	Moderate: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OpC*:					
Opequon	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: depth to rock.
Hagerstown	Moderate: slope, depth to rock.	Severe: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
OpD*:					
Opequon	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: slope, depth to rock.
Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
OpE*:					
Opequon	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, depth to rock.
Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PeB Penlaw	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Ph Philo	Severe: flooding.	Moderate: wetness.	Moderate: flooding, wetness.	Slight	Moderate: flooding.
Pm*:					
Pits.					
Quarries.					
Pp Pope	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Ps Purdy	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, erodes easily.	Severe: ponding.
TgA, TgB Tyler	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Ue Udorthents	Variable	Variable	Variable	Variable	Variable.
UgF*:					
Ungers	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
UgF*:					
Lehew	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: small stones, slope.
VdF*:					
Vanderlip	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
WkC	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones.	Slight	Severe: droughty, depth to rock.
WkD	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate	Severe: droughty, depth to rock.
WkE, WkF	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe	Severe: droughty, depth to rock.
WlF	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, small stones, thin layer.
WsB	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
WsC	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
WsE	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
WwD*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Klinesville	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: small stones.	Severe: small stones, slope, thin layer.
WxB	Moderate: wetness, large stones.	Moderate: wetness, large stones.	Severe: large stones.	Slight	Moderate: large stones, wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WxC---------- Wharton	Moderate: wetness, slope, large stones.	Moderate: slope, wetness, large stones.	Severe: slope, large stones.	Slight----------	Moderate: large stones, wetness, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(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
AbB---- Albrights	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AbC---- Albrights	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AeB---- Allegheny	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AeC---- Allegheny	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ArB---- Andover	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
ArC---- Andover	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
AvB---- Andover	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
AvC---- Andover	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Aw---- Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Ax*:										
Atkins----	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Ernest----	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ba---- Basher	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BbB*:										
Basher----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Birdsboro----	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BcC*:										
Bedington----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BcD*:										
Bedington----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Berks----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--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
BdC*, BdD*, BdE*: Bedington	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Berks	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
BkB---- Berks	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
BkC---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BkD---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BkE---- Berks	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Bm---- Birdsboro	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BrB---- Blairton	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
BrC---- Blairton	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BrD---- Blairton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BtA---- Brinkerton	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
BtB---- Brinkerton	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
BtC---- Brinkerton	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BuB---- Buchanan	Fair	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
BuC---- Buchanan	Fair	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
BwB---- Buchanan	Very poor.	Very poor.	Good	Good	---	Fair	Very poor.	Poor	Fair	Poor.
BwC, BwD---- Buchanan	Very poor.	Very poor.	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.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--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
CeC, CeF---- Cedarcreek	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CkB---- Clarksburg	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DkC*, DkE*, DkF*: Dystrochrepts----	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
EdB---- Edom	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
EdC---- Edom	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EdD---- Edom	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ElB---- Elliber	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ElC---- Elliber	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ElD---- Elliber	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ElE---- Elliber	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ErB---- Ernest	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ErC---- Ernest	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HeB---- Hagerstown	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
HeC, HgC---- Hagerstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HgD---- Hagerstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HnB---- Hagerstown	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
HnC---- Hagerstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HnD---- Hagerstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--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
HTC*:										
Hazleton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Clymer	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
HTE*:										
Hazleton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Clymer	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Hy Holly	Fair	Fair	Poor	Fair	Fair	Good	Good	Fair	Fair	Good.
KlC, KlD, KmE* Klinesville	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
KoF*:										
Klinesville	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
LdB Laidig	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
LdC Laidig	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
LdD Laidig	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
LgC, LgD, LgE Laidig	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LkB*:										
Leck Kill	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Calvin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
LkC*:										
Leck Kill	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Calvin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
LkD*:										
Leck Kill	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Calvin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--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
Lx---------- Lobdell	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
McB---------- Meckesville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
McC---------- Meckesville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MdC, MdD, MdE------ Meckesville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MhC---------- Mertz	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MoA---------- Monongahela	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MoB---------- Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MrB---------- Morrison	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MrC---------- Morrison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MrD---------- Morrison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MsB---------- Morrison	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
MsC, MsD---------- Morrison	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MtB*: Morrison----------	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
Murrill----------	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
MtC*, MtD*: Morrison----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Murrill----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MuB---------- Murrill	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MuC---------- Murrill	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MuD---------- Murrill	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--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
Nd---------- Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OpB*:										
Opequon----------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hagerstown--------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
OpC*:										
Opequon----------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hagerstown--------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
OpD*:										
Opequon----------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hagerstown--------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
OpE*:										
Opequon----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hagerstown--------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
PeB---------- Penlaw	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ph---------- Philo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Pm*: Pits.										
Quarries.										
Pp---------- Pope	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ps---------- Purdy	Poor	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
TgA---------- Tyler	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
TgB---------- Tyler	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ue---------- Udorthents	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
UgF*:										
Ungers----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--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
UgF*:										
Lehew	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
VdF*:										
Vanderlip	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
WkC, WkD, WkE, WkF, WlF---------- Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
WsB---------- Westmoreland	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WsC---------- Westmoreland	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WsE---------- Westmoreland	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WwD*:										
Westmoreland	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Klinesville	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
WxB---------- Wharton	Very poor.	Good	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
WxC---------- Wharton	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--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. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AbB--- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AbC--- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness.	Severe: wetness.
AeB--- Allegheny	Slight---	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
AeC--- Allegheny	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
ArB--- Andover	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
ArC--- Andover	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
AvB--- Andover	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
AvC--- Andover	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
Aw--- Atkins	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: wetness, flooding.
Ax*: Atkins---	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: wetness, flooding.
Ernest---	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: large stones, small stones.
Ba--- Basher	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: wetness, flooding.
BbB*: Basher---	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: wetness, flooding.

See footnote at end of table.

TABLE 11.--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
BbB*:						
Birdsboro	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness.	Slight.
BcC*:						
Bedington	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
BcD*:						
Bedington	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
BdC*:						
Bedington	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, large stones, slope.
Berks	Moderate: slope, depth to rock, large stones.	Moderate: large stones, slope.	Moderate: depth to rock, large stones, slope.	Severe: slope.	Moderate: slope, large stones.	Severe: small stones.
BdD*, BdE*:						
Bedington	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe---	Severe: slope.	Severe: slope.	Severe: slope, small stones.
BkB---- Berks	Moderate: depth to rock.	Slight---	Moderate: depth to rock.	Moderate: slope.	Slight---	Severe: small stones.
BkC---- Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Severe: small stones.
BkD, BkE--- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Bm---- Birdsboro	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness.	Slight.
BrB---- Blairton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.

See footnote at end of table.

TABLE 11.--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
BrC--- Blairton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
BrD--- Blairton	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope, frost action.	Severe: wetness, slope.
BtA, BtB--- Brinkerton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action, low strength.	Severe: wetness.
BtC--- Brinkerton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness, frost action, low strength.	Severe: wetness.
BuB--- Buchanan	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: wetness, frost action.	Severe: small stones.
BuC--- Buchanan	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: slope, wetness, frost action.	Severe: small stones.
BwB--- Buchanan	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Severe: small stones.
BwC--- Buchanan	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: small stones.
BwD--- Buchanan	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
CaB--- Calvin	Moderate: depth to rock.	Slight---	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: large stones, thin layer.
CaC--- Calvin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope, thin layer.
CaD--- Calvin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CeC, CeF--- Cedarcreek	Variable---	Variable---	Variable---	Variable---	Variable---	Variable.
CkB--- Clarksburg	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: low strength, wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--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
DkC*:						
Dystrochrepts	Severe: depth to rock, cutbanks cave.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
DkE*, DkF*:						
Dystrochrepts	Severe: depth to rock, cutbanks cave, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope, depth to rock.
Rock outcrop	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
EdB---------- Edom	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
EdC---------- Edom	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
EdD---------- Edom	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
ElB---------- Elliber	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: small stones, droughty.
ElC---------- Elliber	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Severe: small stones, droughty.
ElD, ElE--------- Elliber	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
ErB---------- Ernest	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: large stones, small stones.
ErC---------- Ernest	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: large stones, small stones, slope.
HeB---------- Hagerstown	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.

See footnote at end of table.

TABLE 11.--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
HeC, HgC---------- Hagerstown	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
HgD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
HnB---------- Hagerstown	Severe: depth to rock, too clayey.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Moderate: large stones.	Moderate: large stones.
HnC---------- Hagerstown	Severe: depth to rock, too clayey.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: slope, depth to rock.	Moderate: large stones, slope.	Moderate: large stones, slope.
HnD---------- Hagerstown	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
HTC*, HTE*: Hazleton--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, large stones.
Clymer----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hy---------- Holly	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
KlC---------- Klinesville	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones, thin layer.
KlD, KmE*-------- Klinesville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.
KoF*: Klinesville-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.
Rock outcrop----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
LdB---------- Laidig	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: frost action, low strength.	Moderate: small stones.

See footnote at end of table.

TABLE 11.--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
LdC--- Laidig	Moderate: wetness, slope.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: small stones, slope.
LdD--- Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LgC--- Laidig	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, small stones, slope.
LgD, LgE--- Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LkB*:						
Leck Kill---	Slight---	Slight---	Slight---	Moderate: slope.	Moderate: frost action.	Slight.
Calvin---	Moderate: depth to rock.	Slight---	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: large stones, thin layer.
LkC*:						
Leck Kill---	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Calvin---	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope, thin layer.
LkD*:						
Leck Kill---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Calvin---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lx--- Lobdell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
McB--- Meckesville	Moderate: wetness.	Slight---	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Moderate: large stones.
McC--- Meckesville	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
MdC--- Meckesville	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, large stones, slope.
MdD, MdE--- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--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
MhC--- Mertz	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: small stones, slope.
MoA--- Monongahela	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness, flooding.	Slight.
MoB--- Monongahela	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.
MrB--- Morrison	Severe: cutbanks cave.	Slight---	Slight---	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
MrC--- Morrison	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
MrD--- Morrison	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MsB--- Morrison	Severe: cutbanks cave.	Slight---	Slight---	Moderate: slope.	Moderate: frost action.	Moderate: large stones.
MsC--- Morrison	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
MsD--- Morrison	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MtB*:						
Morrison---	Severe: cutbanks cave.	Slight---	Slight---	Moderate: slope.	Moderate: frost action.	Moderate: large stones.
Murrill---	Slight---	Slight---	Moderate: shrink-swell.	Moderate: slope.	Moderate: frost action, low strength.	Moderate: large stones, small stones.
MtC*:						
Morrison---	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
Murrill---	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, low strength, frost action.	Moderate: slope, large stones, small stones.
MtD*:						
Morrison---	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Murrill---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--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
MuB--- Murrill	Slight---	Slight---	Moderate: shrink-swell.	Moderate: slope.	Moderate: frost action, low strength.	Moderate: small stones.
MuC--- Murrill	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope, small stones.
MuD--- Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Nd--- Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
OpB*: Opequon---	Severe: depth to rock.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, low strength, shrink-swell.	Severe: depth to rock.
Hagerstown---	Severe: depth to rock, too clayey.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Moderate: large stones.	Moderate: large stones.
OpC*: Opequon---	Severe: depth to rock.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: slope, depth to rock, shrink-swell.	Severe: depth to rock, low strength, shrink-swell.	Severe: depth to rock.
Hagerstown---	Severe: depth to rock, too clayey.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: slope, depth to rock.	Moderate: large stones, slope.	Moderate: large stones, slope.
OpD*, OpE*: Opequon---	Severe: slope, depth to rock.	Severe: slope, depth to rock, shrink-swell.	Severe: slope, depth to rock, shrink-swell.	Severe: slope, depth to rock, shrink-swell.	Severe: slope, depth to rock, low strength.	Severe: slope, depth to rock.
Hagerstown---	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
PeB--- Penlaw	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
Ph--- Philo	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Pm*: Pits. Quarries.						

See footnote at end of table.

