United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Kentucky Natural
Resources and
Environmental Protection
Cabinet and Kentucky
Agricultural Experiment
Station

Soil Survey of Casey County, Kentucky

How To Use This Soil Survey

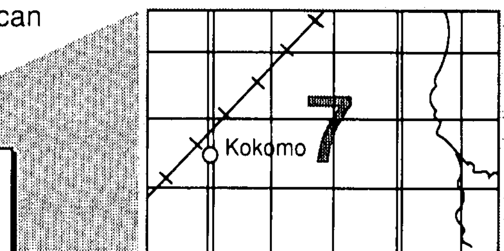
General Soil Map

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.

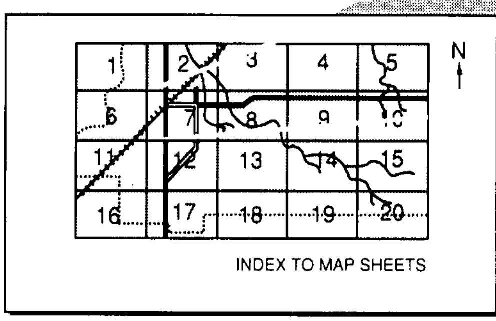
Detailed Soil Maps

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

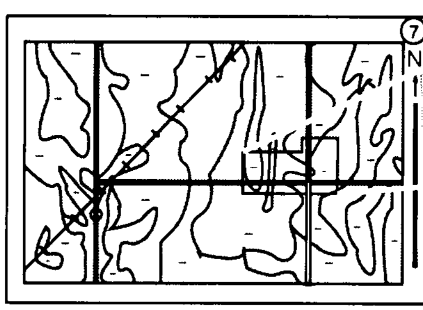


MAP SHEET

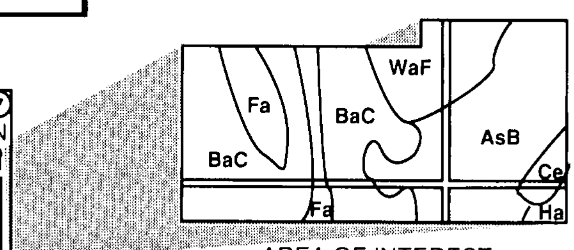
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



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



MAP SHEET



AREA OF INTEREST

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.

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.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This soil survey was made cooperatively by the Soil Conservation Service, the Kentucky Natural Resources and Environmental Protection Cabinet, and the Kentucky Agricultural Experiment Station. It is part of the technical assistance furnished to the Casey 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.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: A farmstead in the Colyer-Faywood-Nolin general soil map unit.

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Issued August 1994

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Casey County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, 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, 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.

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 Soil Conservation Service or the Cooperative Extension Service.

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Soil Survey of Casey County, Kentucky

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Gerald A. Richardson, Kentucky Natural Resources and Environmental Protection Cabinet

United States Department of Agriculture, Soil Conservation Service
in cooperation with
Kentucky Natural Resources and Environmental Protection Cabinet and
Kentucky Agricultural Experiment Station

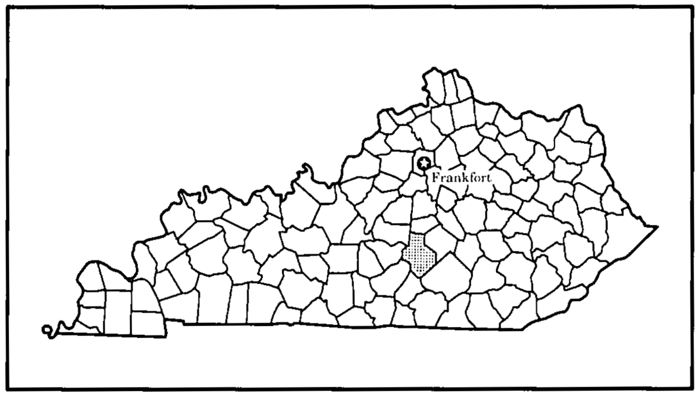

Figure 1.—Location of Casey County in Kentucky.

CASEY COUNTY is in the south-central part of Kentucky (fig. 1). It has an area of about 445 square miles, or 285,107 acres. In 1980, the county had a population of 14,818 and Liberty, the county seat, had a population of 2,206 *(48)*.

Casey County is in the Highland Rim and Pennyroyal and the Kentucky Bluegrass Land Resource Areas *(5)*. The county can be further divided into the Pennyroyal, Knobs, and Outer Bluegrass physiographic regions *(6)*. It is bounded on the north by Boyle County, on the east by Lincoln and Pulaski Counties, on the south by Russell County, and on the west by Adair, Taylor, and Marion Counties.

General Nature of the County

This section provides general information concerning Casey County. It describes history, climate, farming, natural resources, industry and transportation, and topography and drainage.

History

Casey County was formed in 1806 from part of Lincoln County. It was named for Colonel William Casey, who established a station on the Green River *(16)*. One of the first permanent settlers was Christopher Riffe. He bought 800 acres from Abraham Lincoln's grandfather in 1793, settled near Middleburg, and built a mill on the Green River. In 1805, the Catholic monks at Clementsville established a salt works to refine salt from brine. The Montezuma Salt Works, one of the first commercial salt refineries in the state, was founded in 1826 and produced about 4,000 bushels of salt a year. Liberty was established in 1808 and incorporated in 1830. It was named by veterans of the American Revolution who had migrated to the area after the war *(39)*.

Climate

In Casey County, summers are hot in valleys and slightly cooler in the hills and winters are moderately cold. Rains are fairly heavy and well distributed throughout the year. Snow falls nearly every winter, but the snow cover generally lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Campbellsville, Kentucky, in the period 1951 to 1987. 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 37 degrees F and the average daily minimum temperature is 27 degrees. The lowest temperature on record, which occurred at Campbellsville on January 24, 1963, is -21 degrees. In summer, the average temperature is 75 degrees and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Campbellsville on July 27, 1952, is 104 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 (50 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 51 inches. Of this, 28 inches, or about 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 22 inches. The heaviest 1-day rainfall during the period of record was 4.98 inches at Campbellsville on May 7, 1984. Thunderstorms occur on about 45 days each year.

The average seasonal snowfall is about 15 inches. The greatest snow depth at any one time during the period of record was 23 inches. On an average of 4 days, at least 1 inch of snow is on the ground. The number of such days varies 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 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

Farming

In 1987, about 70.8 percent of the acreage of Casey County was used as farms *(49)*. The county had 1,563 farms that averaged about 129 acres each in size. About 99,876 acres of the county was cropland. About 43,295 acres of this cropland was harvested, and about 45,221 acres was used only for pasture or grazing. A large number of the farms were family owned and operated. Nearly half of the farmers have a principal occupation other than farming.

Burley tobacco, corn, soybeans, and hay are the main crops grown in the county. In 1988, income from crops made up about 38 percent of the total farm income *(24)*. Tobacco is the main cash crop and is grown on most farms. In 1982, apple orchards made up about 404 acres. By 1987, this acreage was reduced to about 235 acres *(49)*. The county, however, remains one of Kentucky's major producers of apples. In recent years, vegetable crops, such as peppers, cucumbers, tomatoes, and melons, that are grown for both processing and fresh consumption have become important additions to farm income. The production of specialty crops, such as ginseng, has also increased.

In 1988, livestock production made up about 62 percent of the total farm income *(24)*. The production of beef cattle and calves and dairy products are the main enterprises. In 1988, Casey County was ranked 7th in the state for the production of beef cattle and 18th for the production of all cattle and calves. The production of hogs, poultry, and sheep is less significant.

Natural Resources

The most important natural resources in Casey County are soil, water, timber, oil, and limestone. Soil is one of the most valuable resources because it is the main resource for the production of food and fiber. This fact is an important consideration in managing the soils for the most appropriate uses.

Water is generally adequate for domestic use throughout the county *(27)*. Wells in the northern part of the county may yield unsuitable or inadequate amounts of water. Although much of the county is served by community water systems, many of the outlying areas are served by cisterns and wells. Farm ponds and creeks throughout the county are used for livestock water, irrigation, fishing, and swimming.

The county has about 150,300 acres of woodland *(26)*. Most of the woodland is on soils that are too steep or too wet for farming. Most areas have been logged in the past, and logging continues to be a source of income for landowners (fig. 2).

Numerous oil wells have been drilled in the county, but their success was limited. Many of the wells were dry, produced gas or brine, or produced a few barrels of oil a day *(28, 29, 30, 36)*. In recent years an interest has been shown in mining the oil shale (Chattanooga or New Albany Shale) in the northern part of the county for the production of shale oil, but present commercial production methods are not economical *(30)*.

Clay shale occurs throughout the county but is especially abundant along the base of the Knobs in the northern part. Some of the shale is suitable for making brick and tile *(28, 29, 30, 36, 37)*.

A limestone mine in the eastern part of the county

Figure 2.—A log yard in an area of Carpenter gravelly silt loam, 6 to 12 percent slopes.

produces agricultural lime and gravel and rock for various uses *(36)*. Large quantities of gravel are excavated from creeks in the county and are used for farm roads and barn lots *(28, 29, 36, 37)*.

Industry and Transportation

Although most of the residents of Casey County engage in farming, industry also is important to the economy of the area. The county has seven companies that produce metal farm gates and round bale feeders *(25)*. These products are shipped throughout the United States. Two metal tubing manufacturers supply the gate companies with steel tubing. The county also has several sawmills and a clothing manufacturer. Many residents commute to work in the surrounding counties.

Transportation facilities in Casey County include a network of Federal, State, and county highways that provide access to all parts of the survey area. The Liberty-Casey County Airport, about 6 miles west of Liberty, has a 3,000-foot-long, paved runway *(25)*.

Topography and Drainage

The topography of Casey County is varied. Generally, it is a maturely dissected plateau of medium elevation *(20)*. The highest point is on Green River Knob at an elevation of 1,789 feet. The lowest point is on the shoreline of the Green River at the Adair County line at an elevation of 709 feet.

The northern part of the county is in the Knobs physiographic region *(6)*. This highly dissected area has steep hillsides, narrow ridgetops, narrow flood plains, and an occasional isolated knob. The soils in this area are used mostly for woodland, although tobacco, corn, pasture plants, and hay are grown on the more gently sloping ridgetops and the narrow flood plains. This area is drained by Hanging Fork Creek, the Big South Fork of the Rolling Fork, and the Little South Fork of the North Rolling Fork.

A small area in the northeastern part of the county is in the Outer Bluegrass physiographic region *(6)*. It has steep hillsides and undulating to rolling ridgetops. The soils on the hillsides are used mostly for hay and pasture. The soils on the ridgetops are used mostly for corn or tobacco. This area is drained by Carpenters Creek.

The rest of the county is in the Pennyroyal physiographic region *(6)*. The eastern and southeastern parts of the county have steep hillsides and moderately steep to gently sloping ridgetops. These areas are dominated by steep, rocky knolls of limestone that rise 200 to 300 feet above the ridgetops. The soils on the hillsides and knolls are used mostly for woodland. The soils on the ridgetops and the less steeply sloping side slopes are used for hay, pasture, or row crops. These areas are drained by Fishing Creek, which flows into the Cumberland River, and by tributaries of the Green River.

The southern and western parts of the county are mainly steep hillsides, sloping to rolling ridgetops, and narrow flood plains. The soils in many of these areas are used for pasture and hay. Corn, tobacco, and some truck crops are grown on the ridgetops and flood plains. The soils on the steep hillsides are mostly used for woodland. The soils on the nearly level to gently sloping flood plains along the Green River are used mostly for cultivated crops, especially corn and soybeans. These areas are drained by the Green River and its major tributaries, the South Fork, the Trace Fork, Casey Creek, and Brush Creek.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; 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 from 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 in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil 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-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries *(41)*.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil 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. 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 *(44)*.

While a soil survey is in progress, samples of some of the soils in the area are generally 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 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 assure 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.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. 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 soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns 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 (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

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

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 and some minor soils. It is named for the major soils. The soils making up one 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 a 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.

The boundary lines of soils in this survey area do not completely join with those of adjacent counties because of differences in the design of general soil map units and changes in the concepts of some soils.

1. Nolin-Melvin-Newark

Very deep, nearly level, well drained, somewhat poorly drained, and poorly drained soils that have a loamy subsoil; formed in mixed alluvium; on flood plains

This map unit consists of soils on narrow to moderately broad, nearly level flood plains. The flood plains are dissected by many small streams. Slopes range from about 0 to 2 percent.

This map unit makes up about 5 percent of the county. It is about 30 percent Nolin soils, 25 percent Melvin soils, 25 percent Newark soils, and 20 percent soils of minor extent (fig. 3).

Nolin soils are on flood plains near the major streams. They are well drained. Typically, the surface layer is brown silt loam. The subsoil is brown silt loam in the upper part and brown silty clay loam in the lower part. The substratum is dark grayish brown gravelly silty clay loam.

Melvin soils are in low areas, mostly near the foot slopes of adjacent hills. They are poorly drained. Typically, the surface layer is grayish brown silt loam. The subsoil is light brownish gray, mottled silt loam. The substratum is gray, mottled silt loam.

Newark soils are on flood plains. They are somewhat poorly drained. Typically, the surface layer is brown silt loam. The subsoil is mottled silt loam. It is dark yellowish brown in the upper part and grayish brown in the lower part. The substratum is grayish brown and brownish gray, mottled silt loam.

Of minor extent in this map unit are Lindside, Skidmore, and Yosemite soils on flood plains and Elk, Lawrence, and Robertsville soils on stream terraces.

In most areas this map unit is used for cultivated crops, hay, or pasture. Uncleared areas are mostly in wet, low areas.

In most areas this map unit is suited to farming. Some areas are only suited to the cultivated crops that are tolerant of wetness.

The soils in this map unit are suited to woodland. They are poorly suited to most urban and recreational uses because of flooding and wetness.

2. Faywood-Lowell-Fairmount

Very deep to shallow, sloping to very steep, well drained soils that have a clayey subsoil; formed in material weathered from limestone, calcareous shale, and mudstone; on uplands

This map unit consists of soils on ridgetops and side slopes. The ridgetops are long and narrow and generally are uniform in elevation. The side slopes are short and are highly dissected by small drainageways. Slopes range from about 6 to 60 percent.

This map unit makes up about 2 percent of the county. It is about 35 percent Faywood soils, 25 percent Lowell soils, 15 percent Fairmount soils, and 25 percent components of minor extent (fig. 4).

Faywood soils are on side slopes. They formed in material weathered from limestone, calcareous shale, and mudstone. They are moderately deep. Typically, the surface layer is brown silt loam. The subsoil is yellowish brown silty clay in the upper part

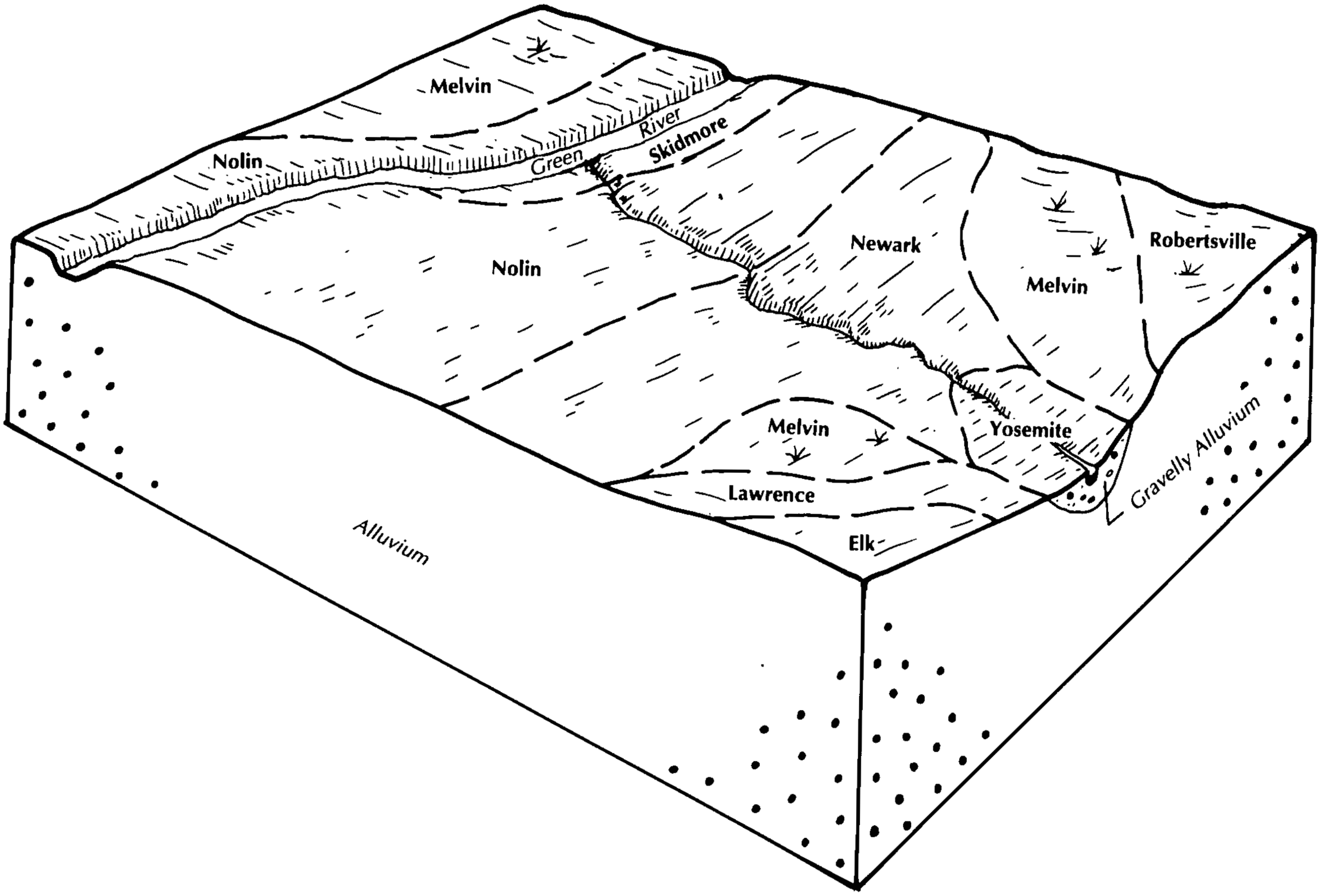

Figure 3.—Typical pattern of soils and underlying material in the Nolin-Melvin-Newark general soil map unit.

and yellowish brown, mottled clay in the lower part.

Lowell soils are on the upper side slopes and ridgetops. They formed in material weathered from limestone. They are deep and very deep. Typically, the surface layer is brown silt loam. The subsoil is brown silty clay loam in the upper part, brown silty clay in the next part, and yellowish brown clay in the lower part. The substratum is brown and gray, mottled clay.

Fairmount soils are on side slopes. They formed in material weathered from limestone, calcareous shale, and mudstone. They are shallow. Typically, the surface layer is brown silty clay loam. The subsoil is yellowish brown flaggy silty clay.

Of minor extent in this map unit are Crider and Berea soils on ridgetops and Colyer and Trappist soils on side slopes. In some areas rock outcrop is on the steep and very steep side slopes.

In most areas this map unit is used for hay, pasture, or cultivated crops. Uncleared areas are mostly on the steeper side slopes.

The soils in this map unit generally are suited to farming. The soils on the sloping ridgetops are suited to cultivated crops. The hazard of erosion and the slope are the main limitations. Erosion-control measures are needed to slow runoff and control soil loss. The sloping and moderately steep soils are suited to hay and pasture crops. The steep and very steep soils are poorly suited to these crops because of the depth to bedrock, rockiness, and the slope.

The soils in this map unit are suited to woodland. The Lowell soils are suited to some urban and recreational uses, but a moderate shrink-swell potential and the slope are limitations. The Faywood and Fairmount soils are poorly suited to most urban uses because of the slope, the depth to bedrock, rockiness, and a high content of clay.

3. Colyer-Faywood-Nolin

Very deep, moderately deep, and shallow, nearly level, moderately steep, steep, and very steep, well drained soils that have a clayey or loamy subsoil; formed in material weathered from black shale, limestone, and calcareous shale or in mixed alluvium; on uplands and flood plains

This map unit consists of soils on side slopes and flood plains. The side slopes are short and are dissected by small drainageways. The flood plains are long and narrow. Slopes range from 12 to 50 percent in the uplands and from 0 to 2 percent on the flood plains.

This map unit makes up about 8 percent of the county. It is about 35 percent Colyer soils, 18 percent Faywood soils, 15 percent Nolin soils, and 32 percent components of minor extent (fig. 5).

Colyer soils are on side slopes. They formed in material weathered from hard black shale. They are shallow. Typically, the surface layer is brown silt loam. The subsurface layer is yellowish brown silty clay loam. The subsoil is strong brown very channery silty clay. The substratum is yellowish brown extremely channery silty clay.

Faywood soils are on side slopes below the Colyer soils. They formed in material weathered from limestone. They are moderately deep. Typically, the surface layer is brown silt loam. The subsoil is yellowish brown silty clay in the upper part and yellowish brown, mottled clay in the lower part.

Nolin soils are on flood plains. They formed in mixed alluvium. They are very deep. Typically, the surface layer is brown silt loam. The subsoil is brown silt loam in the upper part and brown silty clay loam in the lower part. The underlying material is gray, mottled silt loam.

Of minor extent in this map unit are Fairmount, Lenberg, Lowell, and Trappist soils on side slopes; Carpenter soils on toe slopes; and Skidmore and

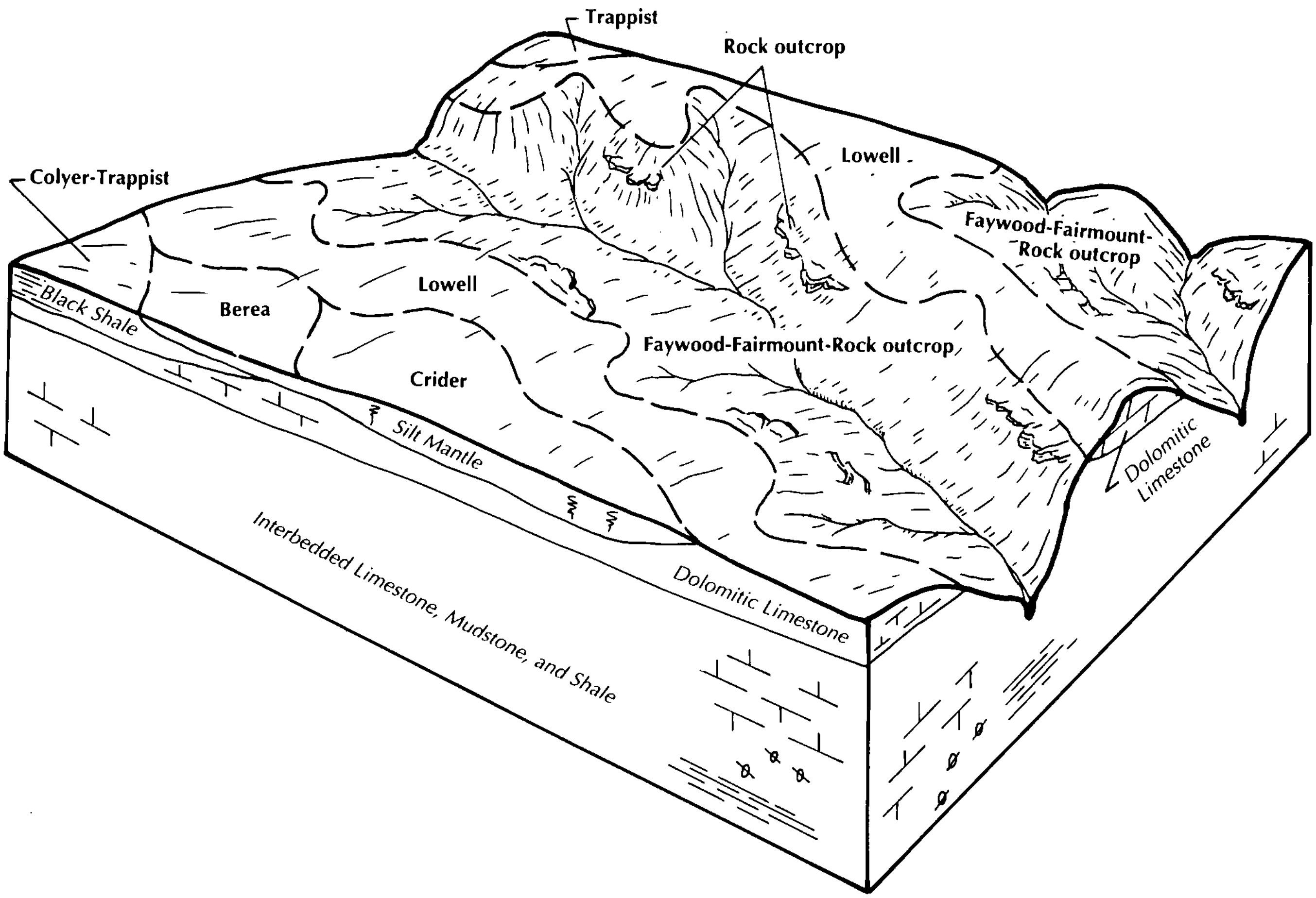

Figure 4.—Typical pattern of soils and underlying material in the Faywood-Lowell-Fairmount general soil map unit.

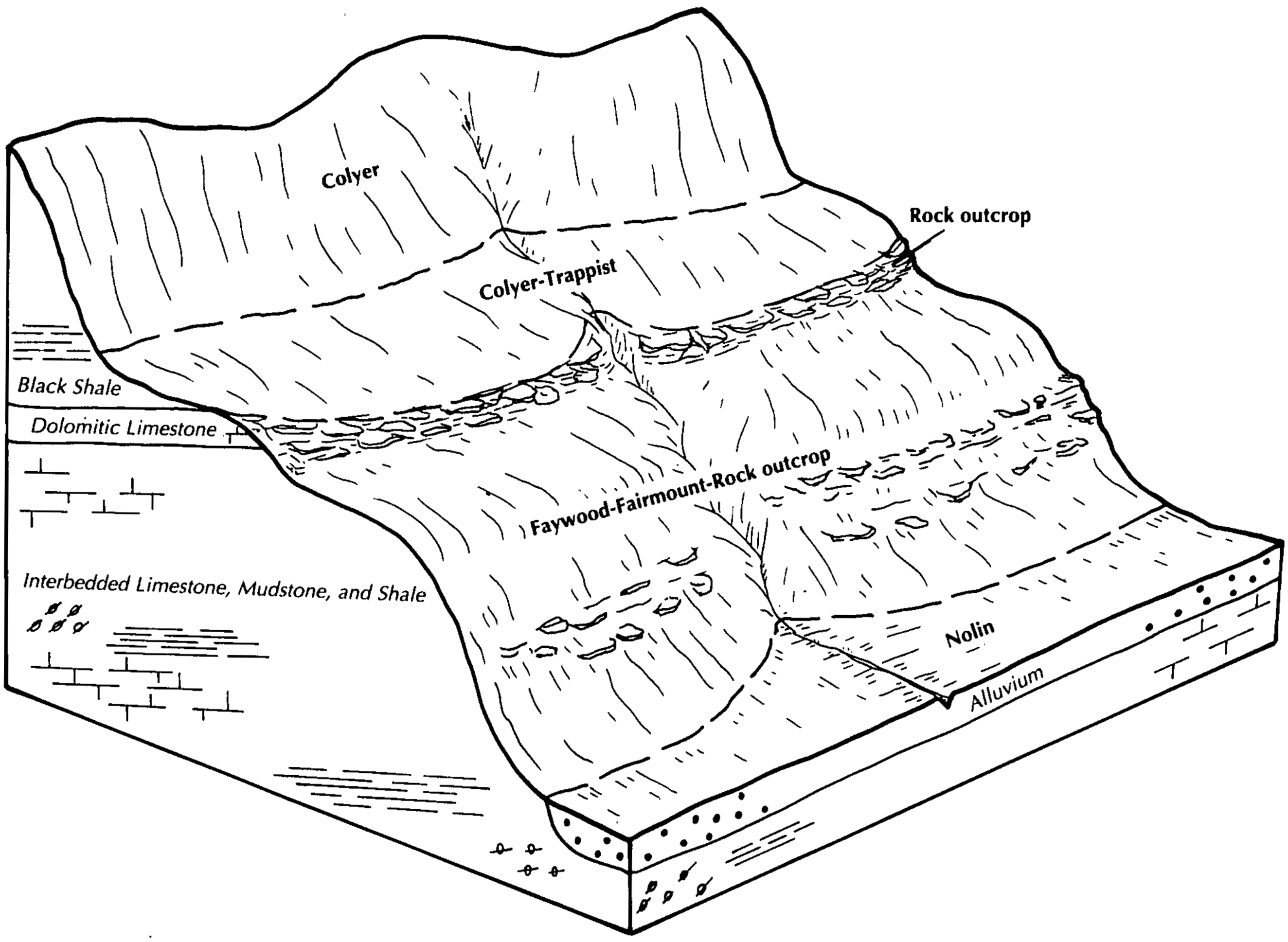

Figure 5.—Typical pattern of soils and underlying material in the Colyer-Faywood-Nolin general soil map unit.

Yosemite soils on flood plains. Rock outcrops of shale and limestone are on some of the steeper slopes.

In most of the upland areas, this map unit is used for pasture and hay. In most of the areas on flood plains, it is used for cultivated crops or hay (fig. 6). Uncleared areas are mostly on the steep side slopes.

The soils in this map unit generally are suited to farming. The soils on the flood plains are suited to cultivated crops. All of the soils are suited to pasture and hay crops except for those on the steep and very steep slopes.

The soils in this map unit are suited to woodland. They generally are poorly suited to most urban and recreational uses because of the slope, the depth to bedrock, flooding, or a high content of clay.

4. Pricetown-Teddy-Frankstown

Very deep and deep, gently sloping to moderately steep, well drained and moderately well drained soils that have a loamy subsoil or a loamy and clayey subsoil; formed in material weathered from limestone, siltstone, and shale or in a loamy mantle over residuum derived from limestone; on uplands

This map unit consists of soils on ridgetops and side slopes. The ridgetops are long and moderately broad and are uniform in elevation. The side slopes are short and are highly dissected by small drainageways. Slopes range from about 2 to 20 percent.

This map unit makes up about 10 percent of the county. It is about 40 percent Pricetown soils, 25 percent Teddy soils, 15 percent Frankstown soils, and 20 percent soils of minor extent (fig. 7).

Pricetown soils are on the more sloping parts of the ridgetops. They formed in material weathered from limestone that is capped by a loamy mantle. They are very deep and well drained. Typically, the surface layer is brown silt loam. The subsoil is yellowish brown silt loam in the upper part, red, mottled silty clay loam in the next part, and red, mottled clay in the lower part.

Teddy soils are on the more level, broader parts of the ridgetops. They formed in material weathered from limestone, sandstone, siltstone, and shale that is capped by a loamy mantle. They are very deep. They are moderately well drained and have a fragipan. Typically, the surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silt loam. The next part is a firm, compact fragipan of yellowish brown, mottled silt loam and clay loam. The next part is red and reddish brown, mottled clay loam. The lower part is yellowish brown, mottled very gravelly clay loam.

Frankstown soils are on the upper side slopes and the narrow ridgetops. They formed in material

Figure 6.—Typical landscape in the Colyer-Faywood-Nolin general soil map unit.

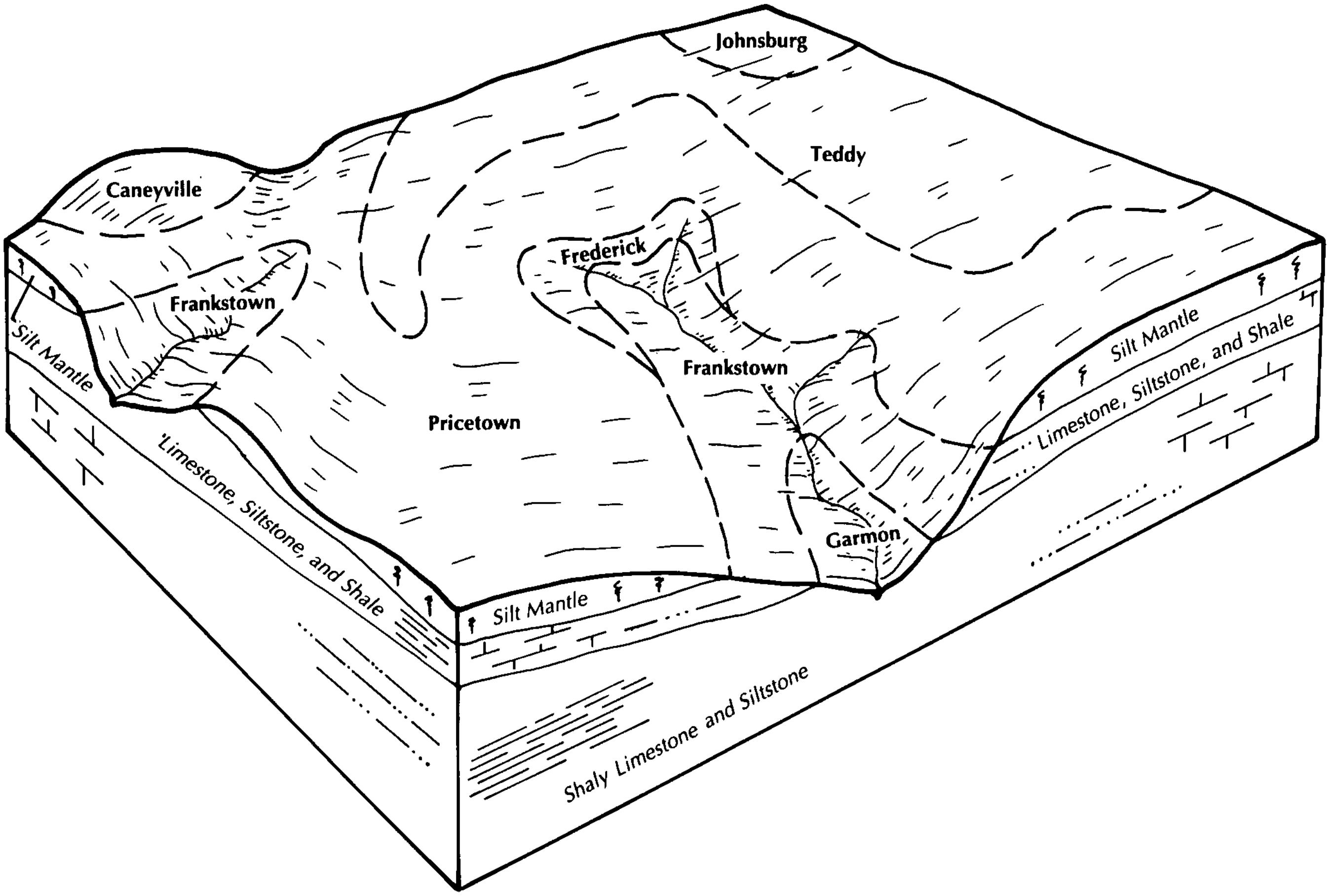

Figure 7.—Typical pattern of soils and underlying material in the Pricetown-Teddy-Frankstown general soil map unit.

weathered from limestone, siltstone, and shale. They are deep and very deep and are well drained. Typically, the surface layer is brown silt loam. The subsoil is yellowish brown silty clay loam in the upper part and strong brown and brown gravelly silty clay loam in the lower part.

Of minor extent in this map unit are Frederick soils on the upper side slopes, Johnsburg soils in low areas in the uplands, Caneyville soils on small hills that rise above the ridgetops, and Garmon soils on very steep side slopes.

In most areas this map unit is used for cultivated crops, hay, or pasture. Uncleared areas are mostly on the steeper side slopes.

The soils in this map unit generally are well suited to farming. Most of the soils are suited to cultivated crops. Erosion is the main hazard, and erosion-control measures are needed. The soils are well suited to hay and pasture crops.

The soils in this map unit are suited to woodland. They generally are suited to most urban and recreational uses. The shrink-swell potential, the slope, and wetness are limitations.

5. Lenberg-Garmon-Carpenter

Very deep to moderately deep, gently sloping to very steep, well drained soils that have a loamy subsoil or a loamy and clayey subsoil; formed in material weathered from shale, siltstone, and limestone and in colluvium over shale or siltstone; on uplands

This map unit consists of soils on narrow ridges, conical hills, and foot slopes. The elevation of the very narrow ridgetops is uniform. The side slopes are short and are dissected by small drainageways. The foot slopes are highly dissected by small drainageways. Slopes range from about 2 to 60 percent.

This map unit makes up about 12 percent of the county. It is about 30 percent Lenberg soils, 25 percent Garmon soils, 20 percent Carpenter soils, and 25 percent soils of minor extent (fig. 8).

Lenberg soils are on the lower side slopes below the Garmon soils. They formed in material weathered from soft clayey shale. They are moderately deep. Typically, the surface layer is dark grayish brown silt loam. The subsurface layer is brown silt loam. The subsoil is strong brown silty clay loam in the upper part, strong brown silty clay in the next part, and yellowish brown, mottled silty clay in the lower part. The substratum is yellowish brown, reddish yellow, and light brownish gray channery silty clay.

Garmon soils are on the very steep side slopes. They formed in material weathered from shaly limestone, siltstone, and calcareous shale. They are moderately deep. Typically, the surface layer is dark grayish brown silt loam. The subsoil is yellowish brown channery silt loam. The substratum is yellowish brown very channery silt loam.

Carpenter soils are on foot slopes, mostly below the Lenberg soils. They formed in loamy colluvium over material weathered from shale or siltstone. They are deep and very deep. Typically, the surface layer is dark grayish brown gravelly silt loam. The subsoil is brown

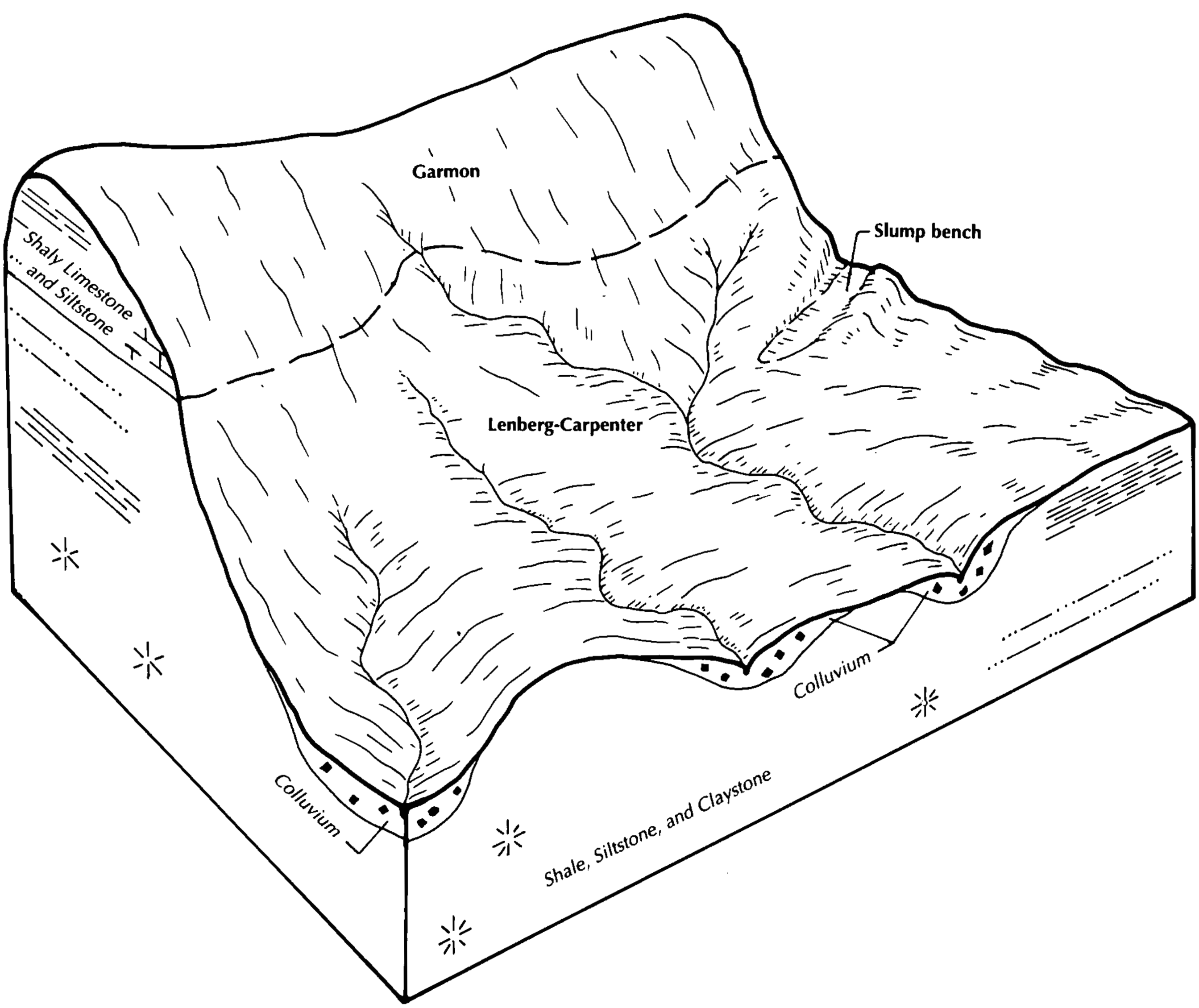

Figure 8.—Typical pattern of soils and underlying material in the Lenberg-Garmon-Carpenter general soil map unit.

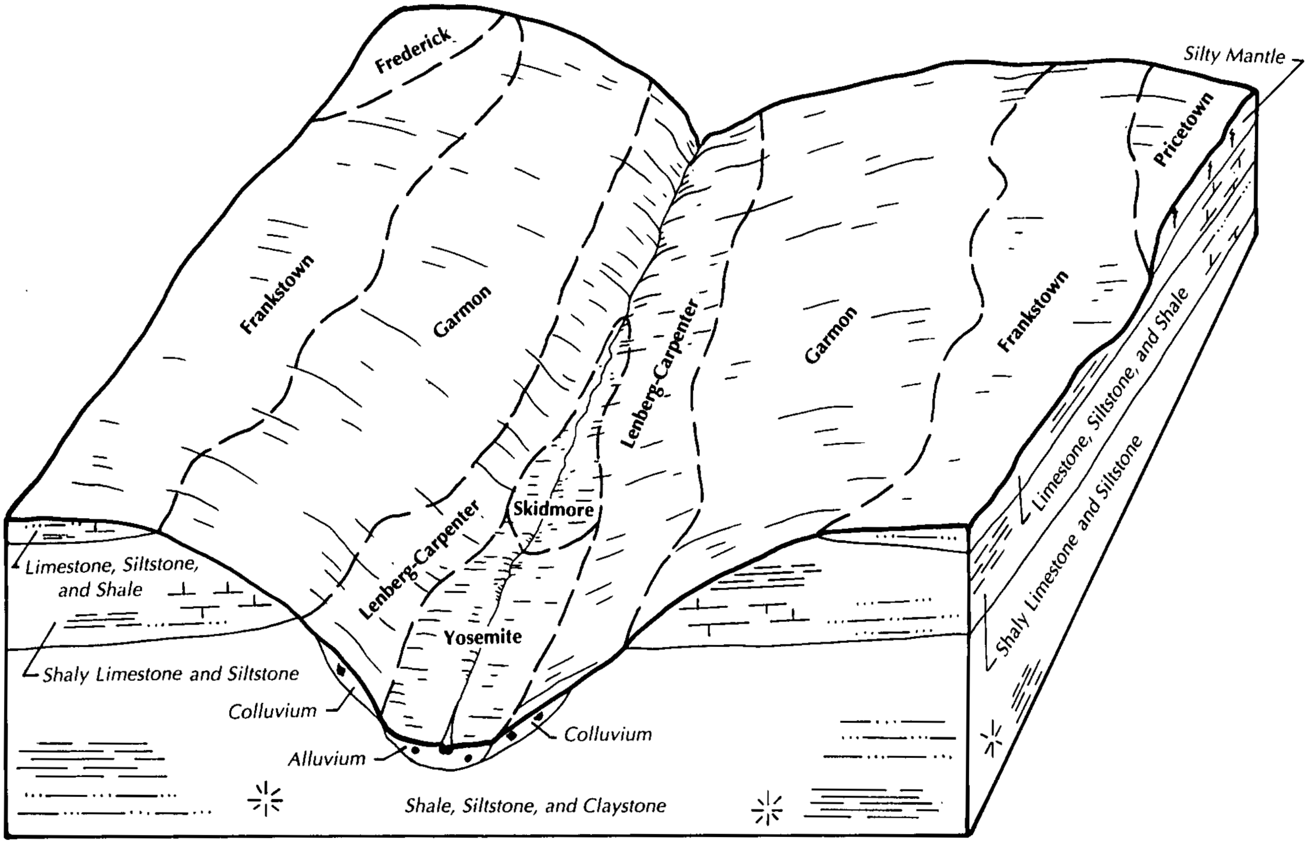

Figure 9.—Typical pattern of soils and underlying material in the Garmon-Frankstown general soil map unit.

gravelly silt loam in the upper part and light yellowish brown gravelly silty clay loam in the lower part. The substratum is light yellowish brown channery silty clay.

Of minor extent in this map unit are Frankstown, Frederick, and Pricetown soils on ridgetops; Colyer and Trappist soils on side slopes; and Skidmore and Yosemite soils on narrow flood plains along streams.

In most areas this map unit is used as woodland. Cleared areas are mostly on the narrow ridgetops. Some of the minor soils on the narrow flood plains are used for hay, pasture, or cultivated crops.

The soils in this map unit generally are not suited to farming because of the slope and the depth to bedrock.

The soils in this map unit are suited to woodland. They generally are not suited to urban and recreational uses because of the slope, the depth to bedrock, slippage, and the shrink-swell potential. The gently sloping and sloping Carpenter soils, however, are suited to some urban uses.

6. Garmon-Frankstown

Very deep to moderately deep, gently sloping, sloping, moderately steep, and very steep, well drained soils that have a loamy subsoil; formed in material weathered from limestone, siltstone, and shale; on uplands

This map unit consists of soils on side slopes and convex ridgetops. The ridgetops are long and narrow and generally are uniform in elevation. The side slopes are short and are highly dissected by small drainageways. Slopes range from about 2 to 60 percent.

This map unit makes up about 57 percent of the county. It is about 35 percent Garmon soils, 30 percent Frankstown soils, and 35 percent soils of minor extent (fig. 9).

Garmon soils are on the very steep side slopes. They formed in material weathered from shaly limestone, siltstone, and calcareous shale. They are moderately deep. Typically, the surface layer is dark grayish brown silt loam. The subsoil is yellowish brown channery silt loam. The substratum is yellowish brown very channery silt loam.

Frankstown soils are on the upper side slopes and ridgetops. They formed in material weathered from limestone, siltstone, and shale. They are deep and very deep. Typically, the surface layer is brown silt loam. The subsoil is yellowish brown silty clay loam in the upper part and strong brown and brown gravelly silty clay loam in the lower part.

Of minor extent in this map unit are Frederick and Pricetown soils on ridgetops; Carpenter, Colyer, Lenberg, and Trappist soils on side slopes; and Skidmore and Yosemite soils on narrow flood plains along streams.

In most areas this map unit is used as woodland. Cleared areas are mostly on the narrow ridgetops. Some of the minor soils on the narrow flood plains are used for cultivated crops, hay, or pasture.

The soils in this map unit generally are not suited to farming because of the depth to bedrock and the slope. The soils on some ridgetops, however, are suited to cultivated crops, hay, and pasture. The hazard of erosion and the slope are the main limitations. Erosion-control measures are needed to slow runoff and control soil loss.

The soils in this map unit are suited to woodland. They generally are not suited to most urban and recreational uses because of the slope, the depth to bedrock, and the shrink-swell potential. The gently sloping and sloping Frankstown soils, however, are suited to some urban uses.

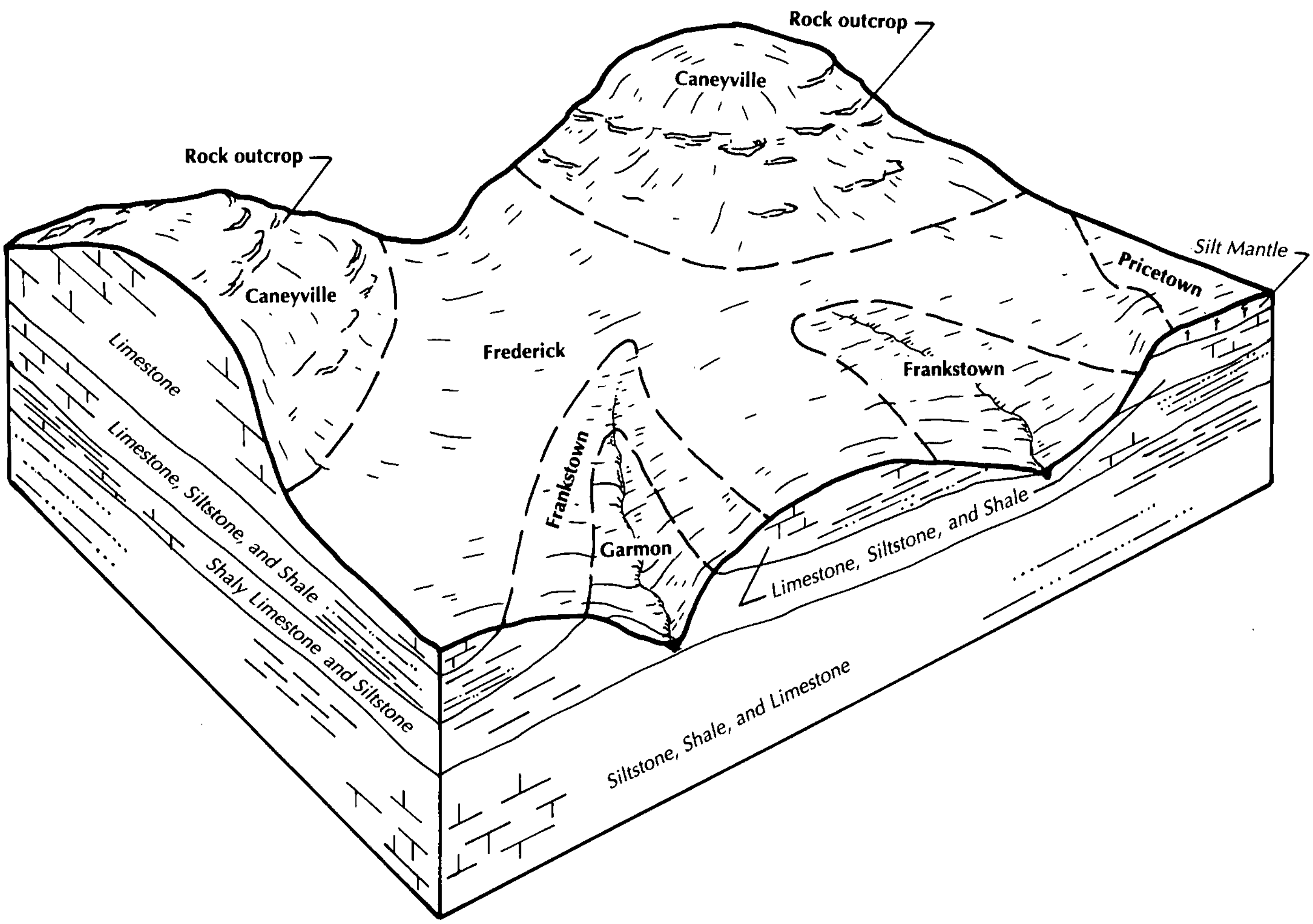

Figure 10.—Typical pattern of soils and underlying material in the Frederick-Caneyville-Frankstown general soil map unit.

7. Frederick-Caneyville-Frankstown

Very deep to moderately deep, gently sloping to very steep, well drained soils that have a clayey or loamy subsoil; formed in material weathered from limestone, siltstone, and shale; on uplands

This map unit consists of soils on convex ridgetops and side slopes. The side slopes generally are short and are highly dissected by drainageways. The ridgetops are long and narrow, and some ridges are topped by hills or knolls. Slopes range from about 2 to 35 percent.

This map unit makes up about 6 percent of the county. It is about 40 percent Frederick soils, 25 percent Caneyville soils, 15 percent Frankstown soils, and 20 percent components of minor extent (fig. 10).

Frederick soils are on ridgetops and the upper side slopes. They formed in material weathered from limestone. They are very deep. Typically, the surface layer is dark yellowish brown silt loam. The subsoil is yellowish red silty clay in the upper part; yellowish red, mottled silty clay in the next part; and variegated red, gray, and reddish yellow silty clay in the lower part.

Caneyville soils are on convex hills or knolls that rise 200 to 300 feet above the surrounding areas. They formed in material weathered from limestone. They are moderately deep. Typically, the surface layer is brown silt loam. The subsoil is strong brown silty clay loam in the upper part and yellowish red and strong brown silty clay in the lower part.

Frankstown soils are on the upper side slopes below the Frederick soils that are on ridgetops. They formed in material weathered from limestone, siltstone, and shale. They are deep and very deep. Typically, the surface layer is brown silt loam. The subsoil is silty clay loam. It is strong brown in the upper part and yellowish red and strong brown in the lower part.

Of minor extent in this map unit are Garmon soils on steep side slopes and Pricetown and Teddy soils on ridgetops. In some areas limestone rock outcrop is on the very steep slopes.

In most areas this map unit is used for hay and pasture. Some areas are used for cultivated crops. Uncleared areas are mostly on the steep side slopes.

In most areas this map unit is suited to farming. The soils on the ridgetops are suited to cultivated crops. Erosion is the main hazard, and erosion-control measures are needed. All of the soils are suited to hay and pasture crops except for the Caneyville soils in the steeper areas.

The soils in this map unit are suited to woodland. They are suited to some urban and recreational uses. The slope and the shrink-swell potential are limitations. The Caneyville soils are poorly suited to most urban uses because of rockiness, the slope, and the depth to bedrock.