TABLE 11.--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
Pp---------- Pope	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Ps---------- Purdy	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, low strength, frost action.	Severe: ponding.
TgA, TgB--------- Tyler	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
Ue---------- Udorthents	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
UgF*: Ungers----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lehew----------	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
VdF*: Vanderlip-------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
WkC---------- Weikert	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: droughty, depth to rock.
WkD, WkE, WkF---- Weikert	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, depth to rock.
WlF---------- Weikert	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones, thin layer.
WsB---------- Westmoreland	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Moderate: low strength, frost action.	Moderate: small stones.
WsC---------- Westmoreland	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: small stones, slope.
WsE---------- Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--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
WwD*:						
Westmoreland----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Klinesville-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.
WxB---------- Wharton	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action, low strength.	Moderate: large stones, wetness.
WxC---------- Wharton	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: large stones, wetness, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AbB---------- Albrights	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
AbC---------- Albrights	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
AeB---------- Allegheny	Slight----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
AeC---------- Allegheny	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
ArB---------- Andover	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
ArC---------- Andover	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
AvB---------- Andover	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
AvC---------- Andover	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Aw---------- Atkins	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Poor: wetness.
Ax*: Atkins----------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Poor: wetness.
Ernest----------	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
Ba---------- Basher	Severe: flooding, wetness.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE 12.--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
BbB*:					
Basher	Severe: flooding, wetness.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: seepage, too sandy, small stones.
Birdsboro	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, small stones.
BcC*:					
Bedington	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: small stones.
Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BcD*:					
Bedington	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
BdC*:					
Bedington	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Poor: small stones.
Berks	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BdD*, BdE*:					
Bedington	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Berks	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
BkB Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BkC Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--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
BkD, BkE---------- Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
Bm---------- Birdsboro	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, small stones.
BrB---------- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim, small stones.
BrC---------- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim, small stones.
BrD---------- Blairton	Severe: slope, depth to rock, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, wetness, slope.	Poor: area reclaim, small stones, slope.
BtA---------- Brinkerton	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
BtB---------- Brinkerton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BtC---------- Brinkerton	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BuB---------- Buchanan	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
BuC---------- Buchanan	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Poor: small stones.
BwB---------- Buchanan	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
BwC---------- Buchanan	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.
BwD---------- Buchanan	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: small stones, slope.
CaB---------- Calvin	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 12.--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
CaC---------- Calvin	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
CaD---------- Calvin	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
CeC, CeF---------- Cedarcreek	Variable---------	Variable---------	Variable---------	Variable---------	Variable.
CkB---------- Clarksburg	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
DkC*:					
Dystrochrepts------	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
Rock outcrop-------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
DkE*, DkF*:					
Dystrochrepts------	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop-------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
EdB---------- Edom	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
EdC---------- Edom	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
EdD---------- Edom	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
ElB---------- Elliber	Moderate: percs slowly, large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
ElC---------- Elliber	Moderate: percs slowly, slope, large stones.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.

See footnote at end of table.

TABLE 12.--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
ElD, ElE---------- Elliber	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
ErB---------- Ernest	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
ErC---------- Ernest	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Poor: small stones.
HeB---------- Hagerstown	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
HeC, HgC---------- Hagerstown	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
HgD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
HnB, HnC---------- Hagerstown	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: too clayey, slope.
HnD---------- Hagerstown	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, too clayey.	Severe: depth to rock, slope.	Poor: too clayey, slope.
HTC*, HTE*: Hazleton----------	Severe: poor filter, slope.	Severe: slope, seepage, large stones.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
Clymer----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Hy---------- Holly	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
KlC---------- Klinesville	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, small stones.

See footnote at end of table.

TABLE 12.--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
KlD, KmE*---------- Klinesville	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.
KoF*: Klinesville---------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.
Rock outcrop-------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
LdB---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage, wetness.	Moderate: wetness.	Severe: seepage.	Fair: small stones, wetness.
LdC---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage, slope, wetness.	Moderate: slope, wetness.	Severe: seepage.	Fair: slope, small stones, wetness.
LdD---------- Laidig	Severe: slope, percs slowly, wetness.	Severe: seepage, slope, wetness.	Severe: slope.	Severe: slope, seepage.	Poor: slope.
LgC---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage, slope, wetness.	Moderate: wetness, slope, large stones.	Severe: seepage.	Fair: slope, small stones, wetness.
LgD, LgE---------- Laidig	Severe: slope, percs slowly, wetness.	Severe: seepage, slope, wetness.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
LkB*: Leck Kill----------	Moderate: percs slowly, depth to rock.	Severe: seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
Calvin----------	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
LkC*: Leck Kill----------	Moderate: percs slowly, slope, depth to rock.	Severe: seepage, slope.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
Calvin----------	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 12.--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
LkD*: Leck Kill	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, depth to rock.	Severe: seepage, slope.	Poor: small stones, slope.
Calvin	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Lx Lobdell	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
McB Meckesville	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: small stones, thin layer.
McC, MdC Meckesville	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Poor: small stones, thin layer.
MdD, MdE Meckesville	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope, thin layer.
MhC Mertz	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey, large stones.	Moderate: slope.	Poor: small stones.
MoA Monongahela	Severe: percs slowly, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Moderate: flooding, wetness.	Fair: small stones, wetness.
MoB Monongahela	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
MrB Morrison	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
MrC Morrison	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
MrD Morrison	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
MsB Morrison	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
MsC Morrison	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.

See footnote at end of table.

TABLE 12.--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
MsD---------- Morrison	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
MtB*:					
Morrison----------	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
Murrill----------	Slight----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Moderate: too clayey, small stones, thin layer.
MtC*:					
Morrison----------	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
Murrill----------	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Moderate: too clayey, small stones, slope.
MtD*:					
Morrison----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Murrill----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MuB---------- Murrill	Slight----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Poor: small stones.
MuC---------- Murrill	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
MuD---------- Murrill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Nd---------- Nolin	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
OpB*:					
Opequon----------	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Hagerstown---------	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 12.--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
OpC*:					
Opequon	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Hagerstown	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: too clayey, slope.
OpD*, OpE*:					
Opequon	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
Hagerstown	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, too clayey.	Severe: depth to rock, slope.	Poor: too clayey, slope.
PeB	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: small stones, wetness, thin layer.
Ph	Severe: flooding, wetness, poor filter.	Severe: flooding, wetness, seepage.	Severe: flooding, depth to rock, seepage.	Severe: flooding, wetness.	Fair: area reclaim, wetness, thin layer.
Pm*:					
Pits.					
Quarries.					
Pp	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
Ps	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: ponding, too clayey, hard to pack.
TgA	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
TgB	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ue	Variable	Variable	Variable	Variable	Variable.
Udorthents					
UgF*:					
Ungers	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 12.--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
UgF*:					
Lehew	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: depth to rock, small stones, slope.
VdF*:					
Vanderlip	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
WkC	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, seepage, small stones.
Weikert					
WkD, WkE, WkF	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, seepage, small stones.
Weikert					
WlF	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, area reclaim, seepage.
Weikert					
WsB	Moderate: depth to rock, percs slowly.	Moderate: slope, depth to rock, seepage.	Severe: depth to rock.	Moderate: depth to rock.	Poor: small stones.
Westmoreland					
WsC	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Poor: small stones.
Westmoreland					
WsE	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Westmoreland					
WwD*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Klinesville	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.
WxB	Severe: percs slowly, wetness.	Moderate: slope.	Severe: depth to rock, wetness.	Moderate: wetness.	Fair: too clayey.
Wharton					

See footnote at end of table.

TABLE 12.--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
WxC---------- Wharton	Severe: percs slowly, wetness.	Severe: slope.	Severe: depth to rock, wetness.	Moderate: wetness, slope.	Fair: too clayey, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AbB, AbC---------- Albrights	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
AeB---------- Allegheny	Good----------	Improbable---------- excess fines.	Improbable---------- excess fines.	Fair: small stones, area reclaim.
AeC---------- Allegheny	Good----------	Improbable---------- excess fines.	Improbable---------- excess fines.	Fair: small stones, area reclaim, slope.
ArB, ArC, AvB, AvC---- Andover	Poor: wetness	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Aw---------- Atkins	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor. wetness.
Ax*:				
Atkins----------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ernest----------	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Ba---------- Basher	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim.
BbB*:				
Basher----------	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim.
Birdsboro----------	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim.
BcC*:				
Bedington----------	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Berks----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BcD*:				
Bedington	Fair: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
BdC*:				
Bedington	Fair: area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable excess fines.	Poor: small stones.
BdD*:				
Bedington	Fair: area reclaim. large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
BdE*:				
Bedington	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Berks	Poor: slope. area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
BkB, BkC Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BkD Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Bke Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Bm Birdsboro	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
BrB, BrC Blairton	Poor: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
BrD Blairton	Poor: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BtA, BtB, BtC--------- Brinkerton	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BuB, BuC, BwB, BwC---- Buchanan	Fair: wetness,	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BwD------------------- Buchanan	Fair: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
CaB, CaC-------------- Calvin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CaD------------------- Calvin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CeC------------------- Cedarcreek	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CeF------------------- Cedarcreek	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CkB------------------- Clarksburg	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
DkC*: Dystrochrepts-------- Rock outcrop---------	Poor: depth to rock. Poor: depth to rock.	Improbable: excess fines. Improbable: excess fines.	Improbable: excess fines. Improbable: excess fines.	Poor: depth to rock, small stones, area reclaim. Poor: depth to rock.
DkE*, DkF*: Dystrochrepts-------- Rock outcrop---------	Poor: depth to rock, slope. Poor: depth to rock, slope.	Improbable: excess fines. Improbable: excess fines.	Improbable: excess fines. Improbable: excess fines.	Poor: depth to rock, small stones, area reclaim. Poor: depth to rock, slope.
EdB, EdC-------------- Edom	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EdD------------------- Edom	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ElB, ElC---------- Elliber	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim,
ElD---------- Elliber	Fair: large stones. slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
ElE---------- Elliber	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
ErB, ErC---------- Ernest	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HeB, HeC, HgC--------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HgD---------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HnB, HnC---------- Hagerstown	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HnD---------- Hagerstown	Poor: low strength, shrink-swell	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HTC*: Hazleton----------	Fair: slope. area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Clymer----------	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
HTE*: Hazleton----------	Severe:---------- slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Clymer----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Hy---------- Holly	Poor: wetness.	Probable----------	Probable----------	Poor: wetness.
KlC---------- Klinesville	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
KlD---------- Klinesville	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
KmE*---------- Klinesville	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
KoF*:				
Klinesville----------	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
Rock outcrop---------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
LdB, LdC---------- Laidig	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LdD---------- Laidig	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones. slope.
LgC---------- Laidig	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LgD---------- Laidig	Fair: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
LgE---------- Laidig	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
LkB*, LkC				
Leck Kill----------	Fair: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Calvin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LkD*:				
Leck Kill----------	Fair: thin layer, slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Calvin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lx---------- Lobdell	Fair: wetness	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones,

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
McB, McC, MdC--------- Meckesville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MdD-------------------- Meckesville	Fair: wetness. slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MdE-------------------- Meckesville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
McH-------------------- Mertz	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MoA, MoB--------------- Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
MrB, MrC--------------- Morrison	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MrD-------------------- Morrison	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MsB, MsC--------------- Morrison	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MsD-------------------- Morrison	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MtB*, MtC*: Morrison--------------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Murrill----------------	Fair:---------- low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones,
MtD*: Morrison--------------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Murrill----------------	Fair:---------- slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
MuB, MuC--------------- Murrill	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MuD---------- Murrill	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Nd---------- Nolin	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim,
OpB*, OpC*: Opequon----------	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too claye, small stones.
Hagerstown----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
OpD*: Opequon----------	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.
Hagerstown----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
OpD*: Opequon----------	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.
Hagerstown----------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
PeB---------- Penlaw	Poor: low strength. wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Ph---------- Philo	Fair: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
Pm*: Pits. Quarries.				
Pp---------- Pope	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Ps---------- Purdy	Poor: low strength. wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.
TgA, TgB---------- Tyler	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ue---------- Udorthents	Variable----------	Variable----------	Variable----------	Variable.
UgF*: Ungers----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
Lehew----------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
VdF*: Vanderlip----------	Poor: slope.	Probable----------	Probable----------	Poor: area reclaim, small stones, slope.
Rock outcrop---------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
WkC---------- Weikert	Poor: depth to rock.	Improbable; small stones.	Improbable: thin layer.	Poor: depth to rock, small stones.
WkD---------- Weikert	Poor: depth to rock.	Improbable; small stones.	Improbable: thin layer.	Poor: depth to rock, small stones, slope.
WkE, WkF---------- Weikert	Poor: depth to rock. slope.	Improbable; small stones.	Improbable: thin layer.	Poor: depth to rock, small stones, slope.
WlF---------- Weikert	Poor: slope, area reclaim.	Improbable; small stones.	Improbable: thin layer.	Poor: slope, small stones, area reclaim.
WsB, WsC---------- Westmoreland	Fair: area reclaim, low strength.	Improbable; excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WsE---------- Westmoreland	Poor: slope.	Improbable; excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WwD*: Westmoreland---------	Fair: area reclaim, low strength,	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
WwD*: Klinesville	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
WxB, WxC Wharton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(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 evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AbB---- Albrights	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Slope----	Wetness, rooting depth, slope.	Wetness, rooting depth.	Wetness, droughty, rooting depth.
AbC---- Albrights	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Slope----	Wetness, rooting depth, slope.	Slope, wetness, rooting depth.	Wetness, slope, droughty.
AeB---- Allegheny	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----	Favorable----	Favorable.
AeC---- Allegheny	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----	Slope----	Slope.
ArB---- Andover	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Large stones, rooting depth.	Wetness, rooting depth, percs slowly.
ArC---- Andover	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, large stones, rooting depth.	Wetness, slope, rooting depth.
AvB---- Andover	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Large stones, wetness, rooting depth.	Large stones, wetness, rooting depth.
AvC---- Andover	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, large stones, wetness.	Large stones, wetness, slope.
Aw---- Atkins	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding, front action, percs slowly.	Wetness, flooding, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ax*: Atkins----	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding, frost action, percs slowly.	Wetness, flooding, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ax*:							
Ernest	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.	Erodes easily, rooting depth.
Ba Basher	Moderate: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave, slow refill.	Flooding, frost action, cutbanks cave.	Flooding, wetness.	Wetness, too sandy.	Favorable.
BbB*:							
Basher	Moderate: seepage.	Severe: seepage, piping, wetness	Severe: cutbanks cave, slow refill.	Flooding, frost action, cutbanks cave.	Flooding, wetness.	Wetness, too sandy.	Favorable.
Birdsboro	Moderate: seepage, slope.	Severe: piping.	Severe: cutbanks cave.	Slope	Slope, wetness, erodes easily.	Slope, wetness, erodes easily.	Erodes easily.
BcC*, BcD*:							
Bedington	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, depth to rock.	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
BdC*, BdD*, BdE*:							
Bedington	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope, depth to rock.	Slope, depth to rock, large stones.	Depth to rock, large stones, slope.
BkB Berks	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, depth to rock.	Depth to rock, large stones.	Droughty, depth to rock, large stones.
BkC, BkD, BkE Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, depth to rock.	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
Bm Birdsboro	Moderate: seepage.	Severe: piping.	Severe: cutbanks cave.	Favorable	Wetness, erodes easily.	Wetness, erodes easily.	Erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BrB---------- Blairton	Moderate: seepage, depth to rock, slope.	Severe: piping, wetness.	Severe: no water.	Depth to rock, frost action, slope.	Slope, wetness, depth to rock.	Depth to rock, wetness.	Wetness, droughty.
BrC, BrD---------- Blairton	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Depth to rock, frost action, slope.	Slope, wetness, depth to rock.	Slope, depth to rock, wetness.	Wetness, slope, droughty.
BtA---------- Brinkerton	Slight---------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Percs slowly, wetness, rooting depth.	Percs slowly, wetness, rooting depth
BtB---------- Brinkerton	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Percs slowly, wetness, rooting depth.	Percs slowly, wetness, rooting depth
BtC---------- Brinkerton	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Wetness, percs slowly, slope.	Wetness, percs slowly, slope.
BuB---------- Buchanan	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, percs slowly, wetness.	Percs slowly, rooting depth.	Percs slowly, rooting depth.
BuC---------- Buchanan	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, percs slowly, wetness.	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.
BwB---------- Buchanan	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, percs slowly, wetness.	Percs slowly, rooting depth.	Percs slowly, rooting depth.
BwC, BwD---------- Buchanan	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, percs slowly, wetness.	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.
CaB---------- Calvin	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Large stones, depth to rock.	Large stones, droughty.
CaC, CaD---------- Calvin	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CeC, CeF--------- Cedarcreek	Severe: seepage, slope.	Moderate: large stones.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
CkB--------- Clarksburg	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, erodes easily.	Erodes easily, rooting depth.
DkC*, DkE*, DkF*: Dystrochrepts---	Severe: seepage, depth to rock, slope.	Severe: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop----	Severe: depth to rock, slope.	Slight---------	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
EdB--------- Edom	Moderate: seepage, depth to rock, slope.	Moderate: hard to pack, thin layer.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
EdC, EdD--------- Edom	Severe: slope.	Moderate: hard to pack, thin layer.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
ElB--------- Elliber	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, droughty, slope.	Large stones---	Large stones, droughty.
ElC, ElD, ElE---- Elliber	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
ErB--------- Ernest	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.	Erodes easily, rooting depth.
ErC--------- Ernest	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness. percs slowly.	Slope, erodes easily, rooting depth.	Rooting depth, slope, erodes easily.
HeB--------- Hagerstown	Moderate: seepage, depth to rock, slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
HeC, HgC, HgD---- Hagerstown	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
HnB---------- Hagerstown	Severe: depth to rock, slope, seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Depth to rock, slope.	Depth to rock.	Depth to rock.
HnC, HnD--------- Hagerstown	Severe: depth to rock, slope, seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
HTC*, HTE*: Hazleton--------	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, droughty, slope.	Large stones, slope, too sandy.	Large stones, slope, droughty.
Clymer----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
Hy---------- Holly	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
KlC, KlD, KmE*--- Klinesville	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, stones, droughty, depth to rock.
KoF*: Klinesville-----	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock Outcrop----	Severe: depth to rock, slope.	Slight---------	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
LdB---------- Laidig	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Rooting depth, slope.	Rooting depth	Rooting depth.
LdC, LdD--------- Laidig	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Rooting depth, slope.	Slope, rooting depth.	Slope, rooting depth.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
LgC, LgD, LgE---- Laidig	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Droughty, rooting depth, slope.	Slope, large stones, rooting depth.	Large stones, slope, droughty.
LkB*:							
Leck Kill-------	Severe: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
Calvin----------	Severe: seepage	Severe: piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Large stones, depth to rock.	Large stones, droughty.
LkC*, LkD*:							
Leck Kill-------	Severe: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
Calvin----------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Lx--------------- Lobdell	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Erodes easily.
McB-------------- Meckesville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Slope----------	Wetness: rooting depth, slope.	Wetness, rooting depth.	Rooting depth.
McC-------------- Meckesville	Severe: slope.	Severe: piping.	Severe: no water.	Slope----------	Wetness, rooting depth, slope.	Slope, wetness.	Slope, rooting depth.
MdC, MdD, MdE---- Meckesville	Severe: slope.	Severe: piping.	Severe: no water.	Slope----------	Wetness, rooting depth, slope.	Slope, large stones, wetness.	Large stones, slope, rooting depth.
MhC-------------- Mertz	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
MoA-------------- Monongahela	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly---	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
MoB---------- Monongahela	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
MrB---------- Morrison	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
MrC, MrD--------- Morrison	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
MsB---------- Morrison	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
MsC, MsD--------- Morrison	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
MtB*:							
Morrison--------	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
Murrill---------	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
MtC*, MtD*:							
Morrison--------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
Murrill---------	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
MuB---------- Murrill	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
MuC, MuD--------- Murrill	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
Nd---------- Nolin	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
OpB*:							
Opequon	Severe: depth to rock.	Severe: hard to pack, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Depth to rock, erodes easily.	Erodes easily, depth to rock, droughty.
Hagerstown	Severe: depth to rock, slope, seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
OpC*, OpD*, Ope*:							
Opequon	Severe: depth to rock, slope.	Severe: hard to pack, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Hagerstown	Severe: depth to rock, slope, seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
PeB Penlaw	Moderate: seepage, depth to rock, slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, rooting depth.	Wetness, erodes easily, rooting depth.
Ph Philo	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Flooding	Wetness, flooding.	Wetness	Favorable.
Pm*:							
Pits.							
Quarries.							
Pp Pope	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable	Favorable.
Ps Purdy	Slight	Severe: piping, hard to pack, ponding.	Severe: slow refill.	Percs slowly, frost action.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
TgA Tyler	Slight	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
TgB--Tyler	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
Ue--Udorthents	Variable	Variable	Variable	Variable	Variable	Variable	Variable.
UgF*:							
Ungers	Moderate: seepage, depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Lehew	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Slope, large stones, droughty.
VdF*:							
Vanderlip	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Slope, too sandy.	Slope, droughty.
Rock outcrop	Severe: depth to rock, slope.	Slight	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
WkC, WkD, WkE, WkF--Weikert	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water		Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
WlF--Weikert	Severe: depth to rock, slope, seepage.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
WsB--Westmoreland	Moderate: seepage, depth to rock, slope.	Severe: piping.	No water	Deep to water	Slope	Large stones	Large stones.
WsC, WsE--Westmoreland	Severe: slope.	Severe: piping.	No water	Deep to water	Slope	Slope, large stones.	Large stones, slope.
WwD*:							
Westmoreland	Severe: slope.	Severe: piping.	No water	Deep to water	Slope	Slope, large stones.	Large stones, slope.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WwD*: Klinesville	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
WxB Wharton	Moderate: depth to rock, slope.	Moderate: thin layer, piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Percs slowly.
WxC Wharton	Severe: slope.	Moderate: thin layer, piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(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	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
AbB, AbC--------- Albrights	0-5	Silt loam---------	ML, CL	A-4	0-10	80-100	80-95	70-90	55-80	15-30	5-10
	5-26	Channery clay loam, gravelly silt loam, silty clay loam, silt loam.	ML, CL, SM, SC	A-4, A-6	0-15	80-100	65-95	60-90	40-85	25-40	3-15
	26-60	Silt loam, silty clay loam, gravelly silty clay loam, channery clay loam.	CL, ML, SC, SC-SM	A-4, A-2, A-6	0-15	65-100	45-95	40-90	25-80	20-40	3-15
AeB, AeC--------- Allegheny	0-10	Loam-------------	ML, CL	A-4	0	90-100	80-100	65-100	55-95	<35	NP-10
	10-36	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	80-100	65-95	35-80	<35	NP-15
	36-60	Clay loam, sandy loam, gravelly fine sandy loam.	SM, GC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
ArB, ArC--------- Andover	0-6	Cobbly loam------	SM, ML, CL-ML	A-4, A-2	5-20	65-75	65-75	60-70	30-60	20-35	NP-10
	6-20	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, ML, CL-ML, CL	A-4, A-2	0-20	80-95	65-85	60-85	30-60	20-35	2-10
	20-40	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, ML, CL-ML, SC-SM	A-2, A-4	0-20	80-95	65-85	60-85	30-60	20-35	2-9
	40-60	Gravelly sandy clay loam, cobbly loam, cobbly sandy loam.	SM, ML, CL-ML, SC-SM	A-2, A-4	5-30	70-95	55-90	50-75	25-60	20-35	2-9
AvB, AvC--------- Andover	0-6	Very stony sandy loam.	ML, CL, SM, SC	A-4, A-2	3-10	70-100	65-95	60-90	30-85	20-35	NP-10
	6-20	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	2-10
	20-40	Loam, gravelly clay loam, cobbly sandy clay loam.	SM, ML, SC-SM, CL-ML	A-4, A-2	0-25	80-95	65-85	60-85	30-60	20-35	2-9
	40-60	Gravelly sandy clay loam, cobbly loam, cobbly sandy loam.	SM, ML, CL-ML, SC-SM	A-2, A-4	5-30	70-95	55-90	50-75	25-60	20-35	2-9

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Aw---------- Atkins	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-95	20-40	3-20
	6-40	Silty clay loam, silt loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	65-100	45-85	20-40	3-20
	40-60	Stratified silty clay loam to gravelly sandy loam.	SM, CL, GM, ML	A-2, A-4, A-6	0-15	60-100	60-100	50-95	30-85	20-40	1-15
Ax*:											
Atkins----------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-95	20-40	3-20
	6-40	Silty clay loam, silt loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	65-100	45-85	20-40	3-20
	40-60	Stratified silty clay loam to gravelly sandy loam.	SM, CL, GM, ML	A-2, A-4, A-6	0-15	60-100	60-100	50-95	30-85	20-40	1-15
Ernest----------	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-10	85-100	80-100	70-95	60-95	20-40	4-15
	10-31	Silty clay loam, silt loam, channery silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	75-95	70-100	65-90	55-90	25-50	6-22
	31-63	Channery silt loam, silt loam, silty clay loam, channery silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	6-22
Ba---------- Basher	0-8	Silt loam--------	ML, CL-ML, SM, SC-SM	A-4, A-2, A-1	0-5	80-100	75-100	45-100	20-90	15-25	2-7
	8-40	Silt loam, loam, gravelly sandy loam.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	40-64	Sandy loam, gravelly loamy sand, very gravelly sand.	GP, SW, SM, ML	A-1, A-2, A-4, A-3	0-5	30-100	25-100	10-85	1-55	---	NP
BbB*:											
Basher----------	0-8	Silt loam--------	ML, CL-ML, SM, SC-SM	A-4, A-2, A-1	0-5	80-100	75-100	45-100	20-90	15-25	2-7
	8-40	Silt loam, loam, gravelly sandy loam.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	40-64	Sandy loam, gravelly loamy sand, very gravelly sand.	GP, SW, SM, ML	A-1, A-2, A-4, A-3	0-5	30-100	25-100	10-85	1-55	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
BbB*:											
Birdsboro-------	0-10	Silt loam--------	ML, CL-ML, CL	A-4	0	95-100	85-100	80-100	65-90	20-35	2-10
	10-46	Silt loam, sandy clay loam, gravelly clay loam, silty clay loam.	ML, CL, SM, GM	A-4, A-6	0-5	70-100	65-100	60-100	45-95	25-40	3-18
	46-70	Stratified sand to very gravelly clay loam.	GM, SM, ML, GP-GM	A-2, A-4, A-1	0-20	40-100	20-95	15-70	10-55	25-35	NP-7
BcC*, BcD*:											
Bedington-------	0-9	Channery silt loam.	GM, SM, ML, CL	A-2, A-4	0-5	50-85	50-80	40-75	30-65	20-35	2-10
	9-50	Silt loam, channery silty clay loam, very channery loam.	GM, SM, ML, SC-SM	A-4, A-2, A-6, A-7	0-30	40-90	30-90	25-75	20-65	25-45	5-15
	50-60	Channery loam, very shaly silt loam, very channery silty clay loam, extremely channery loam.	SM, GM	A-4, A-2, A-1, A-7	0-30	40-85	20-80	15-75	15-45	20-45	1-15
Berks-----------	0-8	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	8-29	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	29-34	Channery loam, very channery loam, channery silt loam, extremely channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
BdC*, BdD*, BdE*:											
Bedington-------	0-9	Very stony loam	GM, SM, ML, CL	A-4, A-2	3-10	50-100	50-100	40-95	30-95	20-35	2-10
	9-50	Silt loam, channery silty clay loam, very channery loam.	GM, SM, ML, SC-SM	A-4, A-2, A-6, A-7	0-30	40-90	30-85	25-75	20-65	25-45	5-15
	50-60	Channery loam, very channery silt loam, very channery silty clay loam, extremely channery loam.	SM, GM	A-4, A-2, A-1	0-30	40-85	10-80	10-75	15-45	20-45	1-15