Detailed Soil Map Units

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

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

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

In the descriptions the suitability of the soils for various uses is described. *Well suited* indicates that the soils have favorable properties for the specified use and that limitations are easy to overcome. Good performance and low maintenance can be expected. *Suited* indicates that the soils have moderately favorable properties for the specific use. One or more properties make these soils less desirable than well suited soils. *Poorly suited* indicates soils that have one or more properties unfavorable for the selected use. Overcoming the limitation requires special design, extra maintenance, or costly alteration. *Not suited* indicates that the soils do not meet the requirements for the selected use or that extreme measures are needed to overcome the limitations.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer or of the substratum, 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 or of the substratum. They also can differ in slope, stoniness, salinity, wetness, 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, Frankstown silt loam, 6 to 12 percent slopes, is a phase of the Frankstown series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Colyer-Trappist complex, 12 to 20 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. The Rock outcrop part of Rock outcrop-Caneyville complex, 6 to 35 percent slopes, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

The boundary lines of soils in this survey area do not completely join with those of adjacent counties because of the design of map units, changes in the concepts of some soils, and different map scales.

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.

BeB—Berea silt loam, 2 to 6 percent slopes. This moderately deep, moderately well drained, gently sloping soil is on ridgetops in the uplands, mainly in the northern part of the county. Individual areas range from about 5 to 20 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of about 36 inches. It is yellowish brown silt loam in the upper part, yellowish brown silty clay loam in the next part, and light yellowish brown, mottled silty clay loam in the lower part. The substratum extends to a depth of about 39 inches. It is brown, mottled very channery silty clay loam. Below this is hard, black shale.

This soil is moderately slowly permeable. It has a moderate available water capacity. The root zone is moderately deep and is easily penetrated by roots. The soil can be easily tilled. The seasonal high water table is at a depth of 1.5 to 3.0 feet. The content of organic matter in the surface layer is low or moderate. Surface runoff is slow. The shrink-swell potential is moderate. The depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Trappist soils and a few areas of a soil that is similar to the Berea soil but is more than 40 inches deep to bedrock. These soils make up about 5 to 10 percent of the unit.

Most areas of the Berea soil are used for cultivated crops, hay, or pasture.

This soil is well suited to corn, soybeans, small grain, and tobacco. Because of the wetness, tillage may be delayed in spring. In some places diversions help to control runoff and overwash from the adjacent hills. Erosion is a moderate hazard if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to most hay and pasture plants that are commonly grown in the county. Alfalfa may be short lived because of the wetness. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are Virginia pine, white oak, and yellow-poplar. The species preferred for planting include eastern white pine, shortleaf pine, and yellow-poplar. Plant competition is a management concern. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to some urban uses. The depth to bedrock, the wetness, and the moderately slow permeability are limitations for some sanitary facilities. The depth to bedrock and the wetness are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Proper design, installation, and site preparation may reduce or overcome these limitations.

This soil is in capability subclass IIe.

CaC—Caneyville silt loam, 6 to 12 percent slopes. This moderately deep, well drained, sloping soil is on side slopes and ridgetops in the uplands in the eastern part of the county. Individual areas range from about 5 to 15 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 30 inches. It is strong brown silty clay loam in the upper part and yellowish red and strong brown silty clay in the lower part. Below this is limestone bedrock.

This soil is moderately slowly permeable. It has a moderate available water capacity. The root zone is moderately deep. The soil can be easily tilled. The content of organic matter in the surface layer is moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Frankstown and Frederick soils. Also included are small areas of soils that are similar to the Caneyville soil but are more than 40 inches deep to bedrock, a few areas of Caneyville soils that have slopes of more than 12 percent, and a few small areas of limestone rock outcrop. Inclusions make up about 5 to 15 percent of this map unit.

Most areas of the Caneyville soil are used for hay and pasture. A few areas are used for cultivated crops or woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The hazard of erosion is severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is suited to woodland. The common trees are eastern redcedar, black oak, and white oak. The species preferred for planting include Virginia pine, white oak, and eastern redcedar. The equipment limitation, the hazard of erosion, and plant competition are management concerns. The content of clay in the soil can limit the use of some equipment. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Steep skid trails and haul roads are subject to washing and gullying unless they are protected by water bars and plant cover. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the depth to bedrock, the moderately slow permeability, a high content of clay, the shrink-swell potential, and low strength. Some limitations can be overcome by proper engineering techniques.

This soil is in capability subclass IIIe.

CaD—Caneyville silt loam, very rocky, 6 to 20 percent slopes. This moderately deep, well drained, sloping and moderately steep soil is on convex side slopes and ridgetops in the uplands, mainly in the eastern part of the county. Limestone outcrop randomly covers about 5 to 10 percent of the surface. Individual areas range from about 10 to 75 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 30 inches. It is strong brown silty clay loam in the upper part and yellowish red and strong brown silty clay in the lower part. Below this is limestone bedrock.

This soil is moderately slowly permeable. It has a moderate available water capacity. The root zone is moderately deep. The content of organic matter in the surface layer is moderate. Runoff is rapid. The shrink-swell potential is moderate. The depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Frankstown and Frederick soils. Also included are small areas of soils that are similar to the Caneyville soil but are more than 40 inches deep to bedrock, a few areas of Caneyville soils that have slopes of more than 20 percent, and a few areas that have irregular limestone boulders 1 to 10 feet in diameter on the surface. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Caneyville soil are used for hay and pasture. A few areas are used as woodland.

This soil generally is not suited to cultivated crops because of the slope, the depth to bedrock, and rock outcrop.

This soil is suited to all hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants. The equipment limitation caused by the slope and rock outcrop are management concerns.

This soil is suited to woodland, but only a few areas are used for timber production. The common trees are eastern redcedar, sugar maple, and black oak. The species preferred for planting include Virginia pine, white oak, and eastern redcedar. The equipment limitation, seedling mortality, and plant competition are management concerns. The slope and rock outcrop can limit the use of some equipment. Reforestation may require careful management to ensure the survival of seedlings. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope, low strength, the depth to bedrock, the moderately slow permeability, and a high content of clay. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass VIs.

CaE—Caneyville silt loam, very rocky, 20 to 30 percent slopes. This moderately deep, well drained, steep soil is on convex side slopes and ridgetops in the uplands in the eastern part of the county. Limestone outcrop randomly covers about 5 to 10 percent of the surface. Individual areas range from about 10 to 75 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 30 inches. It is strong brown silty clay loam in the upper part and yellowish red and strong brown silty clay in the lower part. Below this is limestone bedrock.

This soil is moderately slowly permeable. It has a moderate available water capacity. The root zone is moderately deep. The content of organic matter in the surface layer is moderate. Runoff is rapid. The shrink-swell potential is moderate. The depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Frankstown and Frederick soils. Also included are small areas of soils that are similar to the Caneyville soil but are more than 40 inches deep to bedrock, a few areas of Caneyville soils that have slopes of more than 30 percent, and a few areas that have irregular limestone boulders 1 to 10 feet in diameter on the surface. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Caneyville soil are used as woodland. A few areas are used for hay and pasture.

This soil generally is not suited to cultivated crops because of the slope, the depth to bedrock, and rock outcrop.

This soil is suited to all hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants. The equipment limitation caused by rock outcrop and the slope are management concerns.

This soil is suited to woodland. The common trees are black oak, sugar maple, and eastern redcedar. The species preferred for planting on cool aspects include white ash, yellow-poplar, eastern white pine, and northern red oak, and those on warm aspects include eastern redcedar, Virginia pine, and white oak. The hazard of erosion, the equipment limitation, and plant competition are management concerns on cool and warm aspects. Seedling mortality is an additional management concern on warm aspects. The slope and rock outcrop can limit the use of wheeled and tracked equipment. Cable yarding generally is safer than other logging methods and causes less surface disturbance. Steep roads and skid trails are subject to rilling and gullying unless they are protected by water bars or plant cover, or both. Undesirable plants can hinder natural and artificial reforestation unless sites are intensively prepared and maintained. Reforestation may require careful management to ensure the survival of seedlings. Table 7 provides specific information relating to the potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope, low strength, the depth to bedrock, the moderately slow permeability, and a high content of clay. Some limitations can be overcome by proper engineering techniques.

This soil is in capability subclass VIs.

CgB—Carpenter gravelly silt loam, 2 to 6 percent slopes. This deep and very deep, well drained, gently sloping soil is on foot slopes and the narrow tops of low ridges in the uplands. Individual areas range from about 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown gravelly silt loam about 4 inches thick. The subsoil extends to a depth of about 42 inches. It is brown gravelly silt loam in the upper part and light yellowish brown gravelly silty clay loam in the lower part. The substratum extends to a depth of about 57 inches. It is light yellowish brown channery silty clay. Below this is soft, grayish green shale.

This soil is moderately permeable in the subsoil and slowly permeable in the substratum. It has a high available water capacity. The root zone is deep or very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate in the substratum. The depth to soft shale bedrock is 40 to more than 80 inches.

Included with this soil in mapping are small areas of Colyer, Lenberg, and Trappist soils. These soils make up about 5 to 15 percent of this map unit.

Most areas of the Carpenter soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are Virginia pine, white oak, and chestnut oak. The species preferred for planting include yellow-poplar, eastern white pine, black walnut, and shortleaf pine. Plant competition is a management concern. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The slow permeability, the depth to bedrock, and a high content of clay are limitations for most sanitary facilities. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

CgC—Carpenter gravelly silt loam, 6 to 12 percent slopes. This deep and very deep, well drained, sloping soil is on slightly convex foot slopes and the narrow tops of low ridges in the uplands. Individual areas range from about 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown gravelly silt loam about 4 inches thick. The subsoil extends to a depth of about 42 inches. It is brown gravelly silt loam in the upper part and light yellowish brown gravelly silty clay loam in the lower part. The substratum extends to a depth of about 57 inches. It is light yellowish brown channery silty clay. Below this is soft, grayish green shale.

This soil is moderately permeable in the subsoil and slowly permeable in the substratum. It has a high available water capacity. The root zone is deep or very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate in the substratum. The depth to soft shale bedrock is 40 to more than 80 inches.

Included with this soil in mapping are small areas of Colyer, Lenberg, and Trappist soils. These soils make up about 5 to 15 percent of this map unit.

Most areas of the Carpenter soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The hazard of erosion is severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are Virginia pine, white oak, and chestnut oak. The species preferred for planting include yellow-poplar, eastern white pine, black walnut, and shortleaf pine. Plant competition is a management concern. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The slow permeability and the depth to bedrock are limitations for most sanitary facilities. The slope is a limitation affecting building site development. Low strength and the slope are limitations on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIIe.

CoF—Colyer silt loam, 20 to 50 percent slopes. This shallow, well drained, steep and very steep soil is on side slopes in the uplands, mainly in the northern part of the county. Individual areas range from about 20 to 100 acres in size.

Typically, the surface layer is brown silt loam about 3 inches thick. The subsurface layer to a depth of about 6 inches is yellowish brown silty clay loam. The subsoil to a depth of about 10 inches is strong brown very channery silty clay. The substratum extends to a depth of about 14 inches. It is yellowish brown extremely channery silty clay. Below this is hard, black shale.

This soil is slowly permeable. It has a very low available water capacity. The root zone is shallow, and root penetration may be restricted because of the high content of rock fragments. The content of organic matter in the surface layer is low. Runoff is rapid. The depth to hard bedrock is 8 to 20 inches.

Included with this soil in mapping are small areas of Trappist, Lenberg, and Carpenter soils. Also included are a few small areas of shale rock outcrop. Inclusions make up about 10 to 20 percent of this map unit.

Most areas of the Colyer soil are used as woodland. A few areas are used for pasture.

This soil generally is not suited to cultivated crops because of the slope and the depth to bedrock. It is poorly suited to hay and pasture because of the slope and the depth to bedrock.

This soil is suited to woodland. The common trees are Virginia pine, chestnut oak, and scarlet oak. Some trees preferred for planting are Virginia pine and shortleaf pine. The main management concerns are the hazard of erosion, the equipment limitation, and seedling mortality. Steep skid trails and roads are subject to gullying unless they are protected by water bars or plant cover, or both. The slope can limit the use of some equipment. Reforestation may require careful management to ensure the survival of seedlings. Table 7 provides specific information relating to the potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope, low strength, and the depth to bedrock. Some limitations can be overcome by proper engineering techniques.

This soil is in capability subclass VIIs.

CpD—Colyer-Trappist complex, 12 to 20 percent slopes. These shallow and moderately deep, well drained, moderately steep soils are on side slopes and narrow ridgetops in the uplands. The Colyer soil is on ridgetops and convex side slopes, and the Trappist soil is on the lower part of concave side slopes. The Colyer and Trappist soils occur as areas so closely intermingled that they could not be separated at the scale used in mapping. Individual areas range from about 5 to 200 acres in size. The Colyer and similar soils make up about 60 percent of the map unit, and the Trappist and similar soils make up about 35 percent.

Typically, the surface layer of the Colyer soil is brown silt loam about 3 inches thick. The subsurface layer to a depth of about 6 inches is yellowish brown silty clay loam. The subsoil to a depth of about 10 inches is strong brown very channery silty clay. The substratum extends to a depth of about 14 inches. It is yellowish brown extremely channery silty clay. Below this is hard, black shale.

The Colyer soil is slowly permeable. It has a very low available water capacity. The root zone is shallow, and root penetration may be restricted because of the high content of rock fragments. The content of organic matter in the surface layer is low. Runoff is rapid. The depth to hard bedrock is 8 to 20 inches.

Typically, the surface layer of the Trappist soil is dark yellowish brown silt loam about 6 inches thick. The subsoil to a depth of about 26 inches is yellowish brown and strong brown silty clay. The substratum extends to a depth of about 34 inches. It is variegated reddish brown, yellowish red, and gray extremely channery silty clay. Below this is hard, black shale.

The Trappist soil is slowly permeable. It has a moderate available water capacity. The root zone is moderately deep and is easily penetrated by roots. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to hard bedrock is 20 to 40 inches.

Included with these soils in mapping are small areas of Faywood, Carpenter, and Lenberg soils. Also included are small areas of shale rock outcrop and severely eroded areas of Colyer and Trappist soils that have a surface layer of channery silty clay loam. Inclusions make up about 5 percent of this map unit.

Most areas of the Colyer and Trappist soils are used for hay and pasture. A few small areas are used as woodland.

These soils generally are not suited to cultivated crops because of the slope and the depth to bedrock.

These soils are suited to most hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soils are too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

These soils are suited to woodland. The common trees are Virginia pine, chestnut oak, and scarlet oak. The species preferred for planting on the Colyer soil include Virginia pine and shortleaf pine. The species preferred for planting on the Trappist soil include Virginia pine and white oak. Seedling mortality is a management concern in areas of the Colyer soil. The hazard of erosion, the equipment limitation, and plant competition are management concerns in areas of both soils. Steep skid trails and roads are subject to gullying unless they are protected by water bars or plant cover, or both. The slope limits the use of some equipment. Reforestation may require careful management to ensure the survival of seedlings. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of these soils for woodland.

These soils are poorly suited to most urban uses because of the slope, the depth to bedrock, low strength, and a high content of clay. Some limitations can be overcome by proper engineering designs and techniques.

These soils are in capability subclass VIs.

CrB—Crider silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on slightly convex ridgetops in the uplands, mainly in the northern part of the county. Individual areas range from about 5 to 80 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil extends to a depth of more than 62 inches. It is brown silt loam in the upper part, strong brown silty clay loam in the next part, and yellowish red silty clay and clay in the lower part.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is moderate. Runoff is medium. The shrink-swell potential is moderate in the lower part of the subsoil. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Berea, Lowell, and Trappist soils. These soils make up about 5 to 10 percent of this map unit.

Most areas of the Crider soil are used for cultivated crops or hay. A few areas are used as pasture.

This soil is well suited to corn, soybeans, small grain, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are yellow-poplar, sugar maple, and black oak. Eastern white pine, yellow-poplar, and black walnut are some of the species preferred for planting. Plant competition is the main concern in timber management. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is well suited to most urban uses. The seepage and a high content of clay are limitations for some sanitary facilities. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

EkB—Elk silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on slightly convex stream terraces throughout the county. Individual areas range from about 3 to 20 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil extends to a depth of about 62 inches. It is yellowish brown silt loam and silty clay loam in the upper part and strong brown silty clay loam in the lower part.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is moderate. Runoff is medium. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Nolin, Lindside, and Newark soils. Also included are a few small areas of a soil that has a dark surface layer and a higher content of clay in the subsoil than the Elk soil. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Elk soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are yellow-poplar, red maple, black walnut, and pin oak. Some of the species preferred for planting are eastern white pine, white ash, black walnut, and white oak. Plant competition is a management concern. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is well suited to most urban uses. The seepage and a high content of clay are limitations for some sanitary facilities. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

FaF—Fairmount silty clay loam, very rocky, 30 to 60 percent slopes. This shallow, well drained, steep and very steep soil is on side slopes in the uplands, mainly in the northern part of the county. Limestone ledges and nearly vertical, short limestone bluffs make up about 2 to 10 percent of the map unit. Individual areas range from about 20 to 120 acres in size.

Typically, the surface layer is dark brown silty clay loam about 9 inches thick. The subsoil extends to a depth of about 20 inches. It is yellowish brown flaggy silty clay. Below this is limestone bedrock.

This soil is slowly or moderately slowly permeable. It has a low available water capacity. The root zone is shallow. The content of organic matter in the surface layer is moderate or high. Runoff is rapid. The shrink-swell potential is moderate. The depth to bedrock is 10 to 20 inches.

Included with this soil in mapping are small areas of Faywood, Lowell, and Colyer soils. Also included are small areas of soils that are similar to the Fairmount soil but have a light colored surface layer. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Fairmount soil are used as woodland. A few areas are used for hay and pasture.

This soil generally is not suited to cultivated crops because of the slope, the depth to bedrock, and rock outcrop. It is poorly suited to hay and pasture because of the slope and the depth to bedrock.

This soil is suited to woodland. The common trees are black oak, eastern redcedar, and black locust. Some of the species preferred for planting include Virginia pine, white oak, and white ash. Management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Steep skid trails and roads are subject to gullying unless they are protected by water bars or plant cover, or both. The slope limits the use of some equipment. Reforestation may require careful management to ensure the survival of seedlings. Table 7 provides specific information relating to the potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope, the depth to bedrock, a high content of clay, and the slow or moderately slow permeability. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass VIIe.

FdD2—Faywood silt loam, 12 to 20 percent slopes, eroded. This moderately deep, well drained, moderately steep soil is on side slopes in the uplands, mainly in the northern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Individual areas range from about 10 to 100 acres in size.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 32 inches. It is yellowish brown silty clay in the upper part and yellowish brown, mottled clay in the lower part. Below this is limestone bedrock.

This soil is moderately slowly or slowly permeable. It has a moderate available water capacity. The root zone is moderately deep. The content of organic matter in the surface layer is low or moderate. Runoff is rapid. The shrink-swell potential is moderate. Hard limestone bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of Lowell and Fairmount soils and areas of rock outcrop. Inclusions make up about 5 to 10 percent of this map unit.

Most areas of the Faywood soil are used for hay and pasture. A few areas are used for cultivated crops or woodland.

This soil is poorly suited to most cultivated crops because of the slope and the depth to bedrock. The hazard of erosion is very severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is suited to all hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is suited to woodland, but only a few areas are used for timber production. The common trees are northern red oak, white oak, and sugar maple. Some of the species preferred for planting are eastern white pine, white oak, and white ash. The hazard of erosion, the equipment limitation, and plant competition are management concerns. Steep skid trails and roads are subject to washing and gullying unless they are protected by water bars or plant cover. The slope restricts the use of some equipment. Reforestation may require careful management to ensure the survival of seedlings. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses. The slope, the depth to bedrock, and the moderately slow or slow permeability are limitations for most sanitary facilities. The depth to bedrock, the slope, and the shrink-swell potential are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IVe.

FfE2—Faywood-Fairmount-Rock outcrop complex, 20 to 30 percent slopes, eroded. This unit consists of moderately deep and shallow, well drained, steep Faywood and Fairmount soils and areas of Rock outcrop. It is on side slopes, mainly in the northern part of the county. The Faywood and Fairmount soils and the Rock outcrop occur as areas so closely intermingled that they could not be separated at the scale used in mapping. Erosion has removed about 25 to 75 percent of the original surface layer of the soils. Individual areas range from about 5 to 1,800 acres in size. The Faywood soil makes up about 45 percent of the map unit, the Fairmount soil makes up about 25 percent, and the Rock outcrop makes up about 25 percent.

Typically, the surface layer of the Faywood soil is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 32 inches. It is yellowish brown silty clay in the upper part and yellowish brown, mottled clay in the lower part. Below this is limestone bedrock.

The Faywood soil is moderately slowly or slowly permeable. It has a moderate available water capacity. The root zone is moderately deep. The content of organic matter in the surface layer is low or moderate. Runoff is rapid. The shrink-swell potential is moderate. Hard limestone bedrock is at a depth of 20 to 40 inches.

Typically, the surface layer of the Fairmount soil is dark brown silty clay loam about 9 inches thick. The subsoil extends to a depth of about 20 inches. It is yellowish brown flaggy silty clay. Below this is limestone bedrock.

The Fairmount soil is slowly or moderately slowly permeable. It has a low available water capacity. The root zone is shallow. The content of organic matter in the surface layer is moderate or high. Runoff is rapid. The shrink-swell potential is moderate. Hard limestone bedrock is at a depth of 10 to 20 inches.

The Rock outcrop occurs as short limestone ledges about 1.5 to 3.0 feet in width and varying in length. It is in randomly scattered areas throughout the map unit.

Included with this unit in mapping are a few intermingled areas of Lowell, Trappist, and Colyer soils. Included soils make up about 5 percent of this map unit.

Most areas of this map unit are used as woodland or pasture. The soils generally are not suited to cultivated crops and hay and are poorly suited to pasture. The slope, the Rock outcrop, and the depth to bedrock are the main limitations.

The Faywood and Fairmount soils are suited to woodland. The common trees are northern red oak, black oak, eastern redcedar, and white oak. Some of the species preferred for planting on the Faywood soil are eastern white pine, white oak, and white ash. Some of the species preferred for planting on the Fairmount soil are Virginia pine, white oak, and white ash. The hazard of erosion, the equipment limitation, and plant competition are management concerns in areas of the Faywood soil. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns in areas of the Fairmount soil. Steep skid trails and roads are subject to washing and gullying unless they are protected by water bars or plant cover, or both. The slope and the Rock outcrop limit the use of some equipment. Reforestation may require careful management to ensure the survival of seedlings and control undesirable plants. Table 7 provides specific information relating to potential productivity and management of these soils for woodland.

The Faywood and Fairmount soils generally are not suited to most urban uses because of the slope, the depth to bedrock, a high content of clay, the shrink-swell potential, low strength, and the Rock outcrop. Some limitations can be overcome by proper engineering designs and techniques.

The Faywood and Fairmount soils are in capability subclass VIe. The Rock outcrop is in capability subclass VIIs.

FkB—Frankstown silt loam, 2 to 6 percent slopes. This deep and very deep, well drained, gently sloping soil is on convex ridgetops in the uplands throughout the county. Individual areas range from about 5 to 30 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of about 41 inches. It is yellowish brown silty clay loam in the upper part and strong brown and brown gravelly silty clay loam in the lower part. Weathered soft siltstone and shale is below a depth of about 41 inches.

This soil is moderately permeable. It has a high available water capacity. The root zone is deep or very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to soft bedrock is 40 to more than 60 inches.

Included with this soil in mapping are small areas of Frederick, Pricetown, and Teddy soils. Also included are a few areas of Frankstown soils that are eroded and have a surface layer of silty clay loam or gravelly silty clay loam, areas of a soil that is similar to the Frankstown soil but has more sand in the subsoil and is underlain by sandstone bedrock, and areas of a soil that is similar to the Frankstown soil but has more clay in the lower part of the subsoil. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Frankstown soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, vegetable crops, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are yellow-poplar, northern red oak, and Virginia pine. Some of the species preferred for planting are eastern white pine, yellow-poplar, and shortleaf pine. Plant competition is a management concern. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The depth to bedrock is a limitation for most sanitary facilities. A high content of clay and the shrink-swell potential are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

FkC—Frankstown silt loam, 6 to 12 percent slopes. This deep and very deep, well drained, sloping soil is on side slopes and convex ridgetops in the uplands throughout the county. Individual areas range from about 10 to 100 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of about 41 inches. It is yellowish brown silty clay loam in the upper part and strong brown and brown gravelly silty clay loam in the lower part. Weathered soft siltstone and shale is below a depth of about 41 inches.

This soil is moderately permeable. It has a high available water capacity. The root zone is deep or very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to soft bedrock is 40 to more than 60 inches.

Included with this soil in mapping are small areas of Frederick, Pricetown, and Teddy soils. Also included are a few small areas of Frankstown soils that are eroded and have a surface layer of silty clay loam or gravelly silty clay loam; areas of a soil that is similar to the Frankstown soil but has more sand in the subsoil and is underlain by sandstone bedrock; and areas of a soil that is similar to the Frankstown soil but has more clay in the lower part of the subsoil. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Frankstown soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to corn, soybeans, small grain, vegetable crops, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants commonly grown in the county (fig. 11). Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are northern red oak, yellow-poplar, and Virginia pine. Some of the species preferred for planting are eastern white pine, yellow-poplar, and shortleaf pine. Plant competition is a management concern. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential

Figure 11.—Bales of wheat straw in an area of Frankstown silt loam, 6 to 12 percent slopes, and Pricetown silt loam, 2 to 6 percent slopes.

productivity and management of this soil for woodland.

This soil is suited to most urban uses. The depth to bedrock and the slope are limitations for most sanitary facilities. A high content of clay, the slope, and the shrink-swell potential are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIIe.

FkD—Frankstown silt loam, 12 to 20 percent slopes. This deep and very deep, well drained, moderately steep soil is on side slopes in the uplands throughout the county. Individual areas range from about 10 to 100 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of about 41 inches. It is yellowish brown silty clay loam in the upper part and strong brown and brown gravelly silty clay loam in the lower part. Weathered soft siltstone and shale is below a depth of about 41 inches.

This soil is moderately permeable. It has a high available water capacity. The root zone is deep or very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is moderate. Runoff is medium. The shrink-swell potential is low or moderate. The depth to soft bedrock is 40 to more than 60 inches.

Included with this soil in mapping are a few small areas of Garmon and Frederick soils. Also included are a few small areas of Frankstown soils that have more than 15 percent coarse fragments in the surface layer, small areas of Frankstown soils that are eroded and have a surface layer of silty clay loam or gravelly silt clay loam, and a few small areas of Frankstown soils that have slopes of more than 20 percent. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Frankstown soil are used for hay and pasture. A few areas are used for cultivated crops or woodland.