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
BdC*, BdD*, BdE*:											
Berks	0-7	Very stony silt loam.	GM, SM, GC, SC	A-2, A-4	15-30	40-80	35-70	30-60	25-45	25-36	5-10
	7-29	Channery loam, very channery loam, channery 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
	29-34	Channery loam, very channery loam, channery silt loam, extremely channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	10-55	10-40	15-35	24-38	2-10
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
BkB, BkC, BkD, BkE----- Berks	0-7	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	7-29	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	29-34	Channery loam, very channery loam, channery silt loam, extremely channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	10-55	10-40	15-35	24-38	2-10
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
Bm----- Birdsboro	0-10	Silt loam--------	ML, CL-ML, CL	A-4	0	95-100	85-100	80-100	65-90	20-35	2-10
	10-46	Silt loam, sandy clay loam, loam, gravelly clay loam, silty clay loam.	ML, CL, SM, GM	A-4, A-6	0-5	70-100	65-100	60-100	45-95	25-40	3-18
	46-70	Stratified sand to very gravelly clay loam.	GM, SM, ML, GP-GM	A-2, A-4, A-1	0-20	40-100	20-95	15-70	10-55	25-35	NP-7
BrB, BrC, BrD---- Blairton	0-10	Channery silt loam.	ML, CL-ML	A-4	0-10	70-90	65-75	55-70	50-65	20-35	2-10
	10-27	Silt loam, channery silt loam, channery silty clay loam, very channery loam.	ML, CL, GM	A-4, A-6, A-7, A-2	0-5	50-90	35-90	30-85	25-70	25-42	2-20
	27-32	Very channery loam, channery loam, extremely channery silt loam.	GM, SM, ML, CL	A-4, A-2, A-6, A-1	0-10	15-65	15-65	15-65	10-60	25-40	2-12
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
BtA, BtB, BtC---- Brinkerton	0-8	Silt loam--------	ML	A-4, A-6	0-10	90-100	85-100	85-100	75-100	---	---
	8-22	Silty clay loam, silt loam.	ML	A-4, A-6, A-7, A-5	0-10	90-100	85-100	85-100	65-100	30-45	5-15
	22-45	Silt loam, channery loam, channery silty clay loam.	ML	A-4, A-6, A-7, A-5	0-10	75-100	60-100	60-100	55-100	30-45	5-15
	45-60	Silt loam, channery loam, channery silt loam, very channery silt loam.	ML, SM, SC, CL	A-4, A-6, A-2, A-1	0-50	70-90	25-85	25-85	20-75	30-40	5-15
BuB, BuC--------- Buchanan	0-9	Cobbly loam------	GM, ML, CL, CL-ML	A-4, A-2	10-20	50-100	45-75	40-75	30-65	20-35	2-11
	9-25	Cobbly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-4, A-2	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	25-60	Gravelly loam, loam, cobbly clay loam.	GM, ML, CL, SM	A-4, A-2, A-6	0-20	50-100	30-80	30-75	20-60	20-35	2-15
BwB, BwC, BwD---- Buchanan	0-8	Extremely stony loam.	GM, ML, CL, CL-ML	A-2, A-4	5-20	50-85	45-70	40-70	30-60	20-35	2-11
	8-30	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-2, A-4	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	30-60	Gravelly loam, loam, channery clay loam, very gravelly clay loam.	GM, ML, CL, SM	A-2, A-4, A-6	0-20	50-100	30-80	30-75	20-60	20-35	2-15
CaB, CaC--------- Calvin	0-10	Channery silt loam.	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	10-26	Channery silt loam, channery loam, very channery silt loam.	ML, SM, GM	A-2, A-4, A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	26-40	Channery silt loam, extremely channery silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	20-65	15-60	15-40	23-39	3-13
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
CaD---------- Calvin	0-8	Channery silt loam.	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	8-26	Channery silt loam, channery loam, very channery silt loam.	ML, SM, GM	A-2, A-4, A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	26-40	Channery silt loam, extremely channery silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	20-65	15-60	15-40	23-39	3-13
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CeC, CeF---------- Cedarcreek	0-4	Very stony loam	GC	A-2, A-4, A-6	15-30	45-60	40-55	30-50	20-40	25-35	7-12
	4-70	Extremely channery loam, very stony silt loam, very channery sandy loam.	GC	A-2, A-4	5-30	30-55	25-50	20-45	15-40	25-35	7-12
CkB---------- Clarksburg	0-8	Silt loam--------	CL, ML	A-4, A-6	0-5	90-100	85-100	80-95	75-90	25-35	2-11
	8-30	Loam, channery silty clay loam, gravelly silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-10	80-100	65-100	60-95	55-85	25-45	6-20
	30-45	Silty clay loam, channery loam, gravelly silt loam, silty clay loam.	CL-ML, CL, SC-SM, SC	A-4, A-6, A-7	0-15	75-100	55-100	50-95	45-90	20-45	4-20
	45-60	Clay, channery loam, silty clay loam.	CL, CH, SC-SM, GC	A-4, A-6, A-7, A-2	0-20	50-100	20-100	15-95	15-90	20-52	4-25
DkC*, DkE*, DkF*: Dystrochrepts---	0-6	Extremely bouldery sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	10-25	50-90	45-80	40-75	20-55	<30	NP-8
	6-40	Very channery sandy loam, channery loam, sandy loam.	SM, GM, ML, GC-GM	A-2, A-4, A-1	5-35	50-85	40-75	40-75	20-55	<30	NP-8
	40-60	Channery loam, very channery sandy loam, extremely channery loamy sand.	SM, GM, SG, GC	A-2, A-4, A-1	10-40	50-85	25-75	20-65	15-40	<30	NP-8
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
EdB, EdC, EdD---- Edom	0-7	Silty clay loam	ML, CL	A-4, A-6	0	85-100	80-100	75-95	70-90	---	---
	7-35	Silty clay loam, channery clay, channery silty clay loam.	CH, CL	A-7, A-6	0-10	70-90	65-85	65-85	55-80	35-55	12-30
	35-40	Channery silty clay loam, channery silty clay, channery clay, very channery silty clay loam.	GM, ML, SM	A-7, A-6, A-2	5-20	25-80	20-70	15-60	15-55	35-49	10-20
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
E1B, E1C, E1D, E1E---------- Elliber	0-5	Very channery loam	GM, GP	A-2, A-1, A-4	5-15	30-60	20-55	15-45	10-40	---	---
	5-60	Channery silt loam, very channery sandy loam, very channery loam, extremely channery laom.	GM, SP-SM, SM, GP-GM	A-2, A-1, A-4	20-40	40-65	30-60	25-50	5-40	20-35	NP-7
ErB, ErC--------- Ernest	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-10	85-100	80-100	70-95	60-95	20-40	4-15
	10-31	Silty clay loam, silt loam, channery silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	75-95	70-100	65-90	55-90	25-50	6-22
	31-43	Channery silt loam, channery loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	55-95	55-90	45-90	20-45	4-18
	43-63	Channery silt loam, silt loam, silty clay loam.	ML, CL, GM, SC	A-4, A-6, A-7	0-20	70-95	45-95	45-90	40-90	25-50	6-22
HeB, HeC--------- Hagerstown	0-7	Silt loam--------	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	7-60	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40
HgC, HgD, HnB, HnC, HnD-------- Hagerstown	0-7	Silty clay loam	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	7-60	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
HTC*, HTE*:											
Hazleton--------	0-2	Extremely stony sandy loam.	GM, SM, ML	A-4, A-2	15-50	60-85	50-80	50-70	35-55	---	---
	2-60	Channery loam, very channery sandy loam, extremely channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	5-60	50-80	35-75	25-65	15-50	<30	NP-8
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clymer----------	0-6	Extremely stony sandy loam.	ML, SM, GM	A-4, A-2	15-30	60-100	50-95	45-90	30-85	16-30	NP-9
	6-36	Sandy loam, channery sandy loam, channery clay loam, loam.	GM, SM, GC, ML	A-2, A-4	0-20	60-95	50-95	45-85	30-60	16-32	NP-9
	36-60	Channery loam, very channery sandy loam, channery sandy loam.	GM, GP-GM, GC, SM	A-1, A-2, A-3, A-4	10-30	30-75	25-70	20-60	5-40	16-32	NP-9
	60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Hy---------------	0-4	Silt loam--------	ML	A-4	0	90-100	85-100	80-100	70-90	25-35	3-10
Holly	4-20	Silt loam, loam, sandy loam.	ML, SM	A-4, A-6	0	85-100	75-100	70-95	45-85	20-40	NP-14
	20-40	Silt loam, loam, sandy loam, silty clay loam.	ML, SM	A-4, A-2	0	85-100	75-100	50-95	25-80	20-40	NP-10
	40-60	Stratified silt loam to gravelly sand.	ML, SM, SP-SM	A-4, A-2, A-1-B	0-5	70-100	65-100	40-90	10-70	20-40	NP-10
KlC, KlD---------	0-6	Channery silt loam.	GM, SM	A-2, A-4	0-10	55-85	45-60	35-50	25-40	---	---
Klinesville	6-18	Channery silt loam, very channery silt loam.	GM, GP, SM, SP	A-2, A-1	0-20	15-60	10-50	10-40	4-30	20-35	NP-7
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
KmE:											
Klinesville-----	0-6	Channery silt loam.	GM, SM	A-2, A-4	0-10	55-85	45-60	35-50	25-40	---	---
	6-18	Channery silt loam, very channery silt loam.	GM, GP, SM, SP	A-2, A-1	0-20	15-60	10-50	10-40	4-30	20-35	NP-7
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
KmE:											
Calvin----------	0-10	Channery silt loam.	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	10-26	Channery silt loam, channery loam, very channery clay loam.	ML, SM, GM	A-2, A-4 A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	26-40	Channery silt loam, very channery silt, loam, very channery loam, extremely channery silt loam.	GM, SM, SC, GC	A-2, A-1 A-4, A-6	0-20	35-75	20-65	15-60	15-40	23-39	3-13
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
KoF*:											
Klinesville-----	0-6	Very stony silt loam.	GM, SM	A-2, A-4	3-10	25-85	15-60	10-50	6-40	---	---
	6-18	Channery silt loam, very channery silt loam.	GM, GP, SM, SP	A-2, A-1	0-20	15-60	10-50	10-40	4-30	20-35	NP-7
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LdB, LdC, LdD---- Laidig	0-8	Cobbly loam------	GM, SM, ML, CL	A-4	0-5	65-90	55-80	50-80	35-70	15-30	1-10
	8-33	Channery loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	55-90	40-80	20-70	15-40	2-18
	33-60	Channery sandy clay loam, channery loam, channery sandy loam, very channery silt loam.	GC, SC, CM-GC, CL-ML	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16
LgC, LgD, LgE---- Laidig	0-2	Extremely stony loam.	GC-GM, CL-ML, SC-SM, SM	A-4	15-30	65-90	50-80	45-80	35-70	15-30	NP-10
	2-33	Channery loam, channery sandy clay loam, very channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	50-90	40-80	20-70	15-40	2-18
	33-60	Channery sandy clay loam, very channery loam, very channery silt loam.	GC, GC-GM, CL-ML, SC	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
LkB*, LkC*, LkD*:											
Leck Kill	0-7	Silt loam	ML, CL	A-4	0	85-100	75-95	65-95	50-85	---	---
	7-42	Silt loam, channery silt loam, channery loam, channery silty clay loam, very channery silt 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
	42-50	Very channery silt loam, very channery clay loam, very channery loam.	SM, GM, GP-GM, SP-SM	A-2, A-1	0-30	30-70	10-30	8-30	6-25	25-40	2-13
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Calvin	0-10	Channery silt loam.	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	10-26	Channery silt loam, channery loam, very channery clay loam, very channery silt loam.	ML, SM, GM	A-2, A-4, A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	26-40	Channery silt loam, extremely channery 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
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lx	0-9	Loam	ML, CL-ML, CL	A-4	0	95-100	90-100	80-100	65-90	20-30	NP-8
Lobdell	9-32	Loam, silt loam	ML	A-4	0	90-100	80-100	70-95	55-85	20-35	NP-10
	32-60	Stratified sandy loam to gravely clay loam.	ML, SM, CL-ML, CL	A-4	0	90-100	70-100	65-85	40-80	15-35	NP-10
McB, McC	0-9	Gravelly loam	ML	A-4	0-15	80-100	60-70	60-65	55-60	30-40	5-10
Meckesville	9-28	Loam, channery silt loam, gravelly silty clay loam, gravelly loam.	ML, CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	28-60	Loam, channery silt loam, gravelly clay loam, gravelly loam.	ML, CL-ML, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
	60-72	Loam, channery silt loam, gravelly clay loam, gravelly loam.	ML, CL-ML, GM, SC	A-4, A-2	0-50	45-90	30-85	30-85	25-60	20-30	2-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
MdC---------- Meckesville	0-4	Very stony loam	ML	A-4	3-15	80-100	70-95	65-85	55-80	---	---
	4-28	Loam, channery silt loam, gravelly silty clay loam, gravelly loam.	ML, CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	28-60	Loam, channery silt loam, gravelly clay loam, gravelly loam.	ML, CL, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
	60-72	Loam, channery silt loam, gravelly clay loam, gravelly loam.	ML, CL, GM, SC	A-4, A-2	0-50	45-90	30-85	30-85	25-60	20-30	2-10
MdD, MdE---------- Meckesville	0-4	Very stony silt loam.	ML	A-4	3-15	80-100	70-95	65-85	55-80	---	---
	4-28	Loam, channery silt loam, gravelly silty clay loam, gravelly loam.	ML, CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	28-60	Loam, channery silt loam, gravelly clay loam, gravelly loam.	ML, CL, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
	60-72	Loam, channery silt loam, gravelly clay loam, gravelly loam.	ML, CL, GM, SC	A-4, A-2	0-50	45-90	30-85	30-85	25-60	20-30	2-10
MhC---------- Mertz	0-10	Channery silt loam.	ML, GM	A-4	5-10	70-95	55-85	45-85	40-75	---	NP
	10-70	Channery clay loam, very channery silty clay loam, channery loam.	ML, CL, GM, GC	A-6, A-7, A-4	5-20	55-95	45-85	45-85	40-75	30-45	7-20
	70-90	Channery clay loam, very channery loam, very channery silty clay loam.	CL, GC, SC	A-6, A-7, A-2	5-50	55-80	30-75	30-70	25-55	30-45	10-20