This soil is poorly suited to most cultivated crops because of the slope. The hazard of erosion is very severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland. The common trees are northern red oak, yellow-poplar, and Virginia pine. Some of the species preferred for planting are eastern white pine, yellow-poplar, and shortleaf pine. The hazard of erosion and plant competition are management concerns. Steep skid trails and roads are subject to washing and gullying unless they are protected by water bars or plant cover. The slope limits the use of some equipment. Proper site preparation, weed control, or other management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope, the depth to bedrock, low strength, and the shrink-swell potential. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IVe.

FrB—Frederick silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on convex ridgetops in the uplands, mainly in the southern half of the county. Individual areas range from about 3 to 30 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of more than 86 inches. It is silty clay. It is yellowish red in the upper part, yellowish red and mottled in the next part, and variegated red, gray, and reddish yellow in the lower part.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is more than 72 inches.

Included with this soil in mapping are a few small intermingled areas of Caneyville, Frankstown, and Pricetown soils. Also included are a few small areas of a soil that is similar to the Frederick soil but is about 40 to 60 inches deep to bedrock and areas of Frederick soils that have a surface layer of gravelly silt loam. Included soils made up about 5 to 10 percent of this map unit.

Most areas of the Frederick soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, vegetable crops, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are black oak, yellow-poplar, and white oak. Some of the species preferred for planting are eastern white pine, yellow-poplar, and white ash. Plant competition, seedling mortality, and the equipment limitation are management concerns. Proper site preparation, weed control, or other management may be needed to control undesirable plants. The content of clay can limit the use of some equipment. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The moderate permeability, seepage, and a high content of clay are limitations for some sanitary facilities. The high content of clay and the shrink-swell potential are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

FrC—Frederick silt loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on side slopes and convex ridgetops in the uplands, mainly in the southern half of the county. Individual areas range from about 5 to 75 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of more than 86 inches. It is silty clay. It is yellowish red in the upper part, yellowish red and mottled in the next part, and variegated red, gray, and reddish yellow in the lower part.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is more than 72 inches.

Included with this soil in mapping are small areas of Caneyville, Frankstown, and Pricetown soils. Also included are small areas of eroded Frederick soils that have a surface layer of silty clay loam, a few small areas of a soil that is similar to the Frederick soil but is about 40 to 60 inches deep to bedrock, and areas of Frederick soils that have a surface layer of gravelly silt loam. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Frederick soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to corn, soybeans, small grain, vegetable crops, and tobacco. The hazard of erosion is severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants commonly grown in the county (fig. 12). Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are black oak, yellow-poplar, and white oak. The species preferred for planting include eastern white pine, yellow-poplar, and white ash. The equipment limitation, seedling mortality, and plant competition are management concerns. The content of clay can limit the use of some equipment. Careful management may be needed to control undesirable plants and to ensure the survival of seedlings. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The moderate permeability, seepage, and the slope are limitations for some sanitary facilities. A high content of clay, the shrink-swell potential, and the slope are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome with proper engineering designs and techniques.

This soil is in capability subclass IIIe.

FrD—Frederick silt loam, 12 to 20 percent slopes. This very deep, well drained, moderately steep soil is on side slopes in the uplands, mainly in the southern half of the county. Individual areas range from about 5 to 75 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of more than 86 inches. It is silty clay. It is yellowish red in the upper part, yellowish red and mottled in the next part, and variegated red, gray, and reddish yellow in the lower part.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Frankstown and Caneyville soils. Also included are a few small areas of Frederick soils that have slopes of more than 20 percent, areas of Frederick soils that are eroded and have a surface layer of silty clay loam, and areas of Frederick soils that have a surface layer of gravelly silt loam. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Frederick soil are used for hay and pasture. A few areas are used for cultivated crops or woodland.

This soil is poorly suited to most cultivated crops because of the slope. The hazard of erosion is very severe if a conventional tillage system is used. A combination of cropping systems and erosion-control

Figure 12.—Pasture in an area of Frederick silt loam, 6 to 12 percent slopes.

measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used as woodland. The common trees are black oak, yellow-poplar, and white oak. The species preferred for planting include eastern white pine, yellow-poplar, and white ash.

The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns. Steep skid trails and roads are subject to washing and gullying unless they are protected by water bars or vegetation. The use of some equipment may be limited by the slope and a high content of clay in the soil. Careful management may be needed to control undesirable plants and to ensure the survival of seedlings. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope, the shrink-swell potential, and low strength. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IVe.

GaF—Garmon silt loam, 30 to 60 percent slopes. This moderately deep, well drained, very steep soil is on side slopes and narrow ridgetops in the uplands throughout the county. Individual areas range from about 50 to 1,000 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsoil to a depth of about 21 inches is yellowish brown channery silt loam. The substratum extends to a depth of about 28 inches. It is yellowish brown very channery silt loam. Below this is siltstone bedrock.

This soil is moderately rapidly permeable. It has a moderate available water capacity. The root zone is moderately deep. The content of organic matter in the surface layer is low or moderate. Runoff is rapid. The depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Frankstown, Carpenter, and Caneyville soils. Also included are small areas of soils that are less than 20 inches deep to bedrock and areas of rock outcrop. Inclusions make up 10 to 15 percent of this map unit.

Most areas of the Garmon soil are used as woodland. This soil generally is not suited to cultivated crops, hay, or pasture.

This soil is suited to woodland. The common trees are yellow-poplar, white oak, and sugar maple. The species preferred for planting on cool aspects include yellow-poplar, white oak, and eastern white pine, and those on warm aspects include Virginia pine, white oak, and eastern redcedar. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns. Steep skid trails and roads are subject to gullying unless they are protected by water bars or plant cover, or both. The slope can limit the use of some equipment. Reforestation may require careful management to control undesirable plants and to ensure the survival of seedlings. Table 7 provides specific information relating to the potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope and the depth to bedrock. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass VIIe.

Jo—Johnsburg silt loam. This deep and very deep, somewhat poorly drained, nearly level soil is in low areas in the uplands. It is mainly near Winsor in the southern part of the county and in Maxey Valley in the northeastern part. Slopes are 0 to 2 percent. Individual areas range from about 3 to 80 acres in size.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part of the subsoil is yellowish brown silt loam. The next part is brown, mottled silty clay loam. The lower part is a firm, compact fragipan of pale brown and light brownish gray, mottled silty clay loam.

This soil is moderately permeable above the fragipan and very slowly permeable in the fragipan. The available water capacity is moderate. The root zone is moderately deep because of the fragipan. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. The shrink-swell potential is moderate. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Pricetown, Teddy, and Trappist soils. Also included are a few areas of a somewhat poorly drained loamy soil that does not have a fragipan. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Johnsburg soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to cultivated crops that can withstand wetness. It is poorly suited to small grain because of the seasonal high water table during winter and spring. Tillage is often delayed because of the excessive wetness. The effectiveness of tile drainage systems may be reduced because of the slow permeability in the fragipan. Surface drainage systems may be more effective in reducing wetness. In some places, diversions help to control runoff and overwash from the adjacent soils. These systems help to lengthen the effective growing season, reduce the period of time that tillage is delayed, and increase the range of suitable plants. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture plants that can withstand wetness. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are sweetgum, black oak, and red maple. The species preferred for planting include yellow-poplar, sweetgum, and white oak. The equipment limitation and plant competition are management concerns. The use of some equipment may be limited by the wetness during winter and spring. Reforestation may require careful management to reduce competition from undesirable plants. Table 7 provides specific information relating to the potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the very slow permeability and the wetness. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIIw.

La—Lawrence silt loam, rarely flooded. This very deep, somewhat poorly drained, nearly level soil is on stream terraces throughout the county. Slopes are 0 to 2 percent. Individual areas range from about 3 to 100 acres in size.

Typically, the surface layer is yellowish brown silt loam about 9 inches thick. The subsoil extends to a depth of about 48 inches. The upper part of the subsoil is brown silt loam. The next part is a firm, compact fragipan of brown, mottled silt loam. The lower part is yellowish brown, mottled silty clay loam. The substratum to a depth of about 62 inches is brown, mottled silty clay loam.

This soil is moderately permeable above the fragipan and slowly permeable in the fragipan. The available water capacity is moderate. The root zone is moderately deep because of the fragipan. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is slow. The seasonal high water table is at a depth of 1 to 2 feet. The depth to bedrock is more than 60 inches. The soil is subject to rare flooding in late winter and spring.

Included with this soil in mapping are small areas of Elk, Newark, Melvin, and Robertsville soils. These soils make up about 5 to 10 percent of this map unit.

Most areas of the Lawrence soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to cultivated crops that can withstand wetness. It is poorly suited to small grain because of the seasonal high water table during winter and spring. Tillage is often delayed because of the excessive wetness. The effectiveness of tile drainage systems may be reduced because of the slow permeability in the fragipan. Surface drainage systems may be more effective in reducing wetness. In some places diversions help to control runoff and overwash from the adjacent soils. These drainage systems help to lengthen the effective growing season, reduce the length of time that tillage is delayed, and increase the range of suitable plants. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture plants that can withstand wetness. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are sweetgum, willow oak, and red maple. The species preferred for planting include yellow-poplar, green ash, and American sycamore. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of some equipment may be limited by the wetness during winter and spring. Reforestation may require careful management to reduce competition from undesirable plants and to ensure the survival of seedlings. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slow permeability, the wetness, the flooding, and low strength. Some limitations can be overcome by proper engineering techniques.

This soil is in capability subclass IIw.

LcE—Lenberg-Carpenter complex, 12 to 30 percent slopes. These very deep and moderately deep, well drained, moderately steep and steep soils are on toe slopes and foot slopes in the uplands throughout the county. The Lenberg soil is on the upper part of convex side slopes, and the Carpenter soil is on concave side slopes. The Lenberg and Carpenter soils occur as areas so closely intermingled that they could not be separated at the scale used in mapping. Individual areas range from about 100 to 1,000 acres in size. The Lenberg and similar soils make up about 50 percent of the map unit, and the Carpenter and similar soils make up about 35 percent.

Typically, the surface layer of the Lenberg soil is dark grayish brown silt loam about 2 inches thick. The subsurface layer to a depth of about 5 inches is brown silt loam. The subsoil extends to a depth of about 26 inches. It is strong brown silty clay loam in the upper part, strong brown silty clay in the next part, and yellowish brown, mottled silty clay in the lower part. The substratum extends to a depth of about 36 inches. It is yellowish brown, reddish yellow, and light brownish gray channery silty clay. Below this is soft shale bedrock.

The Lenberg soil is moderately slowly permeable. It has a moderate available water capacity. The root zone is moderately deep. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. The shrink-swell potential is moderate. Runoff is rapid. The depth to soft shale bedrock is 20 to 40 inches.

Typically, the surface layer of the Carpenter soil is dark grayish brown gravelly silt loam about 4 inches thick. The subsoil extends to a depth of about 42 inches. It is brown gravelly silt loam in the upper part and light yellowish brown gravelly silty clay loam in the lower part. The substratum extends to a depth of about 57 inches. It is light yellowish brown channery silty clay. Below this is soft, grayish green shale.

The Carpenter soil is moderately permeable in the subsoil and slowly permeable in the substratum. It has a high available water capacity. The root zone is deep or very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. The shrink-swell potential is moderate in the substratum. Runoff is medium. The depth to soft shale bedrock is 40 to 80 inches.

Included with these soils in mapping are small areas of Garmon and Trappist soils and small areas of rock outcrop. Also included are a few areas that have slopes of less than 12 percent. Inclusions make up about 15 percent of this map unit.

Most areas of the Lenberg and Carpenter soils are used for woodland, hay, or pasture. They generally are not suited to cultivated crops because of the slope and the depth to bedrock.

These soils are poorly suited to hay and pasture. Grasses and legumes that provide adequate forage and ground cover are needed. The slope limits the use of equipment for establishing and maintaining plants. Overgrazing or grazing when the soils are wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, rotation grazing, and weed control can help to maintain the stand of grasses and soil tilth.

These soils are suited to woodland. The common trees are Virginia pine, chestnut oak, and white oak. The species preferred for planting on the Lenberg soil include shortleaf pine, loblolly pine, and white oak. The hazard of erosion, the equipment limitation, and plant competition are management concerns in areas of the Lenberg soil. The species preferred for planting on cool aspects of the Carpenter soil include yellow-poplar, black walnut, and eastern white pine, and those on warm aspects include shortleaf pine and white oak. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are management concerns in areas of the Carpenter soil. Steep skid trails and roads are subject to rilling and gullying unless they are protected by water bars or plant cover, or both. The soils are subject to slumping when they are saturated, especially where road cuts are made. The slope can limit the use of wheeled and tracked equipment. Cable yarding generally is safer than other logging methods and causes less surface disturbance. Reforestation may require careful management to reduce competition from undesirable understory plants. Table 7 provides specific information relating to potential productivity and management of these soils for woodland.

These soils are poorly suited to most urban uses because of the slope, the depth to bedrock, the shrink-swell potential, a high content of clay, and low strength. Some limitations can be overcome by proper engineering designs and techniques.

These soils are in capability subclass VIe.

Ln—Lindside silt loam, occasionally flooded. This very deep, moderately well drained, nearly level soil is on flood plains throughout the county. Slopes are 0 to 2 percent. Individual areas range from about 3 to 50 acres in size.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil extends to a depth of about 48 inches. It is yellowish brown silt loam in the upper part and yellowish brown, mottled silt loam in the lower part. The substratum to a depth of about 62 inches is light yellowish brown silt loam.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is moderate. Runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.0 feet. The depth to bedrock is more than 60 inches. The soil is occasionally flooded for brief periods in winter and early spring.

Included with this soil in mapping are small areas of Newark and Nolin soils. Also included are a few areas of soils that are similar to the Lindside soil but have more sand or gravel in the profile and a few slightly higher areas of soils that are rarely flooded. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Lindside soil are used for cultivated crops or hay. A few areas are used for pasture or woodland.

This soil is well suited to corn, soybeans, and small grain. Because of the occasional flooding, tillage may be delayed during winter and early spring. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to hay and pasture plants that can withstand flooding for brief periods. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are northern red oak, yellow-poplar, and white oak. The species preferred for planting include eastern white pine, yellow-poplar, and black walnut. Seedling mortality and plant competition are management concerns. Reforestation may require careful management to ensure the survival of seedlings and to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the flooding, the wetness, and low strength. Some limitations can be overcome by proper engineering techniques.

This soil is in capability subclass IIw.

LoC—Lowell silt loam, 6 to 12 percent slopes. This deep and very deep, well drained, sloping soil is on side slopes and convex ridgetops in the uplands, mainly in the northern half of the county. Individual areas range from about 5 to 100 acres in size.

Typically, the surface layer is brown silt loam about 9 inches thick. The subsoil extends to a depth of about 38 inches. It is brown silty clay loam in the upper part, brown silty clay in the next part, and yellowish brown clay in the lower part. The substratum extends to a depth of about 80 inches. It is brown and gray, mottled clay.

This soil is moderately slowly permeable. It has a high available water capacity. The root zone is deep or very deep. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is 40 to 80 inches.

Included with this soil in mapping are small areas of Faywood and Crider soils. Also included are a few small areas of eroded Lowell soils that have a surface layer of silty clay loam. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Lowell soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to corn, soybeans, small grain, and tobacco. The hazard of erosion is severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are Virginia pine, black locust, and black oak. The species preferred for planting include eastern white pine, white ash, and white oak. Plant competition is a management concern. Management may be needed to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The moderately slow permeability, the depth to bedrock, the slope, and a high content of clay are limitations for most sanitary facilities. The high content of clay, the depth to bedrock, the slope, and the shrink-swell potential are limitations affecting building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIIe.

LoD—Lowell silt loam, 12 to 20 percent slopes. This deep and very deep, well drained, moderately steep soil is on side slopes in the uplands, mainly in the northern half of the county. Individual areas range from about 5 to 100 acres in size.

Typically, the surface layer is brown silt loam about 9 inches thick. The subsoil extends to a depth of about 38 inches. It is brown silty clay loam in the upper part, brown silty clay in the next part, and yellowish brown clay in the lower part. The substratum extends to a depth of about 80 inches. It is brown and gray, mottled clay.

This soil is moderately slowly permeable. It has a high available water capacity. The root zone is deep or very deep. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is 40 to 80 inches.

Included with this soil in mapping are small areas of Faywood and Fairmount soils. Also included are a few areas of Lowell soils that have slopes of more than 20 percent or that are severely eroded and have a surface layer of silty clay loam. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Lowell soil are used for hay and pasture. A few areas are used for cultivated crops or woodland.

This soil is poorly suited to most cultivated crops because of the slope. The hazard of erosion is very severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are Virginia pine, black locust, and black oak. The species preferred for planting include eastern white pine, white ash, and white oak. The hazard of erosion, the equipment limitation, and plant competition are management concerns. Steep skid trails and roads are subject to washing and gullying unless they are protected by water bars or vegetation. The use of some equipment may be limited by the slope and a high content of clay in the soil. Reforestation may require careful management to ensure the survival of seedlings. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the slope, the depth to bedrock, the moderate shrink-swell potential, and low strength. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IVe.

Me—Melvin silt loam, occasionally flooded. This very deep, poorly drained, nearly level soil is on flood plains throughout the county. Slopes are 0 to 2 percent. Individual areas range from about 3 to 200 acres in size.

Typically, the surface layer is grayish brown silt loam about 8 inches thick. The subsoil to a depth of about 22 inches is light brownish gray, mottled silt loam. The substratum to a depth of more than 68 inches is gray, mottled silt loam.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is slow. The seasonal high water table is within a depth of 1 foot. The depth to bedrock is more than 60 inches. The soil is occasionally flooded in late winter and spring.

Included with this soil in mapping are small areas of Newark, Nolin, Lawrence, and Robertsville soils. Also included in depressions in the uplands in the southern part of the county are a few areas of a soil that is similar to the Melvin soil. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Melvin soil are used for pasture or woodland. A few areas are used for cultivated crops or hay.

Where this soil has been drained, it is suited to cultivated crops. It is poorly suited to small grain because of the seasonal high water table and the flooding during late winter and spring. Because of the wetness, tillage is delayed in undrained areas. In some places diversions help to control runoff and overwash from the adjacent soils. In drained areas, tilth can be maintained by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture plants that can withstand wetness and flooding for brief periods. If drained, it is well suited to a wide range of pasture plants. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Pasture renovation can help to maintain the desired plants.

This soil is well suited to woodland. The common trees are pin oak, sweetgum, and red maple. The species preferred for planting include pin oak, willow oak, and sweetgum. The equipment limitation, seedling mortality, and plant competition are management concerns. The seasonal high water table restricts the use of equipment to periods when the soil is dry. Seedlings selected for planting should be those that can tolerate the seasonal wetness. If site preparation is not adequate, competition from undesirable plants can prevent or delay natural and artificial reestablishment of trees. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the flooding, low strength, and the wetness. Some limitations can be overcome by proper engineering techniques.

This soil is in capability subclass IIIw.

Ne—Newark silt loam, occasionally flooded. This very deep, somewhat poorly drained, nearly level soil is on flood plains throughout the county. Slopes are 0 to 2 percent. Individual areas range from about 3 to 100 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil to a depth of about 39 inches is mottled silt loam. It is dark yellowish brown in the upper part and grayish brown in the lower part. The substratum is grayish brown and brownish gray, mottled silt loam.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is slow. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet. The depth to bedrock is more than 60 inches. The soil is occasionally flooded for brief periods in late winter and spring.

Included with this soil in mapping are small areas of Melvin, Nolin, and Yosemite soils. These soils make up about 5 to 10 percent of this map unit.

This soil is used mainly for cultivated crops, hay, or pasture. A few areas are used as woodland.

Where this soil has been drained, it is suited to cultivated crops. Small grain crops are sometimes damaged by the flooding and the wetness during winter and spring. Because of the wetness, farming may be delayed in undrained areas. Tile drains and open ditches may improve internal drainage. In some places diversions help to control surface runoff and overwash from the adjacent soils. Artificial drainage systems help to lengthen the effective growing season, reduce the length of time that farming is delayed, and increase the range of suitable plants. Tilth and organic matter can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is suited to pasture and hay plants that can withstand wetness and flooding for short periods. If drained, it is suited to a wide range of pasture plants. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are pin oak, sweetgum, and green ash. The species preferred for planting include American sycamore, sweetgum, and green ash. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of some equipment may be limited by the wetness. Careful management may be needed to ensure the survival of seedlings and reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the flooding, the wetness, and low strength. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIw.

No—Nolin silt loam, occasionally flooded. This very deep, well drained, nearly level soil is on flood plains throughout the county. Slopes are 0 to 2 percent. Individual areas range from about 3 to 200 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of about 43 inches. It is brown silt loam in the upper part and brown silty clay loam in the lower part. The substratum to a depth of more than 65 inches is dark grayish brown gravelly silty clay loam.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is moderate. Runoff is slow. The seasonal high water table is at a depth of 3 to 6 feet. The depth to bedrock is more than 60 inches. The soil is occasionally flooded for brief periods in late winter and spring.

Included with this soil in mapping are small areas of Newark, Lindside, and Skidmore soils. Also included are soils that are similar to the Nolin soil but have a thick, dark brown surface layer and soils that have more sand in the subsoil and substratum than the Nolin soil. Included soils make up 5 to 10 percent of this map unit.

Most areas of the Nolin soil are used for cultivated crops or hay. A few areas are used for pasture or woodland.

This soil is well suited to corn, soybeans, tobacco, and small grain. Because of the flooding, tillage may be delayed during winter and early spring. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping system.

This soil is well suited to hay and pasture plants that can withstand flooding for brief periods. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are yellow-poplar, sweetgum, and American sycamore. The species preferred for planting include yellow-poplar, eastern white pine, and black walnut. Seedling mortality and plant competition are management concerns. The flooding can limit the use of equipment during winter and early spring. Proper site preparation and other management may be needed to ensure the survival of seedlings and to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the flooding, the wetness, and low strength. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIw.

PrB—Pricetown silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on convex ridgetops in the uplands throughout the county. Individual areas range from about 3 to 200 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of 70 inches or more. It is yellowish brown silt loam in the upper part; red, mottled silty clay loam in the next part; and red, mottled clay in the lower part.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate in the lower part of the subsoil. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Teddy, Frederick, and Frankstown soils. Also included are a few areas of a soil that is similar to the Pricetown soil but has 15 to 20 percent small pebbles in the upper part of the subsoil. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Pricetown soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, tobacco, and vegetable crops. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are yellow-poplar, white oak, and Virginia pine. The species preferred for planting include shortleaf pine, white ash, and white oak. Plant competition is a management concern. Reforestation may require careful management to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is well suited to most urban uses. The moderate permeability and a high content of clay are limitations for some sanitary facilities. The high content of clay and the shrink-swell potential are limitations affecting some building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

PrC—Pricetown silt loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on convex ridgetops and side slopes in the uplands throughout the county. Individual areas range from about 3 to 50 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of 70 inches or more. It is yellowish brown silt loam in the upper part; red, mottled silty clay loam in the next part; and red, mottled clay in the lower part.

This soil is moderately permeable. It has a high available water capacity. The root zone is very deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate in the lower part of the subsoil. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Teddy, Frankstown, and Frederick soils and small areas of Pricetown soils that have slopes of less than 6 percent. These soils make up about 5 to 10 percent of this map unit.

Most areas of the Pricetown soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to corn, soybeans, small grain, vegetable crops, and tobacco. The hazard of erosion is severe if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control soil loss. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are yellow-poplar, white oak, and Virginia pine. The species preferred for planting include shortleaf pine, white ash, and white oak. Plant competition is a management concern. Management may be needed to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The moderate permeability, the slope, and a high content of clay are limitations for most sanitary facilities. The high content of clay, the slope, and the shrink-swell potential are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIIe.

Rb—Robertsville silt loam, rarely flooded. This very deep, poorly drained soil is on nearly level, low terraces that are mainly along the Green River and its major tributaries. Slopes are 0 to 2 percent. Individual areas range from about 5 to 250 acres in size.

Typically, the surface layer is gray silt loam about 8 inches thick. The subsoil extends to a depth of about 48 inches. The upper part of the subsoil is gray, mottled silt loam. The next part is a firm, compact fragipan of gray, mottled silty clay loam. The lower part is gray, mottled silty clay loam. The substratum to a depth of more than 62 inches also is gray, mottled silty clay loam.

This soil is moderately permeable above the fragipan and slowly permeable in the fragipan. It has a moderate available water capacity. The root zone is shallow or moderately deep because of the fragipan. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is very slow. The seasonal high water table is within a depth of 1 foot. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Lawrence, Newark, and Melvin soils. These soils make up about 5 to 10 percent of this map unit.

Most areas of the Robertsville soil are used for pasture and hay. A few areas are used for cultivated crops or woodland.

Where this soil has been drained, it is suited to cultivated crops. It is poorly suited to small grain because of the seasonal high water table and the flooding during winter and spring. Because of the wetness, tillage is delayed in undrained areas. In drained areas, tilth can be maintained by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is suited to hay and pasture plants that can withstand wetness and flooding for brief periods. If drained, it is well suited to a wide range of hay and pasture plants. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is suited to woodland, but only a few areas are used for timber production. The common trees are sweetgum, pin oak, and red maple. The species preferred for planting include pin oak, sweetgum, and willow oak. Plant competition, the equipment limitation, and seedling mortality are management concerns. Careful management may be needed to reduce competition from undesirable plants and to ensure the survival of seedlings. The wetness and the flooding during winter and spring can limit the use of some equipment. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the flooding, the slow permeability, and the wetness. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IVw.

RoE—Rock outcrop-Caneyville complex, 6 to 35 percent slopes. This map unit consists of areas of Rock outcrop and moderately deep, well drained, sloping to steep Caneyville soil. It is on side slopes and hills in the uplands in the eastern part of the county. The Rock outcrop and the Caneyville soil are so closely intermingled that they could not be separated at the scale used in mapping. Individual areas range from about 5 to 40 acres in size. The Rock outcrop makes up about 55 percent of the map unit, and the Caneyville and similar soils make up about 25 percent.

Typically, the Rock outcrop occurs as short ledges and irregular boulders of limestone. It is in scattered areas throughout the map unit.

Typically, the surface layer of the Caneyville soil is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 30 inches. It is strong brown silty clay loam in the upper part and yellowish red and strong brown silty clay in the lower part. Below this is limestone bedrock.

The Caneyville soil is moderately slowly permeable. It has a moderate available water capacity. The root zone is moderately deep. The content of organic matter in the surface layer is moderate. Runoff is rapid. The shrink-swell potential is moderate. The depth to bedrock is 20 to 40 inches.

Included with this unit in mapping are small areas of Frederick soils and areas of soils near or surrounding the Rock outcrop that have a clayey subsoil and are shallow over bedrock. Included soils make up 15 to 20 percent of this map unit.

Most areas of this map unit are used as woodland. The unit generally is not suited to cultivated crops or hay because of the Rock outcrop and the slope.

The Caneyville soil is suited to pasture plants. However, the grasses and legumes selected for planting should be those that can provide an adequate amount of forage and ground cover and that do not require frequent renovation. The Rock outcrop limits forage production and the use of some equipment. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff.