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
MoA---------- Monongahela	0-9	Silt loam--------	ML, SM, CL-ML, SC-SM	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	9-24	Silt loam, silty clay loam, gravelly loam.	ML, CL, CL-ML	A-4, A-6	0-15	90-100	80-100	75-100	70-90	25-40	5-15
	24-50	Silt loam, clay loam, gravelly sandy loam, gravelly silty clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	60-100	55-95	45-95	20-40	3-15
	50-62	Silt loam, clay loam, gravelly sandy loam, gravelly silty clay loam.	ML, CL, SM, SC	A-4, A-6	10-20	75-100	60-90	60-85	40-85	20-40	1-15
MoB---------- Monongahela	0-9	Silt loam--------	ML, SM, CL-ML, SC-SM	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	9-24	Silt loam, silty clay loam, gravelly loam.	ML, CL, CL-ML	A-4, A-6	0-15	90-100	80-100	75-100	70-90	20-40	5-15
	24-50	Silt loam, sandy clay loam, gravelly loam, gravelly silty clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	60-100	55-95	45-95	20-40	3-15
	50-62	Silt loam, clay loam, gravelly sandy loam, gravelly silty clay loam.	ML, CL, SM, SC	A-4, A-6	10-20	75-100	60-90	60-85	40-85	20-40	1-15
MrB, MrC, MrD---- Morrison	0-10	Channery sandy loam.	SM, ML	A-2, A-4	0-10	80-100	60-70	50-65	25-55	---	---
	10-50	Sandy loam, gravelly loam, channery sandy clay loam.	SM, ML	A-2, A-4	0-15	80-100	60-100	55-80	25-55	<35	NP-10
	50-60	Sandy loam, gravelly loamy sand, channery sandy loam, gravelly sandy loam.	SM, SC	A-2, A-4	0-15	80-100	60-100	55-90	10-45	<25	NP-10
MsB, MsC, MsD---- Morrison	0-5	Very stony sandy loam.	SM, ML	A-2, A-4	3-10	80-100	80-100	60-80	25-55	---	---
	5-50	Sandy loam, loamy sand, gravelly loam, channery sandy clay loam.	SM, ML	A-2, A-4	0-15	80-100	60-100	55-80	25-55	<35	NP-10
	50-60	Sandy loam, gravelly loamy sand, channery sandy loam.	SM, SC, SP-SM, SC-SM	A-2, A-4	0-15	80-100	60-100	55-90	10-45	<25	NP-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
MtB*:											
Morrison--------	0-5	Very stony sandy loam.	SM, ML	A-2, A-4	3-10	80-100	80-100	60-80	25-55	---	---
	5-50	Sandy loam, gravelly loam, channery sandy clay loam.	SM, ML	A-2, A-4	0-15	80-100	60-100	55-80	25-55	<35	NP-10
	50-60	Sandy loam, gravelly loamy sand, channery sandy loam.	SM, SC, SP-SM, SC-SM	A-2, A-4	0-15	80-100	60-100	55-90	10-45	<25	NP-10
MtB*:											
Murrill---------	0-11	Very stony sandy loam.	ML, CL, SC, SC-SM	A-4, A-6, A-2	3-15	65-80	50-70	45-65	30-65	20-40	3-15
	11-39	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	25-50	5-25
	39-60	Clay loam, clay, channery clay loam.	CH, CL, MH	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40
MtC*:											
Morrison--------	0-21	Very stony sandy loam.	SM, ML	A-2, A-4	3-10	80-100	80-100	60-80	25-55	---	---
	21-50	Sandy loam, gravelly loam, channery sandy clay loam.	SM, ML	A-2, A-4	0-15	80-100	60-100	55-80	25-55	<35	NP-10
	50-60	Sandy loam, gravelly loamy sand, channery sandy loam.	SM, SC, SP-SM, SC-SM	A-2, A-4	0-15	80-100	60-100	55-90	10-45	<25	NP-10
Murrill---------	0-11	Very stony sandy loam.	ML, CL, SC, SC-SM	A-4, A-6, A-2	3-15	65-80	50-70	45-65	30-65	20-40	3-15
	11-39	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	25-50	5-25
	39-60	Clay loam, clay, channery clay loam.	CH, CL, MH	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40
MtD*:											
Morrison--------	0-5	Very stony sandy loam.	SM, ML	A-2, A-4	3-10	80-100	80-100	60-80	25-55	---	---
	5-50	Sandy loam, gravelly loam, gravelly sandy clay loam.	SM, ML	A-2, A-4	0-15	80-100	60-100	55-80	25-55	<35	NP-10
	50-60	Sandy loam, gravelly loamy sand, gravelly sandy loam.	SM, SC, SP-SM, SC-SM	A-2, A-4	0-15	80-100	60-100	55-90	10-45	<25	NP-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Murrill---------	0-11	Very stony sandy loam.	ML, CL, SC, SC-SM	A-4, A-6, A-2	3-15	65-80	50-70	45-65	30-65	20-40	3-15
	11-39	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	25-50	5-25
	39-60	Clay loam, clay, channery clay loam.	CH, CL, MH	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40
MuB, MuC, MuD---- Murrill	0-11	Channery loam----	ML, GM, CL, SC-SM	A-4, A-6, A-2	0-5	65-80	55-70	45-65	30-65	20-40	3-15
	11-39	Channery silty clay loam, channery sandy clay loam, channery clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-15	65-85	60-70	55-65	50-65	20-50	5-25
	39-60	Clay loam, clay, channery clay loam.	CH, MH, CL	A-6, A-7	0-20	80-100	65-100	60-100	55-100	35-75	20-40
Nd---------- Nolin	0-15	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	15-50	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	50-60	Loam, silt loam, gravelly loam, gravelly silt loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
OpB*, OpC*, OpD*, OpE*:											
Opequon--------	0-8	Silty clay loam	CL, MH, CH	A-6, A-7	0-5	85-100	80-100	80-100	75-95	30-55	10-30
	8-18	Silty clay loam, clay, silty clay.	CH, MH, CL	A-6, A-7	0-10	80-100	60-100	60-100	55-95	35-65	15-40
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hagerstown-----	0-7	Silty clay loam	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	7-60	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
PeB---------- Penlaw	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0-10	95-100	85-100	75-100	60-100	10-40	5-25
	9-28	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0-10	95-100	85-100	75-100	60-95	10-40	5-25
	28-72	Silty clay loam, silt loam, gravelly silt loam.	CL, CH, CL-ML	A-4, A-6, A-7	0-20	65-100	60-100	55-100	50-95	15-55	6-30

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Ph---------- Philo	0-8	Silt loam--------	ML, SM, CL-ML	A-4	0-5	95-100	80-100	85-90	60-80	20-35	1-10
	8-32	Silt loam, loam, sandy loam.	ML, SM, CL-ML	A-4	0-5	95-100	75-100	70-90	45-80	20-35	1-10
	32-60	Stratified sand to silt loam to cobbly sandy loam.	GM, SM, ML, CL-ML	A-2, A-4	0-25	60-95	50-90	40-85	30-80	15-30	1-10
Pm*: Pits.											
Quarries.											
Pp---------- Pope	0-9	Fine sandy loam	SM, ML, CL-ML, SC-SM	A-2, A-4	0	85-100	75-100	51-85	25-55	<20	NP-5
	9-48	Fine sandy loam, sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	0	95-100	80-100	51-95	25-75	<30	NP-7
	48-62	Sandy loam, loamy sand.	SM, SC-SM, ML, GM	A-2, A-1, A-4	0-20	45-100	35-100	30-95	15-70	<30	NP-7
Ps---------- Purdy	0-8	Silty clay loam	ML, CL	A-4, A-6, A-7	0	95-100	90-100	90-100	90-100	25-50	4-20
	8-40	Silty clay, clay, clay loam.	CL, CH, MH	A-6, A-7	0	95-100	90-100	85-100	75-85	30-65	11-30
	40-60	Silty clay, clay loam, clay, gravelly silty clay loam.	CL, CH, MH	A-6, A-7	0	80-100	65-100	65-100	65-95	30-65	11-30
TgA, TgB---------- Tyler	0-9	Silt loam--------	ML	A-4	0	100	95-100	90-100	75-95	30-40	4-10
	9-19	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	100	95-100	90-100	80-100	25-45	8-20
	19-50	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7, A-4	0	90-100	85-100	80-100	65-95	25-45	8-20
	50-60	Stratified gravelly loam to silty clay loam.	CL, ML, CL-ML	A-6, A-4, A-7	0	85-100	75-100	75-100	55-90	20-45	4-18
Ue---------- Udorthents	0-4	Very channery loam.	GC, GM, CL, SC-SM	A-1, A-2, A-4	0-20	40-80	30-70	20-65	15-60	15-25	NP-10
	4-60	Very channery silt loam, very channery sandy loam, channery loam, clay loam.	GW-GM, SC-SM, GC, GM	A-1, A-2	0-45	25-80	20-50	10-30	5-30	15-40	NP-15