The Caneyville soil is suited to woodland. The common trees are black oak, sugar maple, and eastern redcedar. Some of the species preferred for planting on cool aspects include white oak, yellow-poplar, eastern white pine, and white ash, and those on warm aspects include eastern redcedar, Virginia pine, and white oak. The hazard of erosion, the equipment limitation, and plant competition are management concerns on cool and warm aspects. Seedling mortality is an additional management concern on warm aspects. The slope and the Rock outcrop limit the use of wheeled and tracked equipment. Cable yarding generally is safer than other logging methods and causes less surface disturbance. Steep roads and skid trails are subject to rilling and gullying unless they are protected by water bars or plant cover, or both. Undesirable plants can hinder natural and artificial reforestation unless sites are intensively prepared and maintained. Reforestation may require careful management to ensure the survival of seedlings. Table 7 provides specific information relating to the potential productivity and management of this soil for woodland.

This map unit is poorly suited to most urban uses because of the Rock outcrop, the moderately slow permeability, the slope, the depth to bedrock, and a high content of clay. Some limitations can be overcome by proper engineering designs and techniques.

The Rock outcrop is in capability subclass VIIIs. The Caneyville soil is in capability subclass VIe.

Sk—Skidmore very gravelly loam, frequently flooded. This deep and very deep, well drained, nearly level soil is on flood plains throughout the county. Slopes are 0 to 2 percent. Individual areas range from about 3 to 100 acres in size.

Typically, the surface layer is brown very gravelly loam about 10 inches thick. The subsoil to a depth of about 36 inches is brown very gravelly loam. The substratum to a depth of about 60 inches is brown extremely gravelly loam.

This soil is moderately rapidly permeable. It has a low available water capacity. The root zone is deep or very deep; however, penetration may be restricted by the high content of rock fragments. This soil is somewhat difficult to till because of the content of gravel. The content of organic matter in the surface layer is low or moderate. Runoff is slow. The seasonal high water table is at a depth of 3 to 4 feet. The depth to bedrock is 40 to more than 100 inches. The soil is frequently flooded for brief periods during the winter and early spring.

Included with this soil in mapping are small areas of Yosemite, Nolin, and Carpenter soils. In a few included areas, the soils have less than 10 percent gravel in the surface layer. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Skidmore soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is suited to corn, soybeans, small grain, vegetable crops, and tobacco. The high content of rock fragments in the plow layer restricts tillage. Small grain and other winter crops may be damaged by flooding. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are commonly grown in the county. Some hay crops, however, may be damaged by flooding. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are sweetgum, yellow-poplar, and American sycamore. The species preferred for planting include yellow-poplar, white ash, and eastern white pine. Seedling mortality and plant competition are management concerns. Management may be needed to ensure the survival of seedlings and to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the flooding, the wetness, and the content of small stones. Some limitations can be overcome by proper engineering techniques.

This soil is in capability subclass IIw.

TeB—Teddy silt loam, 2 to 6 percent slopes. This very deep, moderately well drained, gently sloping soil is on ridgetops in the uplands throughout the county. Individual areas range from about 5 to 150 acres in size.

Typically, the surface layer is brown silt loam. The subsoil extends to a depth of about 89 inches or more. In sequence downward it is yellowish brown silt loam; a firm compact fragipan of yellowish brown, mottled silt loam and clay loam; red and reddish brown, mottled clay loam; and yellowish brown, mottled very gravelly clay loam.

This soil is moderately permeable above the fragipan and slowly permeable in the fragipan. The available water capacity is moderate. The root zone is moderately deep because of the fragipan. The soil can be easily tilled. Runoff is slow. The seasonal high water table is at a depth of 2 to 3 feet. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Elk, Johnsburg, and Pricetown soils. Also included are a few small areas of moderately well drained loamy soils that do not have definite fragipan characteristics and a few areas of soils that are similar to the Teddy soil and are on stream terraces. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Teddy soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, tobacco, vegetables, and fruit (fig. 13). Because of the wetness, tillage may be delayed in spring. In some places diversions help to control runoff and overwash from the adjacent hills. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control erosion. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to most hay and pasture plants that are commonly grown in the county. Alfalfa may be short lived on this soil because of the wetness. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are yellow-poplar, black oak, and sugar maple. The species preferred for planting include eastern white pine, shortleaf pine, and yellow-poplar. Plant competition is a management concern. Reforestation may require careful management to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The wetness and the slow permeability are limitations on sites for sanitary facilities. The wetness is a limitation affecting building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

TrB—Trappist silt loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on low convex ridgetops in the uplands, mainly in the northern part of the county and near Dunnville in the southwestern part of the county. Individual areas range from about 5 to 50 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 6 inches thick. The subsoil extends to a depth of about 26 inches. It is yellowish brown silty clay

Figure 13.—A young apple orchard in an area of Teddy silt loam, 2 to 6 percent slopes.

loam in the upper part and strong brown silty clay in the lower part. The substratum extends to a depth of about 34 inches. It is variegated reddish brown, yellowish red, and gray very channery silty clay. Below this is hard, black shale.

This soil is slowly permeable. It has a moderate available water capacity. The root zone is moderately deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are small areas of Berea and Colyer soils. Also included are a few small areas of soils that are similar to the Trappist soil but are more than 40 inches deep to bedrock. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Trappist soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control erosion. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is well suited to all hay and pasture plants that are grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are Virginia pine, white oak, and black oak. The species preferred for planting include white oak and Virginia pine. The equipment limitation and plant competition are management concerns. A high content of clay in the soil can limit the use of some equipment.

Management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The depth to bedrock, the slow permeability, and the high content of clay are limitations for most sanitary facilities. The depth to bedrock and the moderate shrink-swell potential are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIe.

TrC—Trappist silt loam, 6 to 12 percent slopes. This moderately deep, well drained, sloping soil is on low convex ridgetops in the uplands, mainly in the northern half of the county and near Dunnville in the southwestern part of the county. Individual areas range from about 5 to 50 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 6 inches thick. The subsoil extends to a depth of about 26 inches. It is yellowish brown silty clay loam in the upper part and strong brown silty clay in the lower part. The substratum extends to a depth of about 34 inches. It is variegated reddish brown, yellowish red, and gray very channery silty clay. Below this is hard, black shale.

This soil is slowly permeable. It has a moderate available water capacity. The root zone is moderately deep and is easily penetrated by roots. The soil can be easily tilled. The content of organic matter in the surface layer is low or moderate. Runoff is medium. The shrink-swell potential is moderate. The depth to bedrock is 20 to 40 inches.

Included with this soil in mapping are a few small areas of Berea and Colyer soils. Also included are small areas of soils that are similar to the Trappist soil but are more than 40 inches deep to bedrock and a few areas of eroded Trappist soils that have a surface layer of silty clay loam. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Trappist soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

This soil is well suited to corn, soybeans, small grain, vegetable crops, and tobacco. The hazard of erosion is moderate if a conventional tillage system is used. A combination of cropping systems and erosion-control measures is needed to slow runoff and control erosion. Contour farming, stripcropping, and conservation tillage help to control erosion, conserve soil moisture, and improve water quality. Tilth can be maintained or improved by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping sequence.

This soil is suited to all hay and pasture plants that are commonly grown in the county. Overgrazing or grazing when the soil is too wet causes compaction and excessive runoff. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth. Frequent pasture renovation helps to maintain the desired plants.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are Virginia pine, white oak, and black oak. The species preferred for planting include white oak and Virginia pine. The equipment limitation and plant competition are management concerns. The content of clay can limit use of some equipment. Management may be needed to control undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is suited to most urban uses. The depth to bedrock, a high content of clay, and the slope are limitations for most sanitary facilities. The depth to bedrock, the slope, and the moderate shrink-swell potential are limitations affecting most building site development. Low strength is a limitation on sites for local roads and streets. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIIe.

Yo—Yosemite gravelly silt loam, frequently flooded. This very deep, somewhat poorly drained, nearly level soil is on flood plains throughout the county. Slopes are 0 to 2 percent. Individual areas range from about 3 to 100 acres in size.

Typically, the surface layer is brown gravelly silt loam about 10 inches thick. The subsoil extends to a depth of about 31 inches. It is yellowish brown, mottled very gravelly loam in the upper part and light brownish gray, mottled extremely gravelly loam in the lower part. The substratum is light brownish gray, mottled extremely gravelly clay loam and sandy clay loam.

This soil is moderately rapidly permeable. It has a moderate available water capacity. The root zone is very deep. This soil is somewhat difficult to till because of the content of gravel. The content of organic matter in the surface layer is low or moderate. Runoff is slow. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet. The depth to bedrock is more than 60 inches. The soil is frequently flooded for brief periods during winter and spring.

Included with this soil in mapping are small areas of Carpenter, Melvin, Newark, Nolin, and Skidmore soils.

Also included are a few small areas that are poorly drained or moderately well drained.

Most areas of the Yosemite soil are used for cultivated crops, hay, or pasture. A few areas are used as woodland.

Where this soil has been drained, it is suited to cultivated crops. In undrained areas, it is suited to crops that can withstand wetness and flooding. Small grain crops are sometimes damaged by the flooding and the wetness during winter and spring. Because of the wetness, farming may be delayed in undrained areas. Tile drains and open ditches may improve internal drainage. In some places diversions can help to control surface runoff and overwash from the adjacent soils. Artificial drainage systems help to lengthen the effective growing season, reduce the length of time that farming is delayed, and increase the range of suitable plants. Tilth can be improved and organic matter maintained by returning crop residue to the soil, growing green manure crops and cover crops, applying a system of conservation tillage, and including grasses and legumes in the cropping system.

This soil is suited to pasture plants that can withstand wetness and flooding for short periods. If drained, it is suited to a wide range of pasture plants. Overgrazing or grazing when the soil is too wet causes compaction. Restricted use during wet periods, proper stocking rates, and rotation grazing help to maintain the stand of grasses and soil tilth.

This soil is well suited to woodland, but only a few areas are used for timber production. The common trees are sweetgum, pin oak, and yellow-poplar. The species preferred for planting include American sycamore, sweetgum, and green ash. The equipment limitation, seedling mortality, and plant competition are management concerns. The use of some equipment may be limited by the wetness. Management may be needed to ensure the survival of seedlings and to reduce competition from undesirable plants. Table 7 provides specific information relating to potential productivity and management of this soil for woodland.

This soil is poorly suited to most urban uses because of the flooding and the wetness. Some limitations can be overcome by proper engineering designs and techniques.

This soil is in capability subclass IIw.

Prime Farmland

In this section, prime farmland is defined and the soils in Casey County that are considered prime farmland are listed.

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. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

About 19 percent of Casey County, or about 55,100 acres, is prime farmland or has the potential to be prime farmland. These areas are scattered throughout the county, but most are in general soil map units 1 and 4.

The following map units are considered prime farmland in Casey County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a seasonal high water table qualify as prime farmland only in areas where this limitation has been overcome by drainage measures. The need for these measures is shown in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine whether of not this limitation has been overcome by corrective measures.

The soils identified as prime farmland in Casey County are:

BeB	Berea silt loam, 2 to 6 percent slopes
CgB	Carpenter gravelly silt loam, 2 to 6 percent slopes
CrB	Crider silt loam, 2 to 6 percent slopes
EkB	Elk silt loam, 2 to 6 percent slopes
FkB	Frankstown silt loam, 2 to 6 percent slopes
FrB	Frederick silt loam, 2 to 6 percent slopes
Jo	Johnsburg silt loam (where drained)
La	Lawrence silt loam, rarely flooded (where drained)
Ln	Lindside silt loam, occasionally flooded
Me	Melvin silt loam, occasionally flooded (where drained)
Ne	Newark silt loam, occasionally flooded (where drained)

No	Nolin silt loam, occasionally flooded
PrB	Pricetown silt loam, 2 to 6 percent slopes
Rb	Robertsville silt loam, rarely flooded (where drained)
TeB	Teddy silt loam, 2 to 6 percent slopes
TrB	Trappist silt loam, 2 to 6 percent slopes

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 for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as 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 that is in harmony with nature *(35)*.

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 crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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 Soil Conservation Service or the Cooperative Extension Service.

In 1987, about 114,063 acres in Casey County was used for crops or pasture *(49)*. Of this total, about 45,221 acres was used for pastured cropland, 43,295 acres for harvested cropland, 14,187 acres for permanent pasture, and the rest for other cropland. While the total acreage of farms has remained about the same since 1982, an increase in harvested cropland and a slight decrease in permanent pasture have occurred.

The soils in the county have good potential for increased production of crops. In 1982, about 39,900 acres of potentially good cropland in land capability class II and subclass IIIe was used for pasture and about 21,000 acres was forest *(46)*. In addition to using the reserve production capacity represented by this land, crop production could also be increased by applying the latest production techniques to all cropland in the county.

In 1982, about 6,100 acres of the county was urban or built-up land *(46)*. Converting cropland and pasture to urban and built-up land is currently not a major trend, but this could change in future years.

Soil erosion is a major concern on most of the cropland and pasture in the county. If a soil has slope of more than 2 percent, erosion is a hazard. Most of the row crops, such as corn, tobacco, and soybeans, are grown on the gently sloping to strongly sloping ridgetops. Hay and pasture plants are grown primarily on the strongly sloping ridgetops and moderately steep side slopes. All of the soils in these areas have slopes of more than 2 percent. Some of the row crops are grown on the nearly level flood plains and stream terraces, where erosion is not a problem.

Erosion of the surface layer is damaging. Productivity is reduced as organic matter and nutrients are lost and as part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging to soils that have a clayey subsoil, such as Frederick and Lowell soils. Erosion also further limits the depth of the root zone in soils that have a limiting layer in the subsoil or are moderately deep over bedrock. Lawrence and Teddy soils have a fragipan, and Caneyville, Faywood, and Trappist soils are moderately deep over bedrock. Erosion control minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreational use, and for use by livestock, fish, and wildlife.

Erosion-control practices reduce runoff and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods generally can keep soil erosion losses to amounts that will not reduce the productive capacity of the soil. On farms used for pasture and hay, including legumes and grasses in the cropping system helps to control erosion on sloping land. It also provides nitrogen and improves tilth.

Most erosion-control measures in Casey County are conservation tillage, crop rotations, cover crops, or crop residue management. Other measures, such as terraces and diversions, are used in some areas.

Applying a system of conservation tillage and leaving crop residue on the surface increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most of the soils in the county. The acreage of no-till corn and double-cropped soybeans is increasing annually. No tillage and double-cropping are effective in controlling erosion on sloping land and also can be adapted to most soils in the county.

Farming on the contour and contour stripcropping also help to control erosion. They are best suited to soils that have smooth, uniform slopes, including most areas of Frankstown, Frederick, Pricetown, and Teddy soils.

Information on the design and application of erosion-control measures for the soils in the county is available at the local office of the Soil Conservation Service.

The content of organic matter needs to be maintained to achieve optimum crop production. Organic matter is an important source of nitrogen for crops. It also increases the rate of water infiltration, reduces surface crusting, improves tilth, and provides a suitable environment for micro- and macro-organisms. The content of organic matter can be maintained by controlling erosion, adding barnyard manure, managing crop residue, planting green manure crops and cover crops, and including grasses and legumes in the cropping system. Most of the soils in the county are low or moderate in content of organic matter.

Soil drainage is a management concern on about 13 percent of the acreage used for crops and pasture *(46)*. Some soils, such as Melvin and Robertsville soils, are so wet that the production of crops commonly grown in the county is difficult unless they are artificially drained. The somewhat poorly drained soils, such as Newark and Yosemite soils, are so wet that planting is delayed and yields are reduced in most years unless they are drained. On the moderately well drained Teddy and Lindside soils, artificial drainage generally is not needed. Crops that tolerate occasional wetness should be selected.

The design of both surface and subsurface drainage systems varies according to the kind of soil. Johnsburg, Lawrence, and Robertsville soils have a fragipan that reduces the effectiveness of tile drainage systems. An open ditch drainage system or a combination of open ditch and tile drainage systems may be effective on these soils. The lack of adequate outlets for drainage systems is a management concern on Johnsburg soils. Tile drainage systems have been used successfully on Melvin, Newark, and Yosemite soils.

Most of the soils on uplands in the county have naturally low or medium soil fertility and are naturally acid. The soils on flood plains, such as Melvin, Nolin, and Skidmore soils, are richer in plant nutrients than most of the soils on uplands and range in reaction from medium acid to mildly alkaline. Many of the upland soils are naturally very strongly acid. If they have never been limed, applications of ground limestone are needed to raise the pH level sufficiently for good growth of alfalfa and other crops that grow best on nearly neutral soils.

The amount of available phosphorus and potash is naturally low in most of the soils on uplands, except for Lowell soils, which may have a medium level of phosphorus. Additions of lime and fertilizer on any soil should be based on the results of soil tests, on the needs of the crop, and on the desired level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime needed.

Soil tilth is an important factor affecting germination and the infiltration of water into the soil. Soils that have good tilth have granular structure and are porous.

Some soils that are used for crops have a surface layer that is light in color and moderate or low in content of organic matter. Generally, the structure of such soils is weak and intense rainfall causes the formation of a crust on the surface. The crust is hard when dry and nearly impervious to water. Once the crust has formed, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can improve soil structure and reduce crust formation.

Fall plowing is generally not a good practice on soils that have a surface layer of light colored silt loam because a crust forms during the winter and spring. If plowed in the fall, the surface of these soils is nearly as dense and hard at planting time as it was before fall plowing. In addition, about 65 percent of the cropland in the county consists of sloping soils *(46)*, which are subject to damaging erosion if they are plowed in the fall.

A gravelly surface layer reduces the tilth of some soils in the county. The content and size of gravel may hamper the use of some tillage implements. Yosemite and Skidmore soils have a gravelly or very gravelly surface layer.

Field crops that are suited to the soils and climate of the county include many that are not now commonly grown. Corn, burley tobacco, and soybeans are the predominant row crops. Grain sorghum, sunflowers, potatoes, and other similar crops can be grown if economic conditions are favorable.

Wheat is the most common close-growing crop. Rye, barley, and oats are grown mainly for cover crops but could be grown for grain. Canola and other small grain could also be grown, and grass seed could be produced from fescue, orchardgrass, and bluegrass.

Special crops that are grown in the county are vegetables, small fruits, tree fruits, and ginseng. A small acreage is used for melons, peppers, strawberries, sweet corn, tomatoes, and other vegetables and small fruits. Also, large areas can be adapted to other special crops, such as blueberries, grapes, nursery crops, and many vegetables. Casey County is known for its apple orchards. In 1987, over 2,500,000 pounds of apples were harvested *(49)*.

Deep and very deep soils that have good natural drainage and that warm up early in the spring are especially well suited to many vegetables and small fruits. In Casey County, these soils include Crider, Elk, Frankstown, Frederick, and Pricetown soils that have slopes of less than 6 percent. They make up about 20,000 acres. Crops can generally be planted and harvested earlier on these soils than on other soils in the county.

Most of the well drained soils in the county are suitable for orchards and nursery plants. Soils in low landscape positions, where frost is frequent and air drainage is poor, generally are poorly suited to early vegetables, small fruits, and orchards.

The latest information about growing special crops can be obtained from the local offices of the Soil Conservation Service and the Kentucky Cooperative Extension Service.

Pasture and Hayland

A successful livestock program is dependent on the production of large quantities of adequate quality forage. Such a program can furnish as much as 78 percent of the feed for beef cattle and 66 percent for dairy cattle *(18)*.

In Casey County, livestock production is an important part of the farm economy. In 1988, it provided about 62 percent of the total farm income *(24)*. Most farms produce some livestock.

About 82,800 acres of the county is used as pasture, including pastured woodland *(49)*. A sizable acreage needs improvement practices, such as brush control and protection from overgrazing.

The soils vary widely in their capabilities because of differences in depth to bedrock or limiting layers, internal drainage, ability to supply moisture, and many other properties. Grasses and legumes and grass-legume combinations vary widely in their ability to persist and produce on different soils. The forage species or mixture of species selected for planting should be those that are suited to the different kinds of soil in order to achieve the highest yields.

The level to gently sloping, deep and very deep, well drained soils are best suited to the highest producing crops, such as corn silage, alfalfa, a mixture of alfalfa and orchardgrass, or a mixture of alfalfa and timothy. On the steeper soils, sod-forming grasses, such as tall fescue or orchardgrass, should be maintained to minimize soil erosion. Alfalfa should be grown with a cool-season grass where the soils are at least 2 feet deep and are well drained. On soils that are less than 2 feet deep or that are not well drained, a mixture of clover and grass or a pure stand of grass may be more suitable than alfalfa. Legumes can be established through renovation in sods that are dominantly grass.

The forage species selected for planting should be those that are suited not only to the soil but also to the intended use. They should be those that provide maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than grasses and should be grown to the maximum possible extent. The taller legumes, such as alfalfa and red clover, are more versatile than legumes that are used mainly for grazing, such as white clover. Orchardgrass, timothy, and tall fescue are better suited to use as hay and silage.

Tall fescue is an important cool-season grass suited to a wide range of soil conditions. It is grown for both pasture and hay. The growth that occurs from August through November is commonly permitted to accumulate in the field and is stockpiled for deferred grazing in late fall and winter. Applications of nitrogen fertilizer are important for maximum production during the stockpiling period. The rates of application should be based on the desired level of production.

Warm-season grasses planted during the period from early April to late May can help to alleviate the "summer slump" of cool-season grasses, such as tall fescue or Kentucky bluegrass. They grow well in warm weather. Their greatest period of growth occurs from mid June to September, which is the period when the growth of cool-season grasses slows. Warm-season grasses include switchgrass, big bluestem, indiangrass, and Caucasian bluestem.

Renovation can increase the yields in areas of pasture and hay that have a good stand of grass. It involves partial destruction of the sod, applications of lime and fertilizer, and seeding of the desirable forage species *(19)*. Adding legumes to these grass stands provides high quality feed and increases production in summer. Legumes also add nitrogen to the soil.

Additional information on managing pasture and hayland can be obtained from the local office of the Soil Conservation Service or the Kentucky Cooperative Extension Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. 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.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil 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 use as cropland. 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 woodland and for 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 *(42)*.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they 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 a 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.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The acreage of soils in each capability class and subclass is shown in table 6. 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

Charles A. Foster, forester, Soil Conservation Service, helped prepare this section.

Casey County is in the Western Mesophytic Forest region of Kentucky, an area in which white oak, red oak, and hickories are dominant. Commercial forest land covers about 150,300 acres, or 54 percent of the land area *(26).* The dominant forest types include oak-hickory on about 45 percent of the forest land, central mixed hardwoods on 36 percent, redcedar-hardwoods on 6 percent, and elm-ash-cottonwood on 5 percent. The remaining 8 percent includes southern pine, oak-pine, and maple-beech forest types (fig. 14).

Woodland tracts in the county are generally small private holdings of about 24 acres and are essentially unmanaged. The average forest stand currently produces only 33 cubic feet of wood per acre per year. Most of the forest land is capable of producing 50 cubic feet or more of wood per acre per year.

About 30 percent of the landowners own forest land as part of the farm or tract. The stands are not well stocked with desirable, high-quality trees, and many tracts are owned for short intervals, commonly less than 20 years.

Tree growth, stocking, and quality can be improved by removing low-quality trees in fully stocked and understocked stands of all sizes and by regenerating sawtimber stands after harvest. Soil surveys are useful for identifying the most productive forest lands, for identifying soil limitations for management, and in selecting the most suitable tree species.

The wood industry in Casey County consists primarily of commercial sawmills, log and bolt mills, and pallet mills. Products include rough lumber, pallet parts, crossties, dimension stock, wood chips, and handle blanks. Treated posts are produced by one local plant. Sawdust and chips are sold to a charcoal plant in a neighboring county. Several mills in adjacent counties buy logs and standing trees from Casey County.

The local office of the Soil Conservation Service or the Kentucky Division of Forestry can provide specific information about the management and productivity of soils for wood crops.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked

Figure 14.—A plantation of pine in an area of Carpenter gravelly silt loam, 6 to 12 percent slopes.

equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil 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, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants hinders adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The productivity of the soils in this survey is based on published data *(4, 7, 8, 10, 11, 12, 13, 15, 17, 32, 33, 34, 38, 45)*.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

Many outdoor recreational activities are available in Casey County. Hunting and fishing are very popular. The abundance of crop fields, pastures, and wooded areas provides habitat for a variety of game. In the northern part of the county, hilly, wooded areas provide good habitat for deer, squirrel, and wild turkey. Some landowners lease out hunting rights in these areas. Areas in the rest of the county provide good habitat for quail, mourning dove, rabbit, and deer.

The abundance of farm ponds, streams, and rivers provides a variety of opportunities for fishing and swimming. Goose Creek in the southern part of the county is stocked with trout. The Green River is navigable by canoe in the spring.

Other outdoor activities include camping, hiking, golfing, and picnicking. Gateway Park, located in Liberty, has ball diamonds, tennis courts, and a basketball court.

In table 8, the soils of the survey area are rated according to the 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 8, 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 by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

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 gentle 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, 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

Gregory K. Johnson, resource specialist, Soil Conservation Service, helped prepare this section.

The principal kinds of wildlife in Casey County are cottontail rabbit, gray squirrel, fox squirrel, raccoon, opossum, skunk, red fox, gray fox, white-tailed deer, turkey, bobwhite quail, and mourning dove. Many species of nongame birds and mammals also inhabit the county. The county has approximately 33 species of mammals, 89 species of breeding birds, and 34 species of reptiles and amphibians. More than 200 other species of birds migrate through Kentucky each year. Many of these birds are in the county during certain seasons. Although the types of habitat required by wildlife vary, deer and squirrels generally use woodland habitat; rabbits, quail, doves, and woodcock use openland habitat; and ducks and geese use wetland habitat.

Photographers, birdwatchers, and others are especially interested in the flora and fauna of the county. The varied physiography and geology of the county allows for diverse communities of plants. The streams of the county contain a variety of warm-water game fish, panfish, and rough fish that are commonly found throughout the state. Species include largemouth bass and bluegill.

Successful management of wildlife on any tract of land requires that food, cover, and water be available in a suitable combination. The lack of any one of these necessities, an unfavorable balance between them, or an inadequate distribution of them can severely limit or eliminate the population of a desired species. Information on soils is a valuable tool in establishing, providing, or maintaining suitable wildlife habitat.

The local office of the Soil Conservation Service can provide specific information about the management and productivity of soils for wildlife.

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 *(3)*.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife *(50)*. 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.

The elements of wildlife habitat are described in the following paragraphs.

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, orchardgrass, bluegrass, 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, aster, and amaranth.

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 Virginia pine, white pine, and redcedar.

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, cattail, 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.

The habitat for various kinds of wildlife is described in the following paragraphs.

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, 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, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

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. The 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 kind 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 10 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 the year that excavations can be made is affected by the depth to a seasonal high water table and the 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. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, 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, depth to 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, depth to a high water table, depth to bedrock or to a cemented pan, the 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 11 shows the degree and the 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 11 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 that 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, depth to 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. There must be unsaturated soil material 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 11 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, depth to 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 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a 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 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 12 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 12, 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 releases a variety of plant nutrients as it decomposes.

Water Management

Table 13 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 and for embankments, dikes, and levees. 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 the restrictive features that affect each soil for drainage, 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 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.

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, or 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, a severe hazard of wind 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 or 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. These results are reported in table 19.

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 *(21, 22, 23, 43)*. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

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 14 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 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. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

Rock fragments 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.

Physical and Chemical Properties

Table 15 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, or component, 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 the 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 ⅓-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 movement of water through the soil 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 *(40)*.

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 in each major soil layer is stated in inches of water per inch of soil. 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; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

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. Losses are expressed in tons per acre per year. These 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 0.69. 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 over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, 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 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils 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 permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding 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 is 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 the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

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.

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. "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 specified as 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.

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 corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than 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 the amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 17 and the results of chemical analysis are given in table 18. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Kentucky Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(47).*

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all material less than 75 mm (3B1).
Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Organic carbon—wet combustion. Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c).
Extractable cations—ammonium acetate pH 7.0, atomic absorption; calcium (6Ne), magnesium (6Od), sodium (6Pb), potassium (6Qb).
Extractable acidity—barium chloride-triethanolamine IV (6H5a).
Cation-exchange capacity—ammonium acetate, pH 7.0, steam distillation (5A8b).
Cation-exchange capacity—sum of cations (5A3a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1f).
Available phosphorus—(656, Kentucky Agricultural Experiment Station).
Field sampling—site selection (1A1).
Field sampling—soil sampling (1A2).
Laboratory preparation—standard (air-dry) material (1B1).
Particles—(specified size) 2 mm (2A2).
Particles—less than 2 mm (2A1).
Data sheet symbols—(2B).
Particles—greater than 2 mm by field or laboratory weighing (3B1a).
Extractable bases—(5B1a).
Calcium carbonate equivalent—procedure (23b) USDA Handbook 60, USDA salinity laboratory 1954 (6N7).

Engineering Index Test Data

Table 19 shows laboratory test data for three pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the Soil Mechanics Laboratory, Fort Worth, Texas.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); Moisture density—T 99 (AASHTO), D 698 (ASTM); and Specific gravity—T 100 (AASHTO), D 854 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(44)*. 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 on laboratory measurements. Table 20 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 Entisol.

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 Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; 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 Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic 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 known kind of soil. 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 Fluvaquents.

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 class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, 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" *(41)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(44)*. Unless otherwise stated, 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."

Berea Series

The Berea series consists of moderately deep, moderately well drained, moderately slowly permeable soils. These soils formed in silty material over black shale residuum. They are mainly on ridgetops in the uplands. Slopes range from 2 to 6 percent. The soils are fine-silty, mixed, mesic Aquic Hapludults.

Berea soils are associated on the landscape with Crider, Lowell, and Trappist soils. Crider and Lowell soils are on the lower ridgetops and side slopes. They are well drained and have bedrock at a depth of more than 40 inches. Lowell soils are in a fine textured family. Trappist soils are on ridgetops adjacent to the Berea soils. They are well drained and are in a clayey family.

Typical pedon of Berea silt loam, 2 to 6 percent slopes; about 2.0 miles east of Ellisburg, 1.4 miles south of the junction of Kentucky Highways 78 and 906, about 250 feet east of Kentucky Highway 906, about 50 feet north of a private road, in a pasture; in the Ellisburg Quadrangle, about 2,250,500 feet east and 407,500 feet north by the Kentucky coordinate system:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

BA—8 to 14 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; very strongly acid; clear smooth boundary.

Bt1—14 to 22 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds and in pores; about 5 percent shale fragments less than 1 inch in diameter; very strongly acid; clear smooth boundary.

Bt2—22 to 36 inches; light yellowish brown (10YR 6/4) silty clay loam; common fine and medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds and in pores; few small black soft concretions; extremely acid; clear smooth boundary.

2C—36 to 39 inches; brown (10YR 5/3) very channery silty clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; massive; about 35 percent shale fragments; extremely acid; abrupt smooth boundary.

2R—39 inches; hard, black shale.

The thickness of the solum and the depth to hard shale bedrock range from 20 to 40 inches. Reaction ranges from extremely acid to strongly acid unless the soil is limed. The content of rock fragments ranges from 0 to 15 percent in the solum and from 15 to 60 percent in the 2C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The BA horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6. It is silt loam or silty clay loam.

The Bt horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. It has mottles in shades of gray, brown, or yellow in the lower part. It is silt loam or silty clay loam.

The 2C horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. It has mottles in shades of gray, brown, olive, or red. The fine-earth fraction is silty clay loam or silty clay.

Caneyville Series

The Caneyville series consists of moderately deep, well drained, moderately slowly permeable soils. These soils are on side slopes, knolls, and ridgetops in the uplands. They formed in clayey material weathered from limestone. Slopes range from 6 to 30 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Caneyville soils are associated on the landscape with Frankstown, Frederick, and Garmon soils. Frankstown and Frederick soils are on ridgetops below the Caneyville soils and have bedrock at a depth of more than 40 inches. Garmon soils are on side slopes below the Caneyville soils and do not have an argillic horizon. Frankstown and Garmon soils are in a fine-loamy family.

Typical pedon of Caneyville silt loam, very rocky, 6 to 20 percent slopes; about 0.25 mile northeast of Mt. Olive on Kentucky Highway 837, on Salyer Knob, 250 yards northeast of a farmhouse and barn; in the Yosemite Quadrangle, about 2,287,600 feet east and 346,600 feet north by the Kentucky coordinate system:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; few fine roots; neutral; clear smooth boundary.

BA—7 to 13 inches; strong brown (7.5YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; few fine roots; medium acid; clear smooth boundary.

Bt1—13 to 25 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; few medium roots; few small black soft concretions; common faint clay films on faces of peds; medium acid; gradual smooth boundary.

Bt2—25 to 30 inches; strong brown (7.5YR 5/6) silty clay; moderate medium subangular and angular blocky structure; very firm; few medium roots; few small black soft concretions; common distinct clay films on faces of peds; neutral; abrupt smooth boundary.

R—30 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from very strongly acid to neutral in the upper part of the solum and from medium acid to mildly alkaline in the lower part. The content of limestone or chert fragments ranges from 0 to 10 percent in the solum.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon. This horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4. The BA horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 6.

The Bt horizon has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam, silty clay, or clay. In some pedons it has mottles in shades of red, brown, or gray in the lower part. Some pedons have a C horizon. This horizon has colors similar to those of the Bt horizon. It is silty clay or clay and may be channery.

Carpenter Series

The Carpenter series consists of deep and very deep, well drained, moderately permeable soils. These soils formed in loamy colluvium over slowly permeable residuum of shale or siltstone. They are on the lower side slopes, on foot slopes, and on narrow, low ridgetops in the uplands. Slopes range from 2 to 30 percent. The soils are fine-loamy, mixed, mesic Ultic Hapludalfs.

Carpenter soils are associated on the landscape with Colyer, Garmon, and Lenberg soils. Colyer soils are on the lower side slopes, have hard shale bedrock at a depth of 8 to 20 inches, and are in a clayey-skeletal family. Garmon soils are on side slopes and narrow ridgetops above the Carpenter soils and are underlain by hard bedrock at a depth of 20 to 40 inches. Lenberg soils are underlain by soft shale bedrock at a depth of 20 to 40 inches and are in a fine textured family.

Typical pedon of Carpenter gravelly silt loam, in an area of Lenberg-Carpenter complex, 12 to 30 percent slopes; 1.2 miles south of Kidds Store, 0.4 mile east of U.S. Highway 127, about 500 feet southeast of a gravel road; in the Hustonville Quadrangle, about 2,259,500 feet east and 388,800 feet north by the Kentucky coordinate system:

A—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly silt loam; weak fine granular structure; friable; common fine roots; about 15 percent shale and limestone fragments less than 1 inch in diameter; slightly acid; clear smooth boundary.

BA—4 to 9 inches; brown (10YR 5/3) gravelly silt loam; moderate medium subangular blocky structure; friable; common fine roots; about 15 percent shale and limestone fragments less than 1 inch in diameter; very strongly acid; clear smooth boundary.

Bt1—9 to 28 inches; light yellowish brown (10YR 6/4) gravelly silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; about 15 percent shale and limestone fragments less than 2 inches in diameter; few small brown soft concretions; very strongly acid; gradual smooth boundary.

Bt2—28 to 42 inches; light yellowish brown (10YR 6/4) gravelly silty clay loam; moderate medium subangular blocky structure; firm; few medium roots; common faint clay films on faces of peds; about 15 percent shale and limestone fragments less than 2 inches in diameter; few small brown soft concretions; very strongly acid; clear smooth boundary.

2C—42 to 57 inches; light yellowish brown (10YR 6/4) channery silty clay; massive; very firm; about 30 percent small shale fragments; very strongly acid; clear smooth boundary.

2Cr—57 to 65 inches; soft, grayish green shale.

The thickness of the solum ranges from 40 to 60 inches. The depth to soft bedrock ranges from 40 to 80 inches or more. Reaction ranges from very strongly acid to slightly acid in the solum and from very strongly acid to medium acid in the substratum. The content of rock fragments ranges from 15 to 20 percent in the A horizon, from 10 to 30 percent in the B horizon, and from 10 to 35 percent in the 2C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. Some pedons have an Ap horizon. This horizon is 4 to 8 inches thick and has colors and textures similar to those of the A horizon.

The BA horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. The fine-earth fraction is silt loam or loam.

The Bt horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 3 to 8. In some pedons it has few to many red, brown, or gray mottles in the lower part. The fine-earth fraction is silty clay loam or clay loam.

The 2C horizon has colors similar to those of the Bt horizon. The fine-earth fraction is silty clay loam, silty clay, or clay.

Colyer Series

The Colyer series consists of shallow, well drained, slowly permeable soils. These soils formed in material weathered from black, fissile shale. They are on narrow ridgetops and side slopes in the uplands, mainly in the northern part of the county. Slopes range from 12 to 50 percent. The soils are clayey-skeletal, mixed, mesic Lithic Dystrochrepts.

Colyer soils are associated on the landscape with Carpenter, Lenberg, Lowell, and Trappist soils. Carpenter and Lenberg soils are on side slopes above the Colyer soils. Carpenter soils are in a fine-loamy family and have soft bedrock at a depth of more than 40 inches. Lenberg soils are in a fine textured family and have soft shale bedrock at a depth of 20 to 40 inches. Lowell soils are on the lower, broader ridgetops. They are in a fine textured family and have hard bedrock at a depth of more than 40 inches. Trappist soils are on ridgetops and side slopes adjacent to the Colyer soils. They are in a clayey family and have hard shale bedrock at a depth of 20 to 40 inches.

Typical pedon of Colyer silt loam, 20 to 50 percent slopes; about 1.5 miles southeast of Ellisburg, 2.3 miles southwest of the junction of Kentucky Highways 906 and 78, about 100 feet west of a gravel road; in the Hustonville Quadrangle, about 2,246,300 feet east and 404,100 feet north by the Kentucky coordinate system:

A—0 to 3 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; about 10 percent shale fragments; very strongly acid; abrupt smooth boundary.

E—3 to 6 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; about 10 percent shale fragments; very strongly acid; clear smooth boundary.

Bw—6 to 10 inches; strong brown (7.5YR 5/6) very channery silty clay; moderate medium subangular blocky structure; firm; common fine roots; few pressure faces on peds; about 50 percent shale fragments; extremely acid; gradual smooth boundary.

C—10 to 14 inches; yellowish brown (10YR 5/6) extremely channery silty clay; massive with relic platy shale structure; firm; about 65 percent shale fragments; extremely acid; clear smooth boundary.

R—14 inches; hard, black shale.

The thickness of the solum and the depth to hard shale bedrock range from 8 to 20 inches. Reaction ranges from extremely acid to medium acid in the A horizon unless the soil is limed. It is extremely acid or very strongly acid in the Bw and C horizons. The content of shale fragments ranges from 5 to 15 percent in the A and E horizons, from 35 to 55 percent in the Bw horizon, and from 50 to 90 percent in the C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 4. The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. It is silt loam or silty clay loam.

The Bw horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 6. The fine-earth fraction is silty clay loam, silty clay, or clay.

The C horizon has colors similar to those of the Bw horizon. In some pedons it has mottles in shades of gray or olive. The fine-earth fraction is silty clay, clay, or silty clay loam.

Crider Series

The Crider series consists of very deep, well drained, moderately permeable soils. These soils formed in a silty mantle over material weathered from limestone. They are on ridgetops in the uplands, mainly in the northeastern part of the county. Slopes range from 2 to 6 percent. The soils are fine-silty, mixed, mesic Typic Paleudalfs.

Crider soils are associated on the landscape with Berea, Faywood, Lowell, and Trappist soils. Berea and Trappist soils are in the uplands on slopes above the Crider soils. They formed in material weathered from black shale. Berea, Faywood, and Trappist soils have bedrock at a depth of 20 to 40 inches. Berea soils are moderately well drained. Faywood and Lowell soils are in a fine textured family. Faywood soils are on the lower side slopes. Lowell soils are on the slightly lower side slopes and ridgetops adjacent to the Crider soils. Trappist soils are in a clayey family.

Typical pedon of Crider silt loam, 2 to 6 percent slopes; about 3 miles northwest of Kidds Store, 4,000 feet southwest of the Lincoln-Casey County line on Kentucky Highway 78, about 1,000 feet west of a gravel road; in the Hustonville Quadrangle, about 2,257,700 feet east and 410,500 feet north by the Kentucky coordinate system:

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; medium acid; clear smooth boundary.

BA—8 to 14 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bt1—14 to 20 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; few fine rounded black concretions; strongly acid; gradual smooth boundary.

Bt2—20 to 30 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; few fine rounded black concretions; strongly acid; clear smooth boundary.

2Bt3—30 to 48 inches; yellowish red (5YR 4/6) silty clay; moderate medium angular blocky structure;

very firm; common distinct clay films on faces of peds; few fine rounded black concretions; very strongly acid; gradual smooth boundary.

2Bt4—48 to 62 inches; yellowish red (5YR 5/6) clay; few fine and medium distinct reddish yellow and brown mottles; strong medium angular blocky structure; very firm; common distinct clay films on faces of peds; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction ranges from strongly acid to neutral in the upper part of the solum and from very strongly acid to slightly acid in the lower part. The content of rock fragments, mostly chert, ranges from 0 to 15 percent in the lower part of the solum.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6.

The upper part of the Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The lower part has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. The horizon is silt loam or silty clay loam.

The 2Bt horizon has hue of 5YR to 10R, value of 3 to 5, and chroma of 4 to 8. It is silty clay or clay. In some pedons it has mottles in shades of red, brown, or yellow in the upper part and mottles in shades of gray in the lower part.

Elk Series

The Elk series consists of very deep, well drained, moderately permeable soils on stream terraces. These soils formed in mixed alluvium derived from limestone, siltstone, shale, sandstone, and loess. Slopes range from 2 to 6 percent. The soils are fine-silty, mixed, mesic Ultic Hapludalfs.

Elk soils are associated on the landscape with Lawrence, Lindside, Nolin, and Newark soils. Lawrence soils have a fragipan and are somewhat poorly drained. They are on the lower stream terraces. Lindside, Nolin, and Newark soils are on flood plains. Lindside soils are moderately well drained. Newark soils are somewhat poorly drained.

Typical pedon of Elk silt loam, 2 to 6 percent slopes; about 0.25 mile south of Liberty, 0.4 mile southeast of the junction of U.S. Highway 127 and Kentucky Highway 70, about 600 feet east of U.S. Highway 127; in the Liberty Quadrangle, about 2,236,400 feet east and 357,700 feet north by the Kentucky coordinate system:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

BA—7 to 11 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; common fine roots; medium acid; clear smooth boundary.

Bt1—11 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—18 to 38 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; few fine black soft concretions; very strongly acid; gradual smooth boundary.

Bt3—38 to 62 inches; strong brown (7.5YR 5/6) silty clay loam; few fine faint pale brown (10YR 6/3) mottles; moderate fine subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; very strongly acid.

The solum is 40 to more than 60 inches thick. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to slightly acid unless the soil is limed.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. In some pedons it has gray mottles in the lower part.

Some pedons have a C horizon. This horizon has colors and textures similar to those of the Bt horizon.

Fairmount Series

The Fairmount series consists of shallow, well drained, slowly permeable or moderately slowly permeable soils. These soils formed in material weathered from limestone and mudstone interbedded with thin layers of calcareous shale. They are on side slopes in the uplands, mainly in the northern part of the county. Slopes range from 20 to 60 percent. The soils are clayey, mixed, mesic Lithic Hapludolls.

Fairmount soils are associated on the landscape with Faywood and Lowell soils. The associated soils have an ochric epipedon and an argillic horizon. Faywood soils are on side slopes and narrow ridgetops and are underlain by bedrock at a depth of 20 to 40 inches. Lowell soils are on side slopes and ridgetops and are underlain by bedrock at a depth of more than 40 inches.

Typical pedon of Fairmount silty clay loam, very rocky, 30 to 60 percent slopes; about 1.75 miles northwest of Kidds Store, 1.6 miles south of Kentucky Highway 78, about 0.4 mile west of the Lincoln County line; in the Ellisburg Quadrangle, about 2,257,500 feet east and 405,200 feet north by the Kentucky coordinate system:

A—0 to 9 inches; dark brown (10YR 3/3) silty clay loam; weak medium subangular blocky structure; friable; many fine and medium roots; about 5 percent limestone channers and flags; mildly alkaline; clear smooth boundary.
Bw—9 to 20 inches; yellowish brown (10YR 5/4) flaggy silty clay; moderate medium subangular blocky structure; firm; common fine roots; about 15 percent limestone flags and channers; mildly alkaline; abrupt smooth boundary.
R—20 inches; hard, fossiliferous limestone.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. Reaction ranges from neutral to moderately alkaline. The content of limestone fragments, mostly channers and flagstones, ranges from 5 to 35 percent.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The fine-earth fraction is silty clay loam, silty clay, or clay. Some pedons have mottles in shades of brown, gray, or olive.

Faywood Series

The Faywood series consists of moderately deep, well drained, moderately slowly permeable or slowly permeable soils. These soils formed in material weathered from limestone and mudstone interbedded with thin layers of calcareous shale. They are on narrow ridgetops and side slopes in the uplands. Slopes range from 12 to 30 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Faywood soils are associated on the landscape with Fairmount and Lowell soils. Fairmount soils have a mollic epipedon and have bedrock at a depth of less than 20 inches. Lowell soils are on narrow ridgetops and side slopes above the Faywood soils and have bedrock at a depth of more than 40 inches.

Typical pedon of Faywood silt loam, in an area of Faywood-Fairmount-Rock outcrop complex, 20 to 30 percent slopes, eroded; about 8.0 miles north of Liberty, 1.6 miles northwest of the intersection of U.S. Highway 127 and Kentucky Highway 906, about 0.5 mile west of the Lincoln County line; in the Hustonville Quadrangle, about 2,258,000 feet east and 400,400 feet north by the Kentucky coordinate system:

Ap—0 to 4 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.
Bt1—4 to 15 inches; yellowish brown (10YR 5/4) silty clay; moderate medium angular blocky structure; very firm; few fine roots; common faint clay films on faces of peds and in root channels; few fine black concretions; neutral; gradual smooth boundary.
Bt2—15 to 21 inches; yellowish brown (10YR 5/6) silty clay; moderate medium angular blocky structure; very firm; few fine roots; many faint clay films on faces of peds and in root channels; few fine black concretions; neutral; gradual smooth boundary.
Bt3—21 to 32 inches; yellowish brown (10YR 5/6) clay; common fine distinct light gray (10YR 7/2) and strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; very firm; few fine roots; many faint clay films on faces of peds and in root channels; few small concretions; slightly acid; abrupt smooth boundary.
R—32 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from strongly acid to mildly alkaline. The content of flagstones and channers of limestone ranges from 0 to 15 percent in the solum.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is commonly mottled in shades of brown, olive, or gray in the lower part. It is silty clay or clay.

Frankstown Series

The Frankstown series consists of deep and very deep, well drained, moderately permeable soils. These soils formed in material weathered from limestone, siltstone, and interbedded shale. They are on ridgetops and side slopes in the uplands. Slopes range from 2 to 20 percent. The soils are fine-loamy, mixed, mesic Typic Hapludults.

Frankstown soils are associated on the landscape with Frederick, Garmon, Pricetown, and Teddy soils. Frederick soils are on the higher ridgetops and side slopes. They have a solum that is more than 60 inches thick and are in a clayey family. Garmon soils are on very steep side slopes below the Frankstown soils and have bedrock at a depth of 20 to 40 inches. Pricetown and Teddy soils are in the broad, more level landscape positions. Pricetown soils are in a fine-silty family and have a solum that is more than 60 inches thick. Teddy soils have a fragipan and are moderately well drained. They have a solum that is more than 60 inches thick.

Typical pedon of Frankstown silt loam, 12 to 20 percent slopes; about 3.3 miles southeast of Mt. Olive, on Brown Ridge, 1.1 miles southeast of Brown cemetery, on a gravel road, 100 feet south of a barn; in the Science Hill Quadrangle, about 2,297,500 feet east and 334,200 feet north by the Kentucky coordinate system:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; about 10 percent limestone gravel; medium acid; abrupt smooth boundary.

Bt1—8 to 17 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds and in root channels; about 10 percent limestone and siltstone gravel; strongly acid; gradual smooth boundary.

Bt2—17 to 34 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; about 15 percent limestone and siltstone gravel; strongly acid; gradual wavy boundary.

Bt3—34 to 41 inches; variegated strong brown (7.5YR 5/6) and brown (7.5YR 4/4) gravelly silty clay loam; weak coarse subangular blocky structure; firm; few distinct clay films on vertical faces of peds; about 25 percent limestone and siltstone gravel; very strongly acid; gradual wavy boundary.

Cr—41 to 54 inches; yellowish brown (10YR 5/6) weathered soft siltstone and shale.

The thickness of solum ranges from 40 to 60 inches. The depth to soft bedrock ranges from 40 to more than 60 inches. Reaction ranges from very strongly acid to medium acid unless the soil is limed. The content of coarse fragments of limestone, shale, siltstone, or chert ranges from 0 to 15 percent in the Ap horizon and from 0 to 40 percent in the Bt horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. The fine-earth fraction is silty clay loam or silt loam.

Frederick Series

The Frederick series consists of very deep, well drained, moderately permeable soils. These soils formed in clayey material weathered from limestone. They are on convex ridgetops and side slopes in the uplands. Slopes range from 2 to 20 percent. The soils are clayey, mixed, mesic Typic Paleudults.

Frederick soils are associated on the landscape with Caneyville, Frankstown, Garmon, and Pricetown soils. Caneyville soils are on high knolls, ridgetops, and side slopes. They have bedrock at a depth of 20 to 40 inches and have base saturation of more than 35 percent. Frankstown soils are on low ridgetops. They have a solum that is less than 60 inches thick and are in a fine-loamy family. Garmon soils are on very steep side slopes below the Frederick soils. They have bedrock at a depth of 20 to 40 inches and are in a fine-loamy family. Pricetown soils are in a fine-silty family and are on low, broad ridgetops.

Typical pedon of Frederick silt loam, 6 to 12 percent slopes; about 0.9 mile north of Mt. Olive, 2.75 miles east of Kentucky Highway 70; in the Yosemite Quadrangle, about 2,287,300 feet east and 350,550 feet north by the Kentucky coordinate system:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; many fine roots; about 1 percent limestone gravel; slightly acid; abrupt smooth boundary.

Bt1—7 to 18 inches; yellowish red (5YR 5/6) silty clay; moderate medium angular blocky structure; firm; few fine roots; few faint clay films on faces of peds and in root channels; slightly acid; clear smooth boundary.

Bt2—18 to 38 inches; yellowish red (5YR 5/6) silty clay; common medium distinct brownish yellow (10YR 6/6) and few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; very firm; few fine roots; many distinct clay films on faces of peds and in root channels; strongly acid; gradual smooth boundary.

Bt3—38 to 58 inches; yellowish red (5YR 5/6) silty clay; common medium distinct gray (N 6/0) and reddish yellow (7.5YR 7/8) mottles; moderate medium subangular blocky structure; very firm; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt4—58 to 70 inches; yellowish red (5YR 5/6) silty clay; many medium distinct gray (N 6/0) and reddish yellow (7.5YR 7/8) mottles; moderate medium subangular blocky structure; very firm; many distinct clay films on faces of peds; about 1 percent limestone gravel; very strongly acid; gradual smooth boundary.

Bt5—70 to 86 inches; variegated red (2.5YR 5/6), gray (N 6/0), and reddish yellow (7.5YR 7/8) silty clay; moderate medium subangular blocky structure; very firm; many distinct clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. The depth to bedrock is more than 72 inches. Reaction ranges from very strongly acid to medium acid unless the soil is limed. The content of rock fragments, mostly chert, ranges from 0 to 15 percent in the Ap horizon and from 0 to 30 percent in the Bt horizon.

The Ap horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 8. The Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. It is commonly mottled in shades of yellow, brown, red, or gray in the lower part. The fine-earth fraction is silty clay loam, silty clay, or clay in the upper part and silty clay or clay in the lower part.

Garmon Series

The Garmon series consists of moderately deep, well drained, moderately rapidly permeable soils in the uplands. These soils formed in material weathered from siltstone, shaly limestone, and calcareous shale. They are on the upper side slopes throughout the county and on narrow ridgetops in the northern part of the county. Slopes range from 30 to 60 percent. The soils are fine-loamy, mixed, mesic Dystric Eutrochrepts.

Garmon soils are associated on the landscape with Carpenter, Frankstown, Frederick, and Lenberg soils. Carpenter and Lenberg soils are on side slopes below the Garmon soils and have an argillic horizon. Carpenter soils have bedrock at a depth of more than 40 inches. Frankstown and Frederick soils are on side slopes and ridgetops above the Garmon soils. They have an argillic horizon and have bedrock at a depth of more than 40 inches. Frederick soils are in a clayey family. Lenberg soils have soft clayey shale at a depth of 20 to 40 inches.

Typical pedon of Garmon silt loam, 30 to 60 percent slopes; about 7.0 miles northeast of Liberty, 1.4 miles south of Kidds Store, 0.5 mile east of U.S. Highway 127; in the Hustonville Quadrangle, about 2,259,800 feet east and 387,550 feet north by the Kentucky coordinate system:

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; about 10 percent siltstone channers; neutral; clear smooth boundary.

Bw1—4 to 11 inches; yellowish brown (10YR 5/6) channery silt loam; weak medium subangular blocky structure; friable; common fine roots; about 20 percent siltstone channers; medium acid; gradual smooth boundary.

Bw2—11 to 21 inches; yellowish brown (10YR 5/6) channery silt loam; moderate medium subangular blocky structure; firm; few fine roots; about 30 percent siltstone channers; medium acid; gradual smooth boundary.

C—21 to 28 inches; yellowish brown (10YR 5/4) very channery silt loam; massive; firm; about 40 percent siltstone channers; slightly acid; clear smooth boundary.

R—28 inches; siltstone.

The thickness of solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from very strongly acid to neutral in the solum and from medium acid to neutral in the substratum. The content of shale, siltstone, or limestone rock fragments ranges from 2 to 45 percent throughout the profile. The weighted average in the control section is 10 to 35 percent.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The fine-earth fraction is loam, silt loam, or silty clay loam. The C horizon has colors and textures similar to those of the Bw horizon.