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
UgF*:											
Ungers----------	0-8	Very stony silt loam.	ML, CL, SM, GC	A-4	5-15	60-95	55-85	40-70	25-55	---	---
	8-36	Loam, channery clay loam, very channery sandy clay loam, channery loam.	GM, SM, ML	A-2, A-4	0-25	60-95	40-90	30-70	25-55	25-35	1-10
	36-62	Channery loam, very channery sandy loam, very channery loam.	GM, SM, GC, GC-GM	A-2, A-1	0-25	55-85	25-50	20-40	15-30	20-35	NP-11
	62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lehew----------	0-6	Very stony loam	SM, GM, ML, CL-ML	A-2, A-4	5-25	50-90	45-80	40-75	20-55	15-30	NP-7
	6-30	Very channery sandy loam, channery fine sandy loam, channery loam.	SM, GM, GC-GM, SC-SM	A-2, A-4	5-40	45-75	30-65	20-55	10-40	15-30	NP-7
	30-36	Very channery sandy loam, very channery fine sandy loam, channery loam.	SM, GM, GC-GM, SC-SM	A-2, A-4	10-50	45-75	30-65	20-55	10-40	15-30	NP-7
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
VdF*:											
Vanderlip-------	0-3	Very stony loamy sand.	SM	A-1, A-2	3-20	75-85	65-75	40-55	15-25	---	---
	3-48	Loamy sand, gravelly loamy sand, gravelly sand.	SM, SP	A-1, A-2, A-3	0-10	60-100	45-100	25-75	2-30	<25	NP
	48-72	Very gravelly sand, loamy sand, gravelly sand, sand.	SM, SP-SM, GW, GP	A-1, A-2, A-3	0-20	45-100	25-100	15-75	2-30	<25	NP
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WkC, WkD, WkE, WkF---------- Weikert	0-5	Channery 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	Channery loam, very channery silt loam, very channery loam.	GM, GP-GM	A-1, A-2	0-20	15-60	10-55	5-45	5-35	28-36	3-9
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
WlF---------- Weikert	0-5	Very stony silt loam.	GM, ML, SM	A-1, A-2, A-4	3-15	35-70	35-70	25-65	20-55	30-40	4-10
	5-18	Very channery loam, very channery silt loam, channery loam.	GM, GP-GM	A-1, A-2	0-20	15-60	10-55	5-45	5-35	28-36	3-9
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
WsB, WsC, WsE---- Westmoreland	0-8	Channery silt loam.	ML, CL, GM, SC	A-4, A-6	0-15	65-100	55-90	50-85	45-85	<35	NP-10
	8-28	Silty clay loam, channery loam, channery silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	28-50	Very channery loam, very channery silt loam, channery silty clay loam, very channery silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WwD*:											
Westmoreland----	0-8	Channery silt loam.	ML, CL, GM, SC	A-4, A-6	0-15	65-100	55-90	50-85	45-85	<35	NP-10
	8-28	Silty clay loam, channery loam, channery silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	28-50	Very channery loam, very channery silt loam, channery silty clay loam, very channery silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Klinesville-----	0-6	Very stony silt loam.	GM, SM	A-2, A-4	3-10	25-85	15-60	10-50	6-40	---	---
	6-18	Channery silt loam, very channery silt loam.	GM, SM, GP, SP	A-2, A-1, A-4	0-10	25-75	15-55	10-50	4-40	20-35	NP-9
	18-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
WxB, WxC--------- Wharton	0-6	Very stony silt loam.	ML, CL	A-4, A-6	5-15	70-100	65-100	60-95	55-90	---	---
	6-46	Clay loam, channery silty clay loam, channery silt loam, very channery silty clay loam.	ML, CL	A-7, A-6	0-25	75-100	70-100	65-95	60-90	35-55	10-25
	46-65	Silt loam, channery clay, very channery silt loam, very channery silty clay loam.	ML, GM, SM	A-4, A-6, A-7	0-50	45-100	30-100	25-95	25-90	30-45	5-15
	65	Weathered bedrock	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
AbB, AbC---	0-5	15-27	1.20-1.40	0.6-2.0	0.16-0.20	5.1-6.5	Low---	0.32	3	1-4
Albrights	5-26	18-35	1.30-1.50	0.6-2.0	0.10-0.14	3.6-5.5	Low---	0.28		
	26-60	18-35	1.40-1.70	0.2-0.6	0.04-0.08	4.5-6.5	Low---	0.28		
AeB, AeC---	0-10	15-27	1.20-1.40	0.6-2.0	0.12-0.22	5.1-6.5	Low---	0.32	4	1-4
Allegheny	10-36	18-35	1.20-1.50	0.6-2.0	0.13-0.18	3.6-5.5	Low---	0.28		
	36-60	10-35	1.20-1.40	0.6-2.0	0.08-0.17	3.6-5.5	Low---	0.28		
ArB, ArC---	0-6	10-27	1.20-1.40	0.6-2.0	0.08-0.18	4.5-5.5	Low---	0.24	3	1-4
Andover	6-20	18-35	1.20-1.40	0.6-2.0	0.08-0.12	4.5-5.5	Low---	0.17		
	20-40	18-35	1.30-1.60	0.06-0.2	0.06-0.10	4.5-5.5	Low---	0.17		
	40-60	18-40	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low---	0.17		
AvB, AvC---	0-6	10-27	1.20-1.40	0.6-2.0	0.08-0.20	4.5-5.5	Low---	0.17	3	1-4
Andover	6-20	18-35	1.20-1.40	0.6-2.0	0.08-0.12	4.5-5.5	Low---	0.17		
	20-40	18-35	1.30-1.60	0.06-0.2	0.06-0.10	4.5-5.5	Low---	0.17		
	40-60	18-40	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low---	0.17		
Aw---	0-6	18-30	1.20-1.40	0.6-2.0	0.14-0.22	4.5-5.5	Low---	0.32	4	2-4
Atkins	6-40	18-35	1.20-1.50	0.06-2.0	0.14-0.18	4.5-5.5	Low---	0.32		
	40-60	10-35	1.20-1.50	0.2-6.0	0.08-0.18	4.5-5.5	Low---	0.28		
Ax*:										
Atkins---	0-6	18-30	1.20-1.40	0.6-2.0	0.14-0.22	4.5-5.5	Low---	0.32	4	2-4
	6-40	18-35	1.20-1.50	0.06-2.0	0.14-0.18	4.5-5.5	Low---	0.32		
	40-60	10-35	1.20-1.50	0.2-6.0	0.08-0.18	4.5-5.5	Low---	0.28		
Ernest---	0-10	15-20	1.20-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Low---	0.43	3	2-4
	10-31	20-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Moderate---	0.32		
	31-63	20-35	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate---	0.32		
Ba---	0-8	6-18	1.15-1.40	0.6-2.0	0.15-0.21	5.1-6.5	Low---	0.32	5	1-5
Basher	8-40	6-18	1.15-1.45	0.6-2.0	0.10-0.19	3.6-6.0	Low---	0.32		
	40-64	1-8	1.25-1.55	0.6-6.0	0.02-0.07	4.5-6.5	Low---	0.17		
BbB*:										
Basher---	0-8	6-18	1.15-1.40	0.6-2.0	0.15-0.21	5.1-6.5	Low---	0.32	5	1-5
	8-40	6-18	1.15-1.45	0.6-2.0	0.10-0.19	3.6-6.0	Low---	0.32		
	40-64	1-8	1.25-1.55	0.6-6.0	0.02-0.07	4.5-6.5	Low---	0.17		
Birdsboro---	0-10	10-27	1.20-1.50	0.6-2.0	0.16-0.20	5.1-6.5	Low---	0.37	4	1-3
	10-46	20-35	1.30-1.60	0.6-2.0	0.14-0.18	3.6-5.5	Low---	0.28		
	46-70	5-30	1.30-1.60	0.6-20	0.06-0.12	3.6-5.5	Low---	0.17		
BcC*, BcD*:										
Bedington---	0-9	15-25	1.20-1.50	0.6-2.0	0.12-0.16	4.5-7.3	Low---	0.28	4	1-3
	9-50	18-32	1.30-1.60	0.6-2.0	0.12-0.14	4.5-5.5	Low---	0.20		
	50-60	18-32	1.40-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low---	0.20		
BcC*, BcD*:										
Berks---	0-8	5-23	1.20-1.50	0.6-6.0	0.08-0.12	4.5-6.5	Low---	0.17	3	.5-3
	8-29	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low---	0.17		
	29-34	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low---	0.17		
	34	---	---	---	---	---	---	----		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
BdC*, BdD*, BdE*:										
Bedington-------	0-9	15-25	1.20-1.50	0.6-2.0	0.12-0.18	4.5-7.3	Low----------	0.24	4	1-3
	9-50	18-32	1.30-1.60	0.6-2.0	0.12-0.14	4.5-5.5	Low----------	0.24		
	50-60	18-32	1.40-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.24		
Berks-----------	0-7	5-23	1.20-1.50	0.6-6.0	0.08-0.12	4.5-6.5	Low----------	0.17	3	.5-3
	7-29	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	29-34	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	34	---	---	---	---	---	----------	----		
BkB, BkC, BkD,										
BkE-------------	0-7	5-23	1.20-1.50	0.6-6.0	0.08-0.12	5.1-6.5	Low----------	0.17	3	.5-3
Berks	7-29	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	29-34	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	34	---	---	---	---	---	----------	----		
Bm---------------	0-10	10-27	1.20-1.50	0.6-2.0	0.16-0.20	5.6-7.0	Low----------	0.37	4	1-3
Birdsboro	10-46	20-35	1.30-1.60	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.28		
	46-70	5-30	1.30-1.60	0.6-20	0.06-0.12	3.6-5.5	Low----------	0.17		
BrB, BrC, BrD----	0-10	10-27	1.40-1.60	0.6-2.0	0.12-0.16	4.5-6.5	Low----------	0.32	3	1-4
Blairton	10-27	18-35	1.50-1.70	0.2-0.6	0.08-0.14	3.6-5.5	Low----------	0.32		
	27-32	20-40	1.40-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low----------	0.32		
	32	---	---	---	---	---	----------	----		
BtA, BtB, BtC----	0-8	15-30	1.20-1.40	0.6-2.0	0.18-0.24	4.5-6.5	Low----------	0.32	3	1-4
Brinkerton	8-22	15-35	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.37		
	22-45	15-35	1.40-1.70	0.06-0.2	0.08-0.12	4.5-6.0	Moderate-----	0.32		
	45-60	15-25	1.20-1.55	0.06-0.6	0.14-0.18	5.1-6.5	Low----------	0.20		
BuB, BuC---------	0-9	10-27	1.20-1.40	0.6-2.0	0.12-0.18	4.5-6.5	Low----------	0.24	3	1-3
Buchanan	9-25	18-30	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.24		
	25-60	18-35	1.40-1.70	0.06-0.2	0.06-0.10	3.6-5.5	Low----------	0.17		
BwB, BwC, BwD----	0-8	10-27	1.20-1.40	0.6-2.0	0.11-0.16	3.6-5.5	Low----------	0.24	3	1-3
Buchanan	8-30	18-30	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.24		
	30-60	18-35	1.40-1.70	0.06-0.2	0.06-0.10	3.6-5.5	Low----------	0.17		
CaB, CaC---------	0-10	10-25	1.20-1.40	2.0-6.0	0.10-0.16	5.1-6.5	Low----------	0.20	3	.5-2
Calvin	10-26	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	26-40	15-30	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	40	---	---	---	---	---	----------	----		
CaD---------------	0-8	10-25	1.20-1.40	2.0-6.0	0.10-0.16	4.5-6.5	Low----------	0.20	3	.5-2
Calvin	8-26	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	26-40	15-30	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	40	---	---	---	---	---	----------	----		
CeC, CeF---------	0-4	18-27	1.35-1.65	0.6-6.0	0.07-0.16	3.6-5.5	Low----------	0.32	5	<.5
Cedarcreek	4-70	18-27	1.35-1.65	0.6-6.0	0.07-0.16	3.6-5.5	Low----------	0.32		
CkB---------------	0-8	10-27	1.20-1.40	0.6-2.0	0.14-0.20	5.6-7.0	Low----------	0.37	3	1-3
Clarksburg	8-30	22-35	1.30-1.50	0.6-2.0	0.12-0.18	5.1-6.5	Moderate-----	0.28		
	30-45	22-35	1.40-1.70	0.06-0.6	0.06-0.12	5.1-6.5	Moderate-----	0.28		
	45-60	22-40	1.20-1.60	0.06-0.6	0.06-0.16	5.1-6.5	Moderate-----	0.28		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
DkC*, DkE*, DkF*:										
Dystrochrepts---	0-6	7-18	1.20-1.50	6.0-20	0.08-0.12	3.6-6.0	Low----------	0.17	3	2-4
	6-40	7-18	1.20-1.50	6.0-20	0.08-0.12	3.6-5.5	Low----------	0.17		
	40-60	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low----------	0.17		
	60	---	---	---	---	---	----------	----		
Rock outcrop----	0-60	---	---	---	---	---	----------	----	---	---
EdB, EdC, EdD----	0-7	15-35	1.20-1.50	0.6-2.0	0.14-0.20	5.6-7.8	Low----------	0.28	3	.5-4
Edom	7-35	35-60	1.30-1.60	0.2-2.0	0.10-0.14	5.1-7.8	Moderate-----	0.28		
	35-40	27-60	1.30-1.60	0.2-2.0	0.04-0.08	5.6-7.8	Moderate-----	0.17		
	40	---	---	---	---	---	----------	----		
ElB, ElC, ElD, ElE----------	0-6	10-20	1.20-1.40	0.6-6.0	0.08-0.12	5.1-6.5	Low----------	0.17	3	1-3
Elliber	6-60	12-27	1.40-1.60	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.17		
ErB, ErC---------	0-10	15-20	1.20-1.40	0.6-2.0	0.14-0.20	4.5-6.5	Low----------	0.43	3	2-4
Ernest	10-31	20-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-----	0.32		