Johnsburg Series

The Johnsburg series consists of deep and very deep, somewhat poorly drained soils. These soils formed in a silty mantle over material weathered from siltstone, shale, and sandstone. They are in low areas in the uplands. Permeability is moderate above the fragipan and very slow in the fragipan. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Aquic Fragiudults.

Johnsburg soils are associated on the landscape with Frankstown, Pricetown, and Teddy soils. Frankstown and Pricetown soils do not have a fragipan. Frankstown soils are on narrow ridgetops and side slopes. They are in a fine-loamy family and are well drained. Pricetown soils are on broad ridgetops and are well drained. Teddy soils are on broad ridgetops. They are in a fine-loamy family and are moderately well drained.

Typical pedon of Johnsburg silt loam; about 3.0 miles east of Windsor, 0.9 mile west of the Pulaski County line, 250 feet north of Kentucky Highway 80; in the Phil Quadrangle, about 2,248,050 feet east and 291,150 feet north by the Kentucky coordinate system:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

BA—6 to 12 inches; yellowish brown (10YR 5/6) silt loam; weak fine angular blocky structure; friable; few fine roots; about 5 percent gravel; medium acid; gradual smooth boundary.

Bt—12 to 26 inches; brown (10YR 5/3) silty clay loam; common medium distinct light brownish gray (2.5YR 6/2) and gray (10YR 6/1) mottles; moderate fine angular blocky structure; friable; few fine roots; few faint clay films on faces of peds; few brown soft concretions; about 5 percent gravel; very strongly acid; gradual smooth boundary.

Btx1—26 to 36 inches; pale brown (10YR 6/3) silty clay loam; many fine distinct light gray (10YR 7/1) mottles; moderate very coarse prismatic structure parting to moderate medium angular blocky; firm and brittle; few faint clay films on faces of peds; few black and brown soft concretions; about 5 percent gravel; very strongly acid; gradual smooth boundary.

Btx2—36 to 62 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct brownish yellow (10YR 6/8) and strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; few faint clay films between prisms and on faces of peds; about 5 percent gravel; very strongly acid.

The thickness of the solum ranges from 40 to 80 inches. The depth to bedrock ranges from 48 to 72 inches. Reaction ranges from extremely acid to strongly acid unless the soil is limed.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The BA horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has few to many mottles with chroma of 2 or less. It is silt loam or silty clay loam.

The Btx horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 8. It has mottles in shades of gray or brown. It is silt loam or silty clay loam.

Lawrence Series

The Lawrence series consists of very deep, somewhat poorly drained soils that formed in mixed alluvium. These soils are on stream terraces. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Aquic Fragiudalfs.

Lawrence soils are associated on the landscape with Elk, Melvin, Newark, and Robertsville soils. Elk soils are on the slightly higher stream terraces and are well drained. Melvin and Newark soils are on the adjoining flood plains. Melvin and Robertsville soils are poorly drained.

Typical pedon of Lawrence silt loam, rarely flooded; about 5.2 miles northeast of Liberty, 75 yards east of U.S. Highway 127, about 100 yards north of a farm road; in the Liberty Quadrangle, about 2,254,100 feet east and 370,150 feet north by the Kentucky coordinate system:

Ap—0 to 9 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

BA—9 to 14 inches; brown (10YR 5/3) silt loam; moderate medium subangular blocky structure; friable; common fine roots; slightly acid; gradual smooth boundary.

Bt—14 to 20 inches; brown (10YR 5/3) silt loam; common medium faint light gray (10YR 7/2) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Btx1—20 to 30 inches; brown (10YR 5/3) silt loam; common medium distinct light gray (10YR 7/2) and yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; few fine roots between prisms; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Btx2—30 to 42 inches; brown (10YR 5/3) silt loam; many medium distinct light gray (2.5Y 7/2) and strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; common distinct clay films between prisms and on faces of peds; strongly acid; gradual smooth boundary.

Bt'—42 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light gray (2.5Y 7/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

C—48 to 62 inches; brown (7.5YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) mottles; massive; very strongly acid.

The thickness of the solum ranges from 40 to 80 inches. The depth to bedrock is more than 60 inches. Reaction from the surface through the fragipan is very strongly acid or strongly acid unless the soil is limed. Reaction below the fragipan ranges from very strongly acid to neutral.

The Ap horizon has hue of 10YR, value of 4 or 5, chroma of 2 to 4. The BA horizon has colors and textures similar to those of the Ap horizon.

The Bt horizon has hue of 10YR to 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has few to many mottles with chroma of 2 or less. It is silt loam or silty clay loam.

The Btx horizon has hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 1 to 6, or it is neutral in hue and has value of 6 or 7. It has mottles in shades of gray or brown. It is silt loam or silty clay loam.

The C horizon has hue of 7.5YR to 2.5YR, value of 5 or 6, and chroma of 2 to 4. It has mottles in shades of gray or brown. It is silt loam or silty clay loam.

Lenberg Series

The Lenberg series consists of moderately deep, well drained, moderately slowly permeable soils. These soils formed in residuum of soft clayey shale. They are on the lower side slopes and foot slopes in the uplands. Slopes range from 12 to 30 percent. The soils are fine, mixed, mesic Ultic Hapludalfs.

Lenberg soils are associated on the landscape with Carpenter, Colyer, Garmon, and Trappist soils. Carpenter soils are on side slopes and foot slopes adjacent to the Lenberg soils and have bedrock at a depth of more than 40 inches. Carpenter and Garmon soils are in a fine-loamy family. Colyer soils are on the lower side slopes and foot slopes. They are in a clayey-skeletal family and have hard, black shale bedrock at a depth of 8 to 20 inches. Garmon soils are on side slopes and narrow ridgetops above the Lenberg soils. They do not have an argillic horizon and have hard bedrock at a depth of 20 to 40 inches. Trappist soils are on the lower side slopes and ridges. They are in a clayey family and have hard, black shale at a depth of 20 to 40 inches.

Typical pedon of Lenberg silt loam, in an area of Lenberg-Carpenter complex, 12 to 30 percent slopes; about 1.5 miles east of Liberty, about 1.5 miles east of bridge over Green River on Kentucky Highway 70, about 0.5 mile south of the highway; in the Liberty Quadrangle, about 2,247,300 feet east and 360,900 feet north by the Kentucky coordinate system:

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine and medium roots; about 3 percent shale channers; very strongly acid; abrupt smooth boundary.

E—2 to 5 inches; brown (10YR 5/3) silt loam; weak medium angular blocky structure; friable; many fine and medium roots; about 3 percent shale channers; very strongly acid; clear smooth boundary.

Bt1—5 to 10 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; few faint clay films on faces of peds; about 3 percent shale channers; very strongly acid; clear smooth boundary.

Bt2—10 to 20 inches; strong brown (7.5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; common fine roots; common faint clay films on faces of peds; about 3 percent shale channers; very strongly acid; clear smooth boundary.

Bt3—20 to 26 inches; yellowish brown (10YR 5/6) silty clay; common fine distinct light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; about 5 percent shale channers; very strongly acid; clear smooth boundary.

C—26 to 36 inches; mottled yellowish brown (10YR 5/6), reddish yellow (7.5YR 6/6), and light brownish gray (2.5Y 6/2) channery silty clay; massive; very firm; about 20 percent gray shale channers; very strongly acid; clear smooth boundary.

Cr—36 to 46 inches; light olive brown (2.5Y 5/6) soft shale.

The thickness of the solum and the depth to soft shale range from 20 to 40 inches. Reaction is very strongly acid or strongly acid unless the soil is limed. The content of shale, limestone, siltstone, or chert rock fragments ranges, by volume, from 0 to 30 percent in the solum and from 10 to 45 percent in the C horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Cultivated soils have an Ap horizon. This horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. It is silt loam.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The fine-earth fraction is silt loam or silty clay loam. Some pedons have a BA horizon. This horizon is 4 to 10 inches thick and has colors and textures similar to those of the Ap horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It has mottles in shades of brown, red, yellow, or gray in the lower part. The fine-earth fraction is silty clay or silty clay loam.

The C horizon has mottles or matrix colors in shades of brown, yellow, olive, or gray. The fine-earth fraction is silty clay or clay.

Lindside Series

The Lindside series consists of very deep, moderately well drained, moderately permeable soils. These soils formed in mixed alluvial material. They are on flood plains. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Fluvaquentic Eutrochrepts.

Lindside soils are associated on the landscape with Melvin, Newark, and Nolin soils. Melvin soils are poorly drained, Newark soils are somewhat poorly drained, and Nolin soils are well drained.

Typical pedon of Lindside silt loam, occasionally flooded; about 3 miles southwest of Liberty, 350 yards south of the intersection of Kentucky Highways 70 and

1547; in the Liberty Quadrangle, about 2,223,100 feet east and 349,700 feet north by the Kentucky coordinate system:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; few fine roots; slightly acid; clear smooth boundary.

BA—9 to 19 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bw1—19 to 34 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium distinct light brownish gray (10YR 6/2) and few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine black concretions; strongly acid; gradual smooth boundary.

Bw2—34 to 48 inches; yellowish brown (10YR 5/6) silt loam; many fine and medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine black concretions; about 5 percent gravel; medium acid; gradual smooth boundary.

C—48 to 62 inches; light yellowish brown (10YR 6/4) silt loam; many fine and medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; massive; firm; about 5 percent gravel; medium acid.

The thickness of the solum ranges from 25 to 50 inches. The depth to bedrock is more than 60 inches. Reaction ranges from strongly acid to mildly alkaline unless the soil is limed. The depth to mottles that have chroma of 2 or less ranges from 14 to 24 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. The BA horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is silt loam, fine sandy loam, or silty clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is silt loam, silty clay loam, or fine sandy loam. In some pedons the C horizon is weakly stratified.

Lowell Series

The Lowell series consists of deep and very deep, well drained, moderately slowly permeable soils. These soils formed in residuum of limestone and mudstone interbedded with thin layers of shale. They are on ridgetops and side slopes in the uplands, mainly in the northern part of the county. Slopes range from 6 to 20 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Lowell soils are associated on the landscape with Crider and Faywood soils. Crider soils are on broad ridgetops slightly above the Lowell soils and are in a fine-silty family. Faywood soils are on moderately steep to steep side slopes below the Lowell soils and have bedrock at a depth of 20 to 40 inches.

Typical pedon of Lowell silt loam, 6 to 12 percent slopes; about 3.5 miles southeast of Ellisburg, about 500 feet east of Kentucky Highway 906, about 3,500 feet north of Frey Creek Church; in the Hustonville Quadrangle, about 2,251,100 feet east and 399,950 feet north by the Kentucky coordinate system:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.

BA—9 to 13 inches; brown (7.5YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Bt1—13 to 26 inches; brown (7.5YR 4/4) silty clay; moderate medium angular blocky structure; firm; few fine roots; common faint clay films on faces of peds; few fine black soft concretions; strongly acid; gradual smooth boundary.

Bt2—26 to 38 inches; yellowish brown (10YR 5/6) clay; common fine distinct strong brown (7.5YR 5/6) and few fine faint pale brown (10YR 6/3) mottles; moderate medium angular blocky structure; very firm; few fine roots; continuous clay films on faces of peds; common fine black soft concretions; strongly acid; gradual smooth boundary.

C1—38 to 56 inches; yellowish brown (10YR 5/6) clay; few fine faint pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) mottles; massive; very firm; common fine black soft concretions; about 5 percent limestone channers; strongly acid; diffuse smooth boundary.

C2—56 to 80 inches; mottled strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), and gray (5Y 5/1) clay; massive; extremely firm; common fine black soft concretions; about 5 percent limestone channers; strongly acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock is 40 to 80 inches. In the upper part of the solum, reaction ranges from very strongly acid to slightly acid unless the soil is limed. In the lower part, it ranges from strongly acid to mildly alkaline. The content of rock fragments ranges from 0 to 5 percent in the upper part of the solum, from 0 to 15 in the lower part, and from 5 to 50 percent in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam or silty clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. In some pedons it has mottles in shades of brown, red, olive, or gray in the lower part. It is silty clay loam or silty clay in the upper part and silty clay or clay in the lower part.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 6. The fine-earth fraction is silty clay or clay. This horizon has mottles in shades of brown, olive, or gray. Some subhorizons also have mottles in these colors.

Melvin Series

The Melvin series consists of very deep, poorly drained, moderately permeable soils that formed in mixed alluvium. These soils are on flood plains throughout the county. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

Melvin soils are associated on the landscape with Lawrence, Newark, Nolin, and Robertsville soils. Lawrence and Robertsville soils have a fragipan and are on the higher stream terraces adjacent to the Melvin soils. Lawrence and Newark soils are somewhat poorly drained. Nolin soils are well drained.

Typical pedon of Melvin silt loam, occasionally flooded; about 2.5 miles west of Liberty, about 0.3 mile west of Brush Creek Bridge on Kentucky Highway 70, about 100 yards south of the highway; in the Liberty Quadrangle, about 2,225,450 feet east and 350,800 feet north by the Kentucky coordinate system:

Ap—0 to 8 inches; grayish brown (2.5Y 5/2) silt loam; common fine distinct light gray (N 7/0) and yellowish brown (10YR 5/6) mottles; weak fine granular structure; very friable; common fine roots; slightly acid; clear smooth boundary.

Bg—8 to 22 inches; light brownish gray (2.5Y 6/2) silt loam; common fine distinct yellowish brown (10YR 5/6) and yellow (10YR 7/6) mottles; weak fine subangular blocky structure; friable; common fine roots; few fine black concretions; slightly acid; gradual smooth boundary.

Cg1—22 to 40 inches; light gray (N 7/0) silt loam; common fine distinct brownish yellow (10YR 6/8) and olive yellow (2.5Y 6/6) mottles; massive; friable; few fine black concretions; neutral; gradual smooth boundary.

Cg2—40 to 68 inches; gray (N 5/0) silt loam; common medium distinct yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) mottles; massive; friable; few fine black concretions; neutral.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline throughout the profile.

The Ap horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 3. The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 or less, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of brown or red. It is silt loam or silty clay loam.

The Cg horizon has colors similar to those of the Bg horizon. It is silt loam or silty clay loam.

Newark Series

The Newark series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in mixed alluvium. These soils are on flood plains throughout the county. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Newark soils are associated on the landscape with Lindside, Melvin, Nolin, Skidmore, and Yosemite soils. Lindside soils are moderately well drained. Melvin soils are poorly drained. Nolin and Skidmore soils are well drained. Skidmore and Yosemite soils are in a loamy-skeletal family.

Typical pedon of Newark silt loam, occasionally flooded; about 3 miles west of Liberty, 1,000 feet southeast of Canoe Creek Bridge on Kentucky Highway 70; in the Liberty Quadrangle, about 2,223,100 feet east and 350,000 feet north by the Kentucky coordinate system:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; few fine roots; slightly acid; clear smooth boundary.

Bw—8 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; few fine roots; slightly acid; gradual smooth boundary.

Bg—16 to 39 inches; grayish brown (2.5Y 5/2) silt loam; common fine and medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; slightly acid; gradual smooth boundary.

Cg1—39 to 50 inches; grayish brown (10YR 5/2) silt loam; many fine and medium faint gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; massive; friable; slightly acid; gradual smooth boundary.

Cg2—50 to 62 inches; light brownish gray (10YR 6/2) silt loam; many medium faint light gray (10YR 7/2) and yellowish brown (10YR 5/4) mottles; massive; friable; few thin strata of loam and sandy loam; slightly acid.

The thickness of the solum ranges from 20 to 50 inches. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It has mottles in shades of brown or gray. It is silt loam or silty clay loam.

The Bg horizon has hue of 2.5Y or 10YR, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of brown. It is silt loam or silty clay loam. The Cg horizon has colors and textures similar to those of the Bg horizon.

Nolin Series

The Nolin series consists of very deep, well drained, moderately permeable soils. These soils formed in alluvium derived from limestone, sandstone, siltstone, shale, and loess. They are on flood plains throughout the county. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts.

Nolin soils are associated on the landscape with Melvin, Newark, and Skidmore soils. Melvin soils are poorly drained, and Newark soils are somewhat poorly drained. Skidmore soils are in a loamy-skeletal family and are on narrow flood plains.

Typical pedon of Nolin silt loam, occasionally flooded; about 7.7 miles northeast of Liberty, 0.3 mile south of Kidds Store, 75 yards east of U.S. Highway 127, and 400 yards south of Kentucky Highway 906; in the Hustonville Quadrangle, about 2,260,100 feet east and 393,600 feet north by the Kentucky coordinate system:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; about 3 percent small pebbles; mildly alkaline; abrupt smooth boundary.

Bw1—8 to 25 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few fine roots; about 3 percent small pebbles; slightly acid; gradual smooth boundary.

Bw2—25 to 43 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; few fine roots; about 5 percent small pebbles; slightly acid; gradual smooth boundary.

C—43 to 65 inches; dark grayish brown (10YR 4/2) gravelly silty clay loam; few fine faint brown (10YR 5/3) mottles; massive; friable; few roots; about 20 percent small pebbles; neutral.

The thickness of solum is 40 inches or more. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline. The content of rock fragments, mostly pebbles, ranges from 0 to 5 percent in the solum and from 0 to 35 percent in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. In some pedons it has few or common mottles in shades of gray below a depth of 30 inches. It is silt loam or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The fine-earth fraction is silt loam or silty clay loam.

Pricetown Series

The Pricetown series consists of very deep, well drained, moderately permeable soils. These soils formed in a loamy mantle over material weathered from limestone. They are on broad ridgetops in the uplands throughout the county. Slopes range from 2 to 12 percent. The soils are fine-silty, siliceous, mesic Typic Paleudults.

Pricetown soils are associated on the landscape with Frankstown, Frederick, and Teddy soils. Frankstown soils have a solum that is less than 60 inches thick. They are on the lower side slopes and ridgetops. Frankstown and Teddy soils are in a fine-loamy family. Frederick soils are in a clayey family and are on the higher side slopes and ridgetops. Teddy soils have a fragipan. They are moderately well drained and are in the broader, more level landscape positions.

Typical pedon of Pricetown silt loam, 2 to 6 percent slopes; about 3.0 miles southwest of Liberty, 0.5 mile south of Pricetown, 0.3 mile west of U.S. Highway 127, about 10 yards north of a farm road; in the Liberty Quadrangle, about 2,228,800 feet east and 344,400 feet north by the Kentucky coordinate system:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; few very fine tubular pores; about 1 percent chert fragments; neutral; clear smooth boundary.

BA—7 to 13 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few very fine tubular pores; medium acid; clear smooth boundary.

Bt1—13 to 22 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; firm; few fine roots; few very fine tubular pores; few distinct clay films on faces of peds; about 1 percent chert fragments; very strongly acid; clear wavy boundary.

Bt2—22 to 29 inches; yellowish brown (10YR 5/6) silt loam; moderate fine and medium subangular blocky structure; firm; few very fine tubular pores; common distinct clay films on faces of peds and in pores; few fine rounded concretions; very strongly acid; clear wavy boundary.

2Bt3—29 to 36 inches; red (2.5YR 4/6) silty clay loam; many medium prominent pale brown (10YR 6/3) mottles; moderate fine and medium subangular blocky structure; firm; few very fine tubular pores; many distinct clay films on faces of peds and in pores; about 1 percent chert fragments; very strongly acid; clear wavy boundary.

2Bt4—36 to 45 inches; red (2.5YR 4/6) clay; common medium distinct yellow (10YR 7/6) mottles; moderate coarse angular blocky structure; very firm; many distinct clay films on faces of peds; about 3 percent chert fragments; very strongly acid; gradual wavy boundary.

2Bt5—45 to 63 inches; red (2.5YR 4/6) clay; common medium distinct reddish yellow (7.5YR 6/6) and light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; very firm; many distinct clay films on faces of peds; about 3 percent chert fragments; very strongly acid; clear wavy boundary.

2Bt6—63 to 70 inches; red (2.5YR 4/6) clay; many medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; very firm; many distinct clay films on faces of peds; about 3 percent chert fragments; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction ranges from very strongly acid to medium acid in the Ap, BA, and Bt horizons unless the soil is limed. It is very strongly acid or strongly acid in the 2Bt horizon. The content of chert or limestone rock fragments ranges from 0 to 5 percent in the upper part of the solum and from 0 to 35 percent in the lower part.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. The BA horizon has hue of 10YR, value of 5, and chroma of 4 to 6.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. It is silt loam or silty clay loam.

The 2Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of brown, yellow, or gray in the lower part. The fine-earth fraction is silty clay loam, silty clay, or clay.

Robertsville Series

The Robertsville series consists of very deep, poorly drained soils that formed in mixed alluvium. These soils are on stream terraces. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Typic Fragiaqualfs.

Robertsville soils are associated on the landscape with Lawrence, Melvin, and Newark soils. Lawrence soils are at the slightly higher elevations and are somewhat poorly drained. Melvin and Newark soils are on the adjoining flood plains. Newark soils are somewhat poorly drained.

Typical pedon of Robertsville silt loam, rarely flooded; about 8.0 miles south of Liberty, 0.25 mile south of Kentucky Highway 501, and 50 yards west of U.S. Highway 127; in the Phil Quadrangle, about 2,228,750 feet east and 322,600 feet north by the Kentucky coordinate system:

Ap—0 to 8 inches; gray (10YR 6/1) silt loam; few medium distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/6) mottles; weak fine granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.

Btg—8 to 15 inches; gray (10YR 6/1) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Btx—15 to 40 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; few fine roots between prisms; common faint clay films on faces of peds; about 5 percent gravel; strongly acid; gradual smooth boundary.

Btg′—40 to 48 inches; gray (10YR 6/1) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common faint clay films on faces of peds; about 5 percent gravel; strongly acid; gradual smooth boundary.

Cg—48 to 62 inches; gray (10YR 6/1) silty clay loam; many fine prominent strong brown (7.5YR 5/8) and many medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. From the surface through the Btx horizon, reaction ranges from extremely acid to strongly acid unless the soil is limed. Below the Btx horizon, it ranges from very strongly acid to neutral.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. In most pedons it commonly is mottled in shades of brown or gray.

The Btg horizon has hue of 10YR to 5Y, value of 6 or 7, and chroma of 1 or 2. It has mottles in shades of brown, yellow, or gray. It is silt loam or silty clay loam.

The Btx horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It has mottles in shades of brown, yellow, or gray. It is silt loam or silty clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It dominantly has mottles in shades of brown or yellow. In some pedons it is evenly mottled in shades of brown, yellow, or gray. It is silt loam or silty clay loam.

Skidmore Series

The Skidmore series consists of deep and very deep, well drained, moderately rapidly permeable soils. These soils formed in mixed alluvium derived from sandstone, siltstone, and limestone. They are on narrow stream flood plains throughout the county. Slopes range from 0 to 2 percent. The soils are loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts.

Skidmore soils are associated on the landscape with Carpenter, Newark, Nolin, and Yosemite soils. Carpenter soils are on colluvial toe slopes above the Skidmore soils and are in a fine-loamy family. Newark soils are somewhat poorly drained. Newark and Nolin soils are in a fine-silty family. Yosemite soils are somewhat poorly drained.

Typical pedon of Skidmore very gravelly loam, frequently flooded; about 2.1 miles south of Liberty, 100 yards east of Calhoun Creek, 0.35 mile east of U.S. Highway 127; in the Liberty Quadrangle, about 2,232,400 feet east and 342,350 feet north by the Kentucky coordinate system:

Ap—0 to 10 inches; brown (10YR 4/3) very gravelly loam; weak fine granular structure; friable; common fine roots; about 40 percent rock fragments as much as 4 inches in diameter; slightly acid; abrupt smooth boundary.

Bw—10 to 36 inches; brown (10YR 4/3) very gravelly loam; weak fine and medium subangular blocky structure; friable; few fine roots; about 50 percent rock fragments as much as 4 inches in diameter; slightly acid; clear smooth boundary.

C—36 to 60 inches; brown (10YR 5/3) extremely gravelly loam; massive; friable; few fine roots; about 60 percent rock fragments as much as 4 inches in diameter; slightly acid.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is 40 to more than 100 inches. Reaction ranges from medium acid to mildly alkaline. The content of rock fragments ranges from 10 to 50 percent in the Ap and Bw horizons and from 35 to 90 percent in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. In some pedons it has gray mottles in the lower part. The fine-earth fraction is loam, fine sandy loam, sandy loam, or clay loam.

The C horizon has colors similar to those of the Bw horizon. In some pedons it has gray mottles. The fine-earth fraction is loam, fine sandy loam, sandy loam, or clay loam.

Teddy Series

The Teddy series consists of very deep, moderately well drained soils. These soils formed in a loamy mantle over material weathered from limestone, sandstone, siltstone, and shale. They are on broad ridgetops in the uplands throughout the county. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 2 to 6 percent. The soils are fine-loamy, siliceous, mesic Typic Fragiudults.

Teddy soils are associated on the landscape with Frankstown, Frederick, Johnsburg, and Pricetown soils. Frankstown and Frederick soils are on narrow, convex ridgetops and are well drained. Frederick soils are in a clayey family. Johnsburg and Pricetown soils are in a fine-silty family. Johnsburg soils are in the slightly lower areas and are somewhat poorly drained. Pricetown soils are well drained.

Typical pedon of Teddy silt loam, 2 to 6 percent slopes; about 9.0 miles south of Liberty, 2.3 miles southwest of Phil, 50 yards west of Thomas Ridge Church; in the Phil Quadrangle, about 2,228,900 feet east and 311,550 feet north by the Kentucky coordinate system:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common very fine roots; slightly acid; clear smooth boundary.

Bt—9 to 21 inches; yellowish brown (10YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; few very fine tubular pores; few distinct clay films on faces of peds; medium acid; gradual smooth boundary.

Btx1—21 to 30 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light gray (10YR 7/2) and grayish brown (10YR 5/2) mottles; moderate very coarse prismatic structure parting to weak fine and medium subangular blocky; very firm and brittle; few very fine roots between prisms; few distinct clay films on faces of peds; few thin distinct light brownish gray silt coatings between prisms; about 1 percent pebbles; strongly acid; gradual smooth boundary.

Btx2—30 to 46 inches; yellowish brown (10YR 5/4) clay loam; many medium distinct light gray (10YR 7/2) and grayish brown (10YR 5/2) mottles; moderate very coarse prismatic structure parting to weak fine and medium subangular blocky; very firm and brittle; few distinct clay films on faces of peds; few thin light brownish gray silt coatings between prisms; few fine irregular concretions; strongly acid; clear irregular boundary.

2Bt'1—46 to 72 inches; red (2.5YR 4/6) and dark gray (10YR 4/1) clay loam; common medium distinct dark gray (N 4/0) and reddish yellow (7.5YR 6/6) mottles; moderate coarse platy structure parting to moderate medium angular blocky; firm; many distinct clay films on faces of peds; very strongly acid; clear irregular boundary.

2Bt'2—72 to 79 inches; reddish brown (5YR 5/4) clay loam; common medium distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure parting to moderate medium angular blocky; extremely firm; common distinct clay films on faces of peds; about 10 percent pebbles; very strongly acid; gradual irregular boundary.