	31-43	18-30	1.40-1.70	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.32		
	43-63	20-35	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-----	0.32		
HeB, HeC, HgC, HgD, HnB, HnC, HnD----------	0-7	15-35	1.20-1.40	0.6-6.0	0.16-0.24	6.1-7.0	Low----------	0.32	4	1-5
Hagerstown	7-60	23-60	1.20-1.60	0.6-2.0	0.10-0.24	5.1-7.3	Moderate-----	0.28		
HTC*, HTE*:										
Hazleton--------	0-2	7-18	1.20-1.40	2.0-6.0	0.10-0.16	3.6-5.5	Low----------	0.15	3	2-4
	2-60	5-15	1.20-1.40	2.0-20	0.06-0.12	3.6-5.5	Low----------	0.15		
	60	---	---	---	---	---	----------	----		
Clymer----------	0-6	15-27	1.20-1.40	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.17	3	2-4
	6-36	18-30	1.20-1.50	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.15		
	36-60	15-27	1.20-1.40	0.6-2.0	0.04-0.08	3.6-5.5	Low----------	0.15		
	60	---	---	---	---	---	----------	----		
Hy---------------	0-4	15-27	1.20-1.40	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	5	2-5
Holly	4-20	18-30	1.20-1.50	0.2-2.0	0.17-0.21	5.1-7.3	Low----------	0.28		
	20-40	10-27	1.20-1.45	0.6-6.0	0.10-0.20	5.6-7.8	Low----------	0.28		
	40-60	10-27	1.20-1.40	0.6-6.0	0.07-0.18	5.6-7.8	Low----------	0.28		
KlC, KlD---------	0-6	10-25	1.20-1.40	2.0-6.0	0.08-0.12	5.1-6.5	Low----------	0.20	2	.5-2
Klinesville	6-18	10-20	1.40-1.60	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.20		
	18	---	---	---	---	---	----------	----		
KmE:										
Klinesville-----	0-6	10-25	1.20-1.40	2.0-6.0	0.06-0.12	4.5-6.0	Low----------	0.15	2	.5-2
	6-18	10-20	1.40-1.60	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.20		
	18	---	---	---	---	---	----------	----		
Calvin----------	0-8	10-25	1.20-1.40	2.0-6.0	0.10-0.16	4.5-6.0	Low----------	0.20	3	.5-2
	8-26	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	26-40	15-30	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	40	---	---	---	---	---	----------	----		
KoF*:										
Klinesville-----	0-6	10-25	1.20-1.40	2.0-6.0	0.06-0.12	4.5-6.0	Low----------	0.15	2	.5-2
	6-18	10-20	1.40-1.60	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.20		
	18	---	---	---	---	---	----------	----		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
KoF*:										
Rock outcrop----	0-60	---	---	---	---	---	----------	----	---	---
LdB, LdC, LdD----	0-8	10-27	1.20-1.40	0.6-6.0	0.10-0.14	5.1-6.5	Low----------	0.28	4	1-4
Laidig	8-33	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	33-60	18-35	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
LgC, LgD, LgE----	0-2	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.24	4	1-4
Laidig	2-33	18-35	1.30-1.50	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	33-60	18-35	1.30-1.60	0.06-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
LkB*, LkC*, LkD*:										
Leck Kill-------	0-7	10-20	1.20-1.50	0.6-6.0	0.16-0.20	4.5-7.3	Low----------	0.32	3	1-3
	7-42	17-32	1.40-1.70	0.6-6.0	0.12-0.16	4.5-7.3	Low----------	0.24		
	42-50	17-32	1.30-1.60	0.6-6.0	0.04-0.08	4.5-6.0	Low----------	0.17		
	50	---	---	---	---	---	----------	----		
Calvin----------	0-10	10-25	1.20-1.40	2.0-6.0	0.10-0.16	4.5-6.5	Low----------	0.20	3	.5-2
	10-26	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	26-40	15-30	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	40	---	---	---	---	---	----------	----		
Lx---------------	0-9	15-27	1.20-1.40	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.37	5	1-3
Lobdell	9-32	18-30	1.25-1.60	0.6-2.0	0.17-0.22	5.1-7.3	Low----------	0.37		
	32-60	15-30	1.20-1.60	0.6-6.0	0.12-0.18	5.6-7.3	Low----------	0.37		
McB, McC---------	0-9	10-27	1.10-1.30	0.6-2.0	0.12-0.16	5.1-6.5	Low----------	0.28	4	1-4
Meckesville	9-28	18-35	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	28-60	18-35	1.30-1.60	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
	60-72	10-35	1.20-1.40	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
MdC, MdD, MdE----	0-7	10-27	1.10-1.30	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24	4	1-4
Meckesville	7-28	18-35	1.20-1.40	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.24		
	28-60	18-35	1.30-1.60	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
	60-72	10-35	1.20-1.40	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
MhC---------------	0-10	10-27	1.20-1.40	0.6-2.0	0.14-0.18	5.1-7.3	Low----------	0.28	4	1-3
Mertz	10-70	15-35	1.40-1.60	0.2-0.6	0.08-0.18	5.1-7.3	Low----------	0.17		
	70-90	15-35	1.40-1.60	0.2-0.6	0.08-0.18	4.5-5.5	Low----------	0.17		
MoA, MoB---------	0-9	10-27	1.20-1.40	0.6-2.0	0.18-0.24	5.1-6.5	Low----------	0.43	3	2-4
Monongahela	9-24	18-35	1.30-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.43		
	24-50	18-35	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.43		
	50-62	10-35	1.20-1.40	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.37		
MrB, MrC, MrD----	0-10	5-20	1.20-1.40	0.6-6.0	0.12-0.16	5.1-6.5	Low----------	0.17	3	1-4
Morrison	10-50	10-27	1.30-1.50	0.6-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	50-60	5-20	1.20-1.40	0.6-6.0	0.06-0.10	5.1-6.0	Low----------	0.17		
MsB, MsC, MsD----	0-5	5-20	1.20-1.40	0.6-6.0	0.10-0.16	3.6-5.5	Low----------	0.17	3	1-4
Morrison	5-50	10-27	1.30-1.50	0.6-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	50-60	5-20	1.20-1.40	0.6-6.0	0.06-0.10	5.1-6.0	Low----------	0.17		
MtB*:										
Morrison--------	0-5	5-20	1.20-1.40	0.6-6.0	0.10-0.16	3.6-5.5	Low----------	0.17	3	1-4
	5-50	10-27	1.30-1.50	0.6-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	50-60	5-20	1.20-1.40	0.6-6.0	0.06-0.10	5.1-6.0	Low----------	0.17		
Murrill---------	0-11	10-20	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	4	1-4
	11-39	18-35	1.40-1.70	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.24		
	39-60	27-55	1.40-1.70	0.2-2.0	0.08-0.12	4.5-6.0	Moderate-----	0.28		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
MtC*:										
Morrison--------	0-21	5-20	1.20-1.40	0.6-6.0	0.10-0.16	3.6-5.5	Low----------	0.17	3	1-4
	21-50	10-27	1.30-1.50	0.6-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	50-60	5-20	1.20-1.40	0.6-6.0	0.06-0.10	5.1-6.0	Low----------	0.17		
Murrill---------	0-11	10-20	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	4	1-4
	11-39	18-35	1.40-1.70	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.24		
	39-60	27-55	1.40-1.70	0.2-2.0	0.08-0.12	4.5-6.0	Moderate-----	0.28		
MtD*:										
Morrison--------	0-5	5-20	1.20-1.40	0.6-6.0	0.10-0.16	3.6-5.5	Low----------	0.17	3	1-4
	5-50	10-27	1.30-1.50	0.6-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	50-60	5-20	1.20-1.40	0.6-6.0	0.06-0.10	5.1-6.0	Low----------	0.17		
Murrill---------	0-11	10-20	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	4	1-4
	11-39	18-35	1.40-1.70	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.24		
	39-60	27-55	1.40-1.70	0.2-2.0	0.08-0.12	4.5-6.0	Moderate-----	0.28		
MuB, MuC, MuD----	0-11	10-20	1.20-1.50	0.6-2.0	0.12-0.16	5.1-6.5	Low----------	0.28	4	1-4
Murrill	11-39	18-35	1.40-1.70	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.24		
	39-60	27-55	1.40-1.70	0.2-2.0	0.08-0.12	4.5-6.0	Moderate-----	0.28		
Nd----------	0-15	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	2-4
Nolin	15-50	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		
	50-60	10-30	1.30-1.55	0.6-6.0	0.10-0.23	5.1-8.4	Low----------	0.43		
OpB*, OpC*, OpD*, OpE*:										
Opequon--------	0-8	27-45	1.20-1.50	0.2-2.0	0.16-0.21	5.1-7.8	High----------	0.37	1	1-4
	8-18	35-75	1.40-1.70	0.2-2.0	0.12-0.16	5.1-7.8	High----------	0.32		
	18	---	---	---	---	---	----------	----		
Hagerstown-----	0-7	15-35	1.20-1.40	0.6-6.0	0.16-0.24	5.1-6.5	Low----------	0.32	4	1-5
	7-60	23-60	1.20-1.60	0.6-2.0	0.10-0.24	5.1-7.3	Moderate-----	0.28		
PeB----------	0-9	15-25	1.10-1.40	0.6-2.0	0.16-0.20	6.1-7.3	Low----------	0.43	3	2-4
Penlaw	9-28	20-35	1.20-1.60	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.24		
	28-72	20-35	1.30-1.90	0.06-0.2	0.10-0.16	5.6-7.3	Moderate-----	0.24		
Ph----------	0-8	10-18	1.20-1.40	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.37	5	2-4
Philo	8-32	10-18	1.20-1.40	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.32		
	32-60	5-18	1.20-1.40	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.24		
Pm*:										
Pits.										
Quarries.										
Pp----------	0-9	5-15	1.20-1.40	2.0-6.0	0.10-0.16	5.1-6.5	Low----------	0.28	5	1-4
Pope	9-48	5-18	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
	48-62	5-20	1.30-1.60	0.6-6.0	0.10-0.18	3.6-5.5	Low----------	0.28		
Ps----------	0-8	18-35	1.30-1.50	0.2-0.6	0.18-0.24	3.6-5.5	Moderate-----	0.43	3	2-4
Purdy	8-40	35-50	1.30-1.60	<0.2	0.12-0.18	3.6-5.5	Moderate-----	0.32		
	40-60	35-50	1.30-1.60	<0.2	0.10-0.16	3.6-5.5	Moderate-----	0.32		
TgA, TgB---------	0-9	14-26	1.30-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43	3	2-4
Tyler	9-19	20-33	1.40-1.60	0.2-0.6	0.16-0.20	3.6-5.5	Moderate-----	0.43		
	19-50	18-33	1.60-1.85	<0.2	0.04-0.12	3.6-5.5	Low----------	0.43		
	50-60	12-30	1.30-1.70	0.2-0.6	0.04-0.12	4.5-5.5	Low----------	0.43		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Ue----------	0-4	8-27	0.90-1.30	0.2-6.0	0.02-0.06	4.5-8.4	Low----------	0.17	5	1-5
Udorthents	4-60	6-50	1.00-1.60	0.06-20	0.01-0.08	4.5-8.4	Low----------	0.17		
UgF*:										
Ungers----------	0-8	10-20	1.20-1.40	0.6-2.0	0.10-0.18	3.6-5.5	Low----------	0.17	3	1-2
	8-36	17-27	1.30-1.50	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.17		
	36-62	10-20	1.30-1.50	0.6-2.0	0.06-0.12	3.6-5.5	Low----------	0.17		
	62	---	---	---	---	---	----------	----		
UgF*:										
Lehew----------	0-6	4-16	1.20-1.40	2.0-20	0.08-0.12	4.5-5.5	Low----------	0.17	3	1-2
	6-30	5-18	1.20-1.40	2.0-20	0.06-0.10	4.5-5.5	Low----------	0.17		
	30-36	5-18	1.20-1.40	2.0-20	0.06-0.10	4.5-5.5	Low----------	0.17		
	36	---	---	---	---	---	----------	----		
VdF*:										
Vanderlip-------	0-3	5-10	1.20-1.40	6.0-20	0.08-0.12	4.5-6.0	Low----------	0.15	4	1-2
	3-48	5-10	1.40-1.60	6.0-20	0.06-0.10	4.5-6.0	Low----------	0.15		
	48-72	5-10	1.40-1.60	6.0-20	0.04-0.10	4.5-6.0	Low----------	0.15		
Rock outcrop----	0-60	---	---	---	---	---	----------	----	---	---
WkC, WkD, WkE, WkF----------	0-5	15-27	1.20-1.40	2.0-6.0	0.08-0.14	5.1-6.5	Low----------	0.20	2	1-3
Weikert	5-18	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	18	---	---	---	---	---	----------	----		
WlF----------	0-5	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-5.5	Low----------	0.20	2	1-3
Weikert	5-18	15-27	1.20-1.40	2.0-6.0	0.04-0.08	3.6-5.5	Low----------	0.28		
	18	---	---	---	---	---	----------	----		
WsB, WsC, WsE----	0-8	15-30	1.20-1.50	0.6-2.0	0.14-0.18	5.1-6.5	Low----------	0.32	3	1-4
Westmoreland	8-28	20-35	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.28		
	28-50	18-35	1.20-1.50	0.6-2.0	0.06-0.10	5.1-6.0	Low----------	0.17		
	50	---	---	---	---	---	----------	----		
WwD*:										
Westmoreland----	0-8	15-30	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low----------	0.32	3	1-4
	8-28	20-35	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.28		
	28-50	18-35	1.20-1.50	0.6-2.0	0.06-0.10	5.1-6.0	Low----------	0.17		
	50	---	---	---	---	---	----------	----		
Klinesville-----	0-6	10-25	1.20-1.40	2.0-6.0	0.06-0.12	4.5-6.0	Low----------	0.15	2	.5-2
	6-18	10-20	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	18-22	---	---	---	---	---	----------	----		
WxB, WxC---------	0-6	15-35	1.10-1.30	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.28	3	1-3
Wharton	6-46	15-35	1.20-1.50	0.06-0.6	0.12-0.16	4.5-5.5	Moderate-----	0.24		
	46-65	20-45	1.20-1.60	0.06-0.6	0.08-0.12	4.0-5.0	Moderate-----	0.24		
	65	---	---	---	---	---	----------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness			Uncoated steel	Concrete
					Ft			In		In			
AbB, AbC-------- Albrights	C	None--------	---	---	0.5-3.0	Perched	Nov-Mar	>60	---	---	Moderate	High-----	High.
AeB, AeC-------- Allegheny	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Low------	High.
ArB, ArC, AvB, AvC---------- Andover	D	None--------	---	---	0-0.5	Perched	Oct-Jun	>60	---	---	High-----	High-----	High.
Aw--------------- Atkins	D	Frequent----	Very brief	Sep-Jul	0-1.0	Apparent	Nov-Jun	>60	---	---	High-----	High-----	Moderate.
Ax*: Atkins----------	D	Frequent----	Very brief	Sep-Jul	0-1.0	Apparent	Nov-Jun	>60	---	---	High-----	High-----	Moderate.
Ernest----------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	---	Moderate	Moderate	Moderate.
Ba--------------- Basher	B	Occasional	Brief to long.	Dec-Apr	1.5-2.0	Apparent	Jan-May	>60	---	---	High-----	Moderate	Moderate.
BbB*: Basher----------	B	Occasional	Brief to long.	Dec-Apr	1.5-2.0	Apparent	Jan-May	>60	---	---	High-----	Moderate	Moderate.
Birdsboro------	B	Rare--------	---	---	2.0-6.0	Apparent	Nov-Mar	>60	---	---	Moderate	Moderate	High.
BcC*, BcD*, BdC*, BdD*, BdE*: Bedington-----	B	None--------	---	---	>6.0	---	---	>40	Soft	---	Moderate	Low------	High.
Berks----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	Low------	Low------	High.
BkB, BkC, BkD, BkE---------- Berks	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	Low------	Low------	High.
Bm--------------- Birdsboro	B	Rare--------	---	---	2.0-6.0	Apparent	Nov-Mar	>60	---	---	Moderate	Moderate	High.
BrB, BrC, BrD--- Blairton	C	None--------	---	---	0.5-2.5	Perched	Nov-Mar	20-40	Soft	---	High-----	High-----	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness			Uncoated steel	Concrete
					Ft			In		In			
BtA, BtB, BtC--- Brinkerton	D	None--------	---	---	0-0.5	Perched	Oct-May	>60	---	---	High-----	High-----	High.
BuB, BuC, BwB, BwC, BwD------- Buchanan	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	---	Moderate	High-----	High.
CaB, CaC, CaD--- Calvin	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Low------	Moderate.
CeC, CeF-------- Cedarcreek	C	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate	High.
CkB---------- Clarksburg	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	---	Moderate	Moderate	Moderate.
DkC*, DkE*, DkF*: Dystrochrepts-	A	None--------	---	---	>6.0	---	---	10-80	Hard	---	Low------	Low------	High.
Rock outcrop--	D	None--------	---	---	>6.0	---	---	0	Hard	---	---	---	---
EdB, EdC, EdD--- Edom	C	None--------	---	---	>6.0	---	---	40-72	Soft	---	Moderate	High-----	Low.
ElB, ElC, ElD, ElE---------- Elliber	A	None--------	---	---	>6.0	---	---	>60	Hard	---	Moderate	Low------	High.
ErB, ErC-------- Ernest	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	---	Moderate	Moderate	Moderate.
HeB, HeC, HgC, HgD, HnB, HnC, HnD---------- Hagerstown	C	None--------	---	---	>6.0	---	---	40-84	Hard	---	Moderate	Moderate	Low.
HTC*, HTE*: Hazleton-------	B	None--------	---	---	>6.0	---	---	>40	Hard	---	Moderate	Low------	High.
Clymer---------	B	None--------	---	---	>6.0	---	---	>40	Hard	---	Moderate	Low------	High.
Hy---------- Holly	D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Dec-May	>60	---	---	High-----	High-----	Moderate.
KlC, KlD, KmE*-- Klinesville	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	Moderate	Moderate	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness			Uncoated steel	Concrete
					Ft			In		In			
KoF*:													
Klinesville----	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	Moderate	Moderate	High.
Rock outcrop---	D	None--------	---	---	>6.0	---	---	0	Hard	---	---	---	---
LdB, LdC, LdD--- Laidig	C	None--------	---	---	2.5-4.0	Perched	Jan-Mar	60	---	---	Moderate	Moderate	High.
LgC, LgD, LgE--- Laidig	C	None--------	---	---	2.5-4.0	Perched	Jan-Mar	>60	---	---	Moderate	Moderate	High.
LkB*, LkC*, LkD*:													
Leck Kill-----	B	None--------	---	---	>6.0	---	---	>40	Soft	---	Moderate	Low------	Moderate.
Calvin--------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Low------	Moderate.
Lx---------- Lobdell	B	Frequent----	Brief-----	Jan-Apr	2.0-3.5	Apparent	Dec-Apr	>60	---	---	High-----	Low------	Moderate.
McB, McC, MdC, MdD, MdE------- Meckesville	C	None--------	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	---	Moderate	Moderate	High.
MhC---------- Mertz	C	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate	High.
MoA---------- Monongahela	C	Rare--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	---	Moderate	High-----	High.
MoB---------- Monongahela	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	---	Moderate	High-----	High.
MrB, MrC, MrD, MsB, MsC, MsD-- Morrison	B	None--------	---	---	>6.0	---	---	>72	Hard	---	Moderate	Low------	High.
MtB*, MtC*, MtD*:													
Morrison------	B	None--------	---	---	>6.0	---	---	>72	Hard	---	Moderate	Low------	High.
Murrill-------	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate	High.
MuB, MuC, MuD--- Murrill	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate	High.
Nd---------- Nolin	B	Occasional	Brief to long.	Feb-May	3.0-5.0	Apparent	Feb-Mar	>60	---	---	---	Low------	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness			Uncoated steel	Concrete
					Ft			In		In			
OpB*, OpC*, OpD*, OpE*:													
Opequon	C	None	---	---	>6.0	---	---	12-20	Hard	---	Moderate	Moderate	Low.
Hagerstown	C	None	---	---	>6.0	---	---	>60	Hard	---	Moderate	Moderate	Low.
PeB Penlaw	C	None	---	---	0.5-1.5	Perched	Nov-Mar	40-72	Hard	---	High	High	Moderate.
Ph Philo	B	Occasional	Very brief	Dec-May	1.5-3.0	Apparent	Dec-Apr	>40	Hard	---	Moderate	Low	High.
Pm*:													
Pits.													
Quarries.													
Pp Pope	B	Occasional	Very brief to brief.	Nov-Apr	>6.0	---	---	>60	---	---	Moderate	Low	High.
Ps Purdy	D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	---	High	High	High.
TgA, TgB Tyler	D	None	---	---	0.5-1.5	Perched	Nov-May	>60	---	---	High	High	High.
Ue Udorthents	B/D	None	---	---	>6.0	---	---	20-60	Hard	---	Low	High	High.
UgF*:													
Ungers	B	None	---	---	>6.0	---	---	>40	Hard	---	Moderate	Low	High.
Lehew	C	None	---	---	>6.0	---	---	20-40	Hard	---	Low	Low	High.
VdF*:													
Vanderlip	A	None	---	---	>6.0	---	---	>60	Hard	---	Low	Low	High.
Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---	---
WkC, WkD, WkE, WkF, WlF Weikert	C	None	---	---	>6.0	---	---	10-20	Soft	---	Moderate	Moderate	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness			Uncoated steel	Concrete
					Ft			In		In			
WsB, WsC, WsE--- Westmoreland	B	None---------	---	---	>6.0	---	---	>40	Soft	---	Moderate	Low------	High.
WwD*:													
Westmoreland---	B	None---------	---	---	>6.0	---	---	>40	Soft	---	Moderate	Low------	High.
Klinesville----	C	None---------	---	---	>6.0	---	---	10-20	Soft	---	Moderate	Moderate	High.
WxB, WxC-------- Wharton	C	None---------	---	---	1.5-3.0	Perched	Nov-Mar	>40	Soft	---	High-----	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Albrights	Fine-loamy, mixed, mesic Aquic Fragiudalfs
Allegheny	Fine-loamy, mixed, mesic Typic Hapludults
Andover	Fine-loamy, mixed, mesic Typic Fragiaquults
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Basher	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Bedington	Fine-loamy, mixed, mesic Typic Hapludults
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Birdsboro	Fine-loamy, mixed, mesic Typic Hapludults
Blairton	Fine-loamy, mixed, mesic Aquic Hapludults
Brinkerton	Fine-silty, mixed, mesic Typic Fragiaqualfs
Buchanan	Fine-loamy, mixed, mesic Aquic Fragiudults
Calvin	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Cedarcreek	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Clarksburg	Fine-loamy, mixes mesic Typic Fragiudalfs
Clymer	Fine-loamy, mixed, mesic Typic Hapludults
Dystrochrepts	Loamy-skeletal Dystrochrepts
Edom	Fine, illitic, mesic Typic Hapludalfs
Elliber	Loamy-skeletal, mixed, mesic Typic Hapludults
Ernest	Fine-loamy, mixed, mesic Aquic Fragiudults
Hagerstown	Fine, mixed, mesic Typic Hapludalfs
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Holly	Fine-loamy, mixed, nonacid, mesic Typic Fluvaquents
Klinesville	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Laidig	Fine-loamy, siliceous, mesic Typic Fragiudults
Leck Kill	Fine-loamy, mixed, mesic Typic Hapludults
Lehew	Loamy-skeletal, siliceous, mesic Typic Dystrochrepts
Lobdell	Fine-loamy, mixed, mesic Fluvaquentic Eutrochrepts
Meckesville	Fine-loamy, mixed, mesic Typic Fragiudults
Mertz	Loamy-skeletal, mixed, mesic Typic Hapludults
Monongahela	Fine-loamy, mixed, mesic Typic Fragiudults
Morrison	Fine-loamy, mixed, mesic Ultic Hapludalfs
Murrill	Fine-loamy, mixed, mesic Typic Hapludults
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Opequon	Clayey, mixed, mesic Lithic Hapludalfs
Penlaw	Fine-silty, mixed, mesic Aquic Fragiudalfs
Philo	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Pope	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Purdy	Clayey, mixed, mesic Typic Ochraquults
Tyler	Fine-silty, mixed, mesic Aeric Fragiaquults
Udorthents	Udorthents
Ungers	Fine-loamy, mixed, mesic Typic Hapludults
Vanderlip	Mesic, coated, Typic Quartzipsamments
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Westmoreland	Fine-loamy, mixed, mesic Ultic Hapludalfs
Wharton	Fine-loamy, mixed, mesic Aquic Hapludults

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