3Bt'3—79 to 89 inches; yellowish brown (10YR 5/4) very gravelly clay loam; many medium prominent red (2.5YR 4/8) and common medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure parting to moderate medium angular blocky; firm; few faint clay films on faces of peds; about 35 percent pebbles; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction ranges from very strongly acid to slightly acid in the Ap and Bt horizons unless the soil is limed. It is very strongly acid or strongly acid in the Btx, 2Bt', and 3Bt' horizons. The content of rock fragments ranges from 0 to 2 percent in the Ap, Bt, and Btx horizons, from 0 to 15 percent in the 2Bt' horizon, and from 10 to 45 percent in the 3Bt' horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Some pedons have an A horizon. This horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or loam.

Some pedons have an E horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is silt loam or loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. It is silt loam, loam, or silty clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 8. It has mottles in shades of gray or brown. It is silt loam, silty clay loam, or clay loam. In some pedons it has gray silt coatings surrounding the prisms.

The 2Bt' horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 1 to 6. It has mottles in shades of brown, gray, or red. It is silty clay loam, silty clay, or clay loam.

The 3Bt' horizon has hue of 2.5YR to 10YR, value of 5 or 6, and chroma of 4 to 6. It has mottles in shades of red, gray, or brown. The fine-earth fraction is clay loam or silty clay loam.

Some pedons have a 3C horizon. This horizon has colors similar to those of the 2Bt' horizon, or it is mottled in those colors and has no dominant matrix hue. It has textures similar to those of the 2Bt' horizon. The content of rock fragments ranges from 10 to 45 percent.

Trappist Series

The Trappist series consists of moderately deep, well drained, slowly permeable soils. These soils formed in material weathered from black shale and siltstone. They are on ridgetops and side slopes in the uplands, mainly in the northern part of the county and near Dunnville in the southwestern part of the county. Slopes range from 2 to 20 percent. The soils are clayey, mixed, mesic Typic Hapludults.

Trappist soils are associated on the landscape with Carpenter, Colyer, and Lenberg soils. Carpenter soils are in a fine-loamy family and have soft bedrock at a depth of more than 40 inches. Carpenter and Lenberg soils are on steep slopes above the Trappist soils. Colyer soils have bedrock at a depth of less than 20 inches. Lenberg soils are in a fine textured family and are underlain by soft bedrock.

Typical pedon of Trappist silt loam, 6 to 12 percent slopes; about 2.0 miles west of Ellisburg, about 0.75 mile northwest of the confluence of Coffman Branch and Big South Fork, and 0.25 mile north of Kentucky Highway 78; in the Ellisburg Quadrangle, about 2,236,700 feet east and 416,550 feet north by the Kentucky coordinate system:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.

Bt1—6 to 11 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; few very fine continuous pores; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—11 to 26 inches; strong brown (7.5YR 5/6) silty clay; few fine distinct brown (10YR 5/3) mottles; strong fine angular blocky structure parting to strong fine subangular blocky; very firm; few fine roots throughout; common distinct clay films on faces of peds; about 10 percent shale channers; very strongly acid; gradual wavy boundary.

C—26 to 34 inches; variegated reddish brown (5YR 4/3), yellowish red (5YR 5/6), and gray (5YR 6/1) very channery silty clay; massive; very firm; about 40 percent shale channers; very strongly acid; clear smooth boundary.

Cr—34 to 38 inches; black (5YR 2/1), weathered shale bedrock; abrupt smooth boundary.

R—38 inches; black (5YR 2/1), unweathered shale bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from extremely acid to strongly acid unless the soil is limed. The content of shale or siltstone rock fragments ranges from 0 to 35 percent in the solum and from 25 to 75 percent in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons it has mottles in shades of red or brown in the lower part. The fine-earth fraction is silty clay loam, silty clay, or clay.

The C horizon is variegated in shades of red, brown, and gray. The fine-earth fraction is silty clay or clay.

Yosemite Series

The Yosemite series consists of very deep, somewhat poorly drained, moderately rapidly permeable soils. These soils formed in mixed alluvium. They are on narrow flood plains. Slopes range from 0 to 2 percent. The soils are loamy-skeletal, mixed, nonacid, mesic Aeric Fluvaquents.

Yosemite soils are associated on the landscape with Nolin, Melvin, and Skidmore soils. Nolin and Skidmore soils are well drained. Nolin and Melvin soils are in a fine-silty family. Melvin soils are poorly drained.

Typical pedon of Yosemite gravelly silt loam, frequently flooded; about 2.0 miles east of Bethelridge, 0.5 mile north of the Pulaski County line, 250 feet north of Russell Creek; in the Science Hill Quadrangle, about 2,297,500 feet east and 332,500 feet north by the Kentucky coordinate system:

Ap—0 to 10 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; friable; common fine roots; about 33 percent gravel; medium acid; abrupt smooth boundary.

Bw—10 to 17 inches; yellowish brown (10YR 5/4) very gravelly loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; common fine roots; about 37 percent gravel; slightly acid; clear smooth boundary.

Bg1—17 to 23 inches; light brownish gray (10YR 6/2) extremely gravelly loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; about 65 percent gravel; slightly acid; clear wavy boundary.

Bg2—23 to 31 inches; light brownish gray (10YR 6/2) extremely gravelly loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; about 80 percent gravel; slightly acid; gradual wavy boundary.

Cg1—31 to 43 inches; light brownish gray (10YR 6/2) extremely gravelly clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; single grain; loose; few distinct dark organic coatings on the upper surfaces of rock fragments; about 84 percent gravel; neutral; gradual wavy boundary.

Cg2—43 to 64 inches; light brownish gray (10YR 6/2) extremely gravelly sandy clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; single grain; loose; about 83 percent gravel; neutral.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline. The content of rock fragments, mostly gravel, ranges from 15 to 35 percent in the Ap horizon, from 20 to 40 percent in the Bw horizon, from 35 to 80 percent in the Bg horizon, and from 35 to 85 percent in the Cg horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. It has mottles in shades of brown or gray. The fine-earth fraction is loam, silt loam, or sandy clay loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of gray or brown. The fine-earth fraction is loam, silt loam, sandy loam, silty clay loam, clay loam, or sandy clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of gray or brown. The fine-earth fraction is sandy clay loam, sandy loam, clay loam, or silty clay loam.

Formation of the Soils

This section relates the factors of soil formation to the soils in Casey County. It also discusses the geology and topography of the county.

Factors of Soil Formation

Soils form through the interaction of five major factors: parent material, climate, plant and animal life, relief, and time *(9)*. These factors are interrelated, and each factor affects the others. The effects of each one vary from place to place. In some places a particular factor may dominate soil formation. In Casey County, climate and plant and animal life are not likely to vary greatly but differences exist regarding parent material and relief.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. In the early stages of soil formation, a soil has properties similar to those of the parent material. As weathering takes place, these properties are modified and the soil develops its own characteristics. The nature of the parent material affects the rate of weathering and determines the texture and mineral composition of the soil. These properties affect the permeability, shrink-swell potential, and porosity of the soil.

Parent material can be weathered in place, or it can be transported and deposited by water, wind, gravity, or ice. In Casey County most of the soils formed in material that weathered in place from sedimentary rock of the Mississippian, Devonian, and Ordovician periods. Frankstown, Trappist, and Faywood soils are examples. These soils developed mostly from residual parent material and have a loamy or clayey subsoil.

Examples of soils that formed in material deposited by water or streams are Melvin, Nolin, and Yosemite soils. These soils have a loamy subsoil.

Some soils formed in more than one type of material. Carpenter, Pricetown, and Teddy soils are examples. In Pricetown and Teddy soils, the surface layer and the upper part of the subsoil formed in a loamy mantle, possibly wind-transported material, or loess. The lower part of the subsoil and the substratum formed in residual parent material and are generally clayey. Carpenter soils formed in gravity-transported material, or colluvium, deposited over residual material. They are loamy in the surface layer and the upper part of the subsoil and are clayey in the lower part.

Climate

Climatic factors, mainly temperature and rainfall, affect the physical, chemical, and biological properties of soils. Climate is probably the most influential factor in soil formation *(9)*. Temperature affects the rates of chemical and physical reactions in the soils and thus the rate of soil formation. If the temperature increases 10 degrees C, the rate of chemical reaction doubles. Moisture and temperature affect biochemical reactions. Moisture is essential in soil formation. Climate significantly influences the natural vegetation. Because it affects such factors as erosion and deposition, climate also influences the relief of an area and the degree of profile development *(14)*.

Changes in climate over long periods affect the soils. Soil formation is affected by the average climatic condition, but extremes in the weather probably have had more influence on particular soil properties than on soil formation *(14)*. The soils in Casey County formed in a temperate, moist climate that was probably similar to the present climate. Winters are fairly short, and periods of extremely low temperatures also are short. Periods of high temperatures are fairly brief in summer. The average annual temperature in the county is about 57 degrees F. The average annual precipitation is about 51 inches. The precipitation is fairly evenly distributed throughout the year.

Temperature and rainfall in Casey County have favored almost continuous weathering of rocks and minerals, leaching of soluble materials and fine particles, and removing and depositing materials by water. Soluble bases, including calcium and magnesium, and clay minerals have been moved to lower horizons or completely leached from the soils. As a result, many soils that formed in material high in carbonates and clay minerals are acid and have a loamy surface layer and an accumulation of clay in the subsoil. Examples are Frederick and Frankstown soils.

Plant and Animal Life

The native vegetation in Casey County is mostly mixed hardwoods. Most of the soils formed under this hardwood forest. The soils that remain in woodland have a thin, dark surface layer that contains a high content of organic matter. Below the surface layer is a lighter colored horizon that has had much of the clay and soluble minerals leached from it. Most of the soils in the county have been plowed, and the dark surface layer has been mixed with the underlying light colored layer.

Earthworms, insects, and other small animals mix soil material and add organic matter to the soils. Bacteria, fungi, and other micro-organisms break down plant and animal residue. Trees and other plants transport nutrients from the lower part of the soils to the surface. They also add organic matter to the soils, provide a protective cover that slows erosion, and, in association with micro-organisms, add nitrogen to the soil. Soil material is mixed by root channeling and by the uprooting of trees by the wind. The organic matter added by plants and animals alters the chemical processes in the soils and forms humus. Some micro-organisms directly or symbiotically release nutrients, such as nitrogen, to the soils. The organic fraction tends to improve soil structure. The decay of the organic matter releases acids that accelerate weathering.

Changes caused by human activity are evident in soils that have been eroded, drained, excavated, or filled. Many areas of the poorly drained Melvin and somewhat poorly drained Newark soils on the Green River flood plain have been artificially drained. In Liberty, fill material has been added to raise some low areas above the flood plain. In some places, erosion has removed most or all of the original surface layer and the subsoil is exposed. Cultivation, drainage, irrigation, fertilization, introduction of new plants, and major farming operations further influence soil formation by changing the nature and properties of the soils. Most of these changes, except for those caused by major land shaping, take place slowly.

Relief

Relief affects soil formation through its influence on drainage, erosion, plant cover, and soil temperature. Because it varies widely in Casey County, relief accounts for many differences among the soils. Topography tends to modify the effects of climate and vegetation. For example, Melvin soils, which formed on nearly level flood plains, had an excessive amount of water during formation. The wetness resulted in a lack of oxidation and the formation of a gray subsoil. In other nearly level to gently sloping soils, a fragipan can form under certain conditions. Lawrence and Teddy soils are examples.

Gently sloping and sloping soils commonly show most clearly the influence of all the soil-forming factors. Although excess water runs off these soils, erosion is not excessive. Because the surface is relatively stable, an argillic horizon formed in these soils. Frederick and Trappist soils are examples.

Some steep soils are shallow and show slight profile development because geologic erosion takes place almost as rapidly as soil formation. Colyer and Fairmount soils are examples. Some steep soils are deep because the parent material moves down the slopes slowly and accumulates at the lower part of the slope. This process is most apparent on foot slopes below steep slopes. Carpenter soils are an example of soils forming through this process. Other steep soils are moderately deep because weathering of the underlying rock proceeds at a faster rate than geologic erosion. Faywood and Garmon soils are examples.

Although the soil temperature, moisture content, and plant cover are somewhat different on north- and south-facing slopes, these differences are generally slight in the county. They may, however, be within the range of characteristics of a specific series, such as Garmon, and still cause differences in woodland productivity (see table 7).

Time

The time required for a soil to form depends on the other soil-forming factors *(9)*. Less time is required for a soil to form in a warm, moist climate than in a cool, dry climate. Also, some parent material is more resistant to weathering than others. For example, quartz sand- and silt-sized particles are more resistant than particles of calcite or gypsum that are the same size *(9)*. The relative degree of profile development, rather than the number of years a soil has been in the process of forming, determines the age or maturity of a soil.

Soils that have characteristics that are almost identical to those of the parent material are immature. In Casey County, immature soils are on flood plains where fresh deposition prevents the development of distinct horizons. Nolin and Melvin soils are examples. Immature soils also occur on steep landscapes where geologic erosion and runoff prevent horizon development. Garmon soils are an example.

Soils that have well developed profiles are mature. Pricetown and Trappist soils are examples. They are deep to moderately deep over bedrock and have distinct, well developed profiles. Erosion often removes material from mature soils and some immature soils and deposits the sediments as new parent material on other soils *(14)*.

Geology and Topography

Casey County is in the Eastern Pennyroyal, Knobs, and Outer Bluegrass physiographic regions *(6)*. It is underlain by sedimentary rock of the Ordovician, Devonian, Mississippian, and Pennsylvanian periods of the Paleozoic era *(20, 28, 29, 30, 31, 36, 37)*. Some of the broad upland ridgetops are capped with a loamy mantle, which possibly was influenced by loess of Quaternary age. The valleys consist of alluvial materials of Quaternary age. Table 21 shows the relationship of the geologic systems, formations, and members and the thickness and predominant soils of the members.

The oldest rock in the county is of Upper Ordovician age. It occurs mainly in the northern part of the county, in the Outer Bluegrass region, and at the base of the Knobs. It also occurs along some valley walls and along some faults. It generally consists of limestone and mudstone interbedded with thin layers of calcareous shale. The Drakes and Ashlock are the major formations. Several of the members of these formations contain abundant amounts of fossils. Fairmount and Faywood soils are dominant on the side slopes on these formations. Rock outcrops are common on the steep side slopes. Lowell soils are on the sloping ridgetops. In many places the Boyle Formation of Devonian age has a rim of rock outcrops on top of the Ordovician formations.

Rock of Silurian age is unknown in the county. The Boyle Formation and the New Albany (Chattanooga) Shale are of Devonian age. The Boyle Formation is dark gray dolomite and bluish gray limestone. It often forms resistant outcrops on side slopes. Fairmount and Faywood soils are the dominant soils on these side slopes. Crider soils formed where this formation occurs on ridgetops. The New Albany Shale occurs mainly in the Knobs region in the northern part of the county. It also occurs near Dunnville and on the lower side slopes along some streams. It is locally called slate rock or black shale. Colyer and Trappist soils are dominant on this formation. They are on sloping to steep side slopes.

Rock of Mississippian age covers most of the county. It is mostly limestone and shale with minor components of sandstone and siltstone. Lenberg and Carpenter soils are dominant on the Lower Mississippian shales, which are the New Providence and Nancy members of the Borden Formation. The New Providence member is greenish gray clay shale. The Nancy member is gray silty shale and siltstone. Areas of these members slump readily, especially when saturated. Lenberg soils formed in material weathered from these members, and Carpenter soils formed in colluvium underlain by residuum. These soils are on the moderately steep to steep lower side slopes. Garmon soils are dominant on the upper part of the Nancy member and on the Halls Gap member. The Halls Gap member is greenish gray siltstone and shale. Garmon soils are on steep side slopes. The Muldraugh member of the Borden Formation consists of light gray siltstone and chert. Frankstown and Garmon soils are dominant on this member. They are on moderately steep and steep side slopes.

The Salem and Warsaw Formation consists of gray limestone, siltstone, shale, and reddish brown sandstone. Frankstown soils are dominant on the sloping and moderately steep side slopes and ridgetops. Pricetown and Teddy soils are dominant on the broader, gently sloping ridgetops.

The St. Louis Limestone rests on the Salem and Warsaw Formation. It is gray limestone, claystone, and siltstone. Frederick, Pricetown, and Teddy soils are dominant on the gently sloping to sloping ridgetops. In the eastern part of the county, the Monteagle Limestone rests on the St. Louis Limestone and has steep knobs that rise above the ridges. It is gray limestone and chert. Caneyville and Frederick soils are dominant on this formation. Rock outcrop is common on the steep sides of the knobs.

A few of the higher knobs have the Bangor Limestone and the Hartselle Formation resting on the Monteagle Limestone. They have very little exposure and have little significance in the county. Green River Knob, the highest point in the county, is capped by the Pennington Formation, a limestone of Mississippian age, and the Lee Formation, a sandstone of Pennsylvanian age. Both the Lee and Pennington Formations have little significance in the county.

The youngest geologic material in Casey County is the alluvial deposits of the Quaternary period. These deposits are on flood plains scattered throughout the county. The largest area of these deposits is in the Green River Valley. Nolin, Melvin, Newark, and Yosemite soils are the dominant soils on the flood plains.

Several faults displace the rock in Casey County *(20)*. These faults may also interrupt the regular pattern of soils in an area. One of the most noticeable fault areas is the Middleburg graben, which runs from Lincoln County along the Green River to Yosemite. The Goose Creek Fault is part of a series of faults that form another graben. It runs north from the Russell County line to Red Hill Ridge. At one point just north of the county line, the rock is displaced vertically about 200 feet *(30)*. The Trace Fork Fault runs from Yosemite to Gilpin.

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Glossary

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.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Aspect. The direction that a slope faces.
Warm aspect.—Slopes of more than 15 percent facing an azimuth of 135 to 315 degrees.
Cool aspect.—Slopes of more than 15 percent facing an azimuth of 315 to 135 degrees.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	less than 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	more than 5.2

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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.

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.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Chert. An impure, very fine grained, siliceous rock frequently associated with limestone, dolomite, and conglomerate.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil 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 are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock made up of rounded to subangular rock fragments that commonly has a matrix of sand and finer material. It commonly is cemented by silica, calcium, calcium carbonate, or iron oxide.

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. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

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.

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.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Devonian period. The fourth period of the Paleozoic era of geologic time, extending from the end of the Silurian period (about 405 million years ago) to the beginning of the Mississippian period (about 345 million years ago).

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Dolomite. A sedimentary rock that is made up mainly of calcium and magnesium carbonate.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

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.

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 fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fault. A fracture or zone of fractures of the earth that has a displacement of sides in respect to one another.

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.

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.*

Fine earth. The portion of the soil that can pass through a No. 10 (2 millimeter) U.S. standard sieve.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Fissile. The characteristic or quality of a rock that permits its distinct separation into parallel layers, as in shale.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant that is not a grass or a sedge.

Formation. The basic stratigraphic unit in the local classification of rocks; a body of rock generally characterized by some degree of internal homogeneity or distinctive lithologic features and by its mappability at the earth's surface.

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.

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.

Geode. A hollow nodule, concretion, or vug that is commonly lined with inwardly pointing crystals.

Geology. The study of science that includes the origin, composition, structure, and history of the earth, especially as revealed by the rocks and the processes through which changes in the rocks occur.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graben. A depressed segment of the earth's crust that is bounded on at least two sides by faults.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 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 (geology). 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.

Hill. A natural elevation of the land surface that generally is restricted in summit area and has a well defined outline.

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 at the surface of a mineral soil.

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 O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but 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-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

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.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

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.

Intermittent stream. A small creek or stream in which streamflow is interrupted by an occasional dry period.

Knob. A low, rounded hill rising above adjacent landforms. In Kentucky, shale commonly is the major rock on the side slopes of the knob.

Landform. Any physical, recognizable form or feature on the earth's surface that has a characteristic shape and that formed through natural causes. It includes major features such as plains, hills, and valleys.

Landscape (geology). The distinct association of landforms, especially as modified by geologic forces, that can be seen in a single view.

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.

Limestone. A sedimentary rock consisting mainly of calcium carbonate, primarily in the form of calcite. Limestone generally forms through a combination of organic and inorganic processes and includes soluble and insoluble constituents. Many limestones contain fossils.

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 strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is 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.

Mississippian period. The fifth period of the Paleozoic era of geologic time, extending from the end of the Devonian period (about 345 million years ago) to the beginning of the Pennsylvanian period (about 310 million years ago).

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.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mudstone. Sedimentary rock that formed by the induration of silt and clay in approximately equal proportions.

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 between 6.6 and 7.3. (See Reaction, soil.)

Ordovician period. The second period of the Paleozoic era of geologic time, extending from the end of the Cambrian period (about 500 million years ago) to the beginning of the Silurian period (about 425 million years ago).

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter is expressed as:

Low	less than 2 percent
Moderate	2 to 4 percent
High	more than 4 percent

Paleozoic era. The geologic era between the Precambrian and Mesozoic eras. It began about 600 million years ago and ended about 230 million years ago. It is characterized by the development of the first fish, amphibians, reptiles, and land plants.

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.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pennsylvanian period. The sixth period of the Paleozoic era of geologic time, extending from the end of the Mississippian period (about 310 million years ago) to the beginning of the Permian period (about 280 million years ago).

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.

Perennial stream. A creek or stream that has flowing water throughout the year.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 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. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

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.

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.

Quaternary period. The second period of the Cenozoic era of geologic time, extending from the end of the Tertiary period (about 1 million years ago) to the present.

Reaction, soil. A measure of the 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:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

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 is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

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.

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.

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 adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. 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. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

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 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. The slope classes in this survey are:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Sloping	6 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 30 percent
Very steep	30 to 60 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

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.

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 substratum. The living roots and plant and animal activities are largely confined to the solum.

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.

Stratified. Arranged in layers or strata. The term refers to geologic material. Layers of soil that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind 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 grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

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."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

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). An 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.

Topography. The configuration of the surface of an area, including the relative positions and elevations of the natural or manmade features.

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.

Upland (geology). 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 that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. 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.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-87 at Campbellsville, Kentucky)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average daily	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	43.2	24.5	33.9	70	-11	23	4.01	1.74	5.94	7	6.0
February----	48.5	27.7	38.1	73	-2	30	3.75	1.91	5.34	7	4.1
March-------	58.3	35.8	47.1	81	13	102	4.77	2.62	6.65	9	2.9
April-------	69.4	45.4	57.4	86	25	240	4.64	2.39	6.60	8	.0
May---------	77.6	53.7	65.7	91	34	487	4.84	2.74	6.69	8	.0
June--------	84.8	61.5	73.2	95	45	696	4.40	2.41	6.16	7	.0
July--------	87.9	65.5	76.7	97	50	828	5.40	2.92	7.58	8	.0
August------	87.1	64.0	75.6	96	49	794	4.24	2.02	6.15	6	.0
September---	81.6	57.3	69.5	95	39	585	4.22	1.58	6.41	6	.0
October-----	71.0	45.5	58.3	88	25	277	2.83	1.07	4.30	5	.0
November----	58.0	36.9	47.5	79	14	62	3.70	1.85	5.30	7	.8
December----	48.1	29.6	38.9	71	1	32	4.40	2.05	6.41	7	1.6
Yearly:											
Average---	68.0	45.6	56.8	---	---	---	---	---	---	---	---
Extreme---	---	---	---	99	-12	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,156	51.20	42.43	60.52	85	15.4

* 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 (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-87 at Campbellsville, Kentucky)

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. 6	Apr. 20	Apr. 30
2 years in 10 later than--	Apr. 1	Apr. 15	Apr. 25
5 years in 10 later than--	Mar. 23	Apr. 5	Apr. 15
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 26	Oct. 15	Oct. 5
2 years in 10 earlier than--	Nov. 1	Oct. 21	Oct. 11
5 years in 10 earlier than--	Nov. 12	Oct. 31	Oct. 23

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-87 at Campbellsville, Kentucky)

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	213	185	169
8 years in 10	220	193	176
5 years in 10	233	209	190
2 years in 10	247	224	203
1 year in 10	254	232	210

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BeB	Berea silt loam, 2 to 6 percent slopes	460	0.2
CaC	Caneyville silt loam, 6 to 12 percent slopes	640	0.2
CaD	Caneyville silt loam, very rocky, 6 to 20 percent slopes	1,680	0.6
CaE	Caneyville silt loam, very rocky, 20 to 30 percent slopes	2,970	1.0
CgB	Carpenter gravelly silt loam, 2 to 6 percent slopes	1,150	0.4
CgC	Carpenter gravelly silt loam, 6 to 12 percent slopes	5,410	1.9
CoF	Colyer silt loam, 20 to 50 percent slopes	9,050	3.1
CpD	Colyer-Trappist complex, 12 to 20 percent slopes	5,490	1.9
CrB	Crider silt loam, 2 to 6 percent slopes	720	0.3
EkB	Elk silt loam, 2 to 6 percent slopes	420	0.1
FaF	Fairmount silty clay loam, very rocky, 30 to 60 percent slopes	730	0.3
FdD2	Faywood silt loam, 12 to 20 percent slopes, eroded	1,210	0.4
FfE2	Faywood-Fairmount-Rock outcrop complex, 20 to 30 percent slopes, eroded	10,900	3.8
FkB	Frankstown silt loam, 2 to 6 percent slopes	1,360	0.5
FkC	Frankstown silt loam, 6 to 12 percent slopes	21,370	7.5
FkD	Frankstown silt loam, 12 to 20 percent slopes	35,130	12.3
FrB	Frederick silt loam, 2 to 6 percent slopes	970	0.3
FrC	Frederick silt loam, 6 to 12 percent slopes	13,300	4.6
FrD	Frederick silt loam, 12 to 20 percent slopes	1,920	0.7
GaF	Garmon silt loam, 30 to 60 percent slopes	72,890	25.5
Jo	Johnsburg silt loam	1,010	0.4
La	Lawrence silt loam, rarely flooded	1,370	0.5
LcE	Lenberg-Carpenter complex, 12 to 30 percent slopes	29,680	10.4
Ln	Lindside silt loam, occasionally flooded	730	0.3
LoC	Lowell silt loam, 6 to 12 percent slopes	1,289	0.5
LoD	Lowell silt loam, 12 to 20 percent slopes	830	0.3
Me	Melvin silt loam, occasionally flooded	5,120	1.8
Ne	Newark silt loam, occasionally flooded	5,120	1.8
No	Nolin silt loam, occasionally flooded	8,220	2.9
PrB	Pricetown silt loam, 2 to 6 percent slopes	17,390	6.1
PrC	Pricetown silt loam, 6 to 12 percent slopes	750	0.3
Rb	Robertsville silt loam, rarely flooded	1,020	0.4
RoE	Rock outcrop-Caneyville complex, 6 to 35 percent slopes	270	0.1
Sk	Skidmore very gravelly loam, frequently flooded	6,520	2.3
TeB	Teddy silt loam, 2 to 6 percent slopes	9,380	3.3
TrB	Trappist silt loam, 2 to 6 percent slopes	660	0.2
TrC	Trappist silt loam, 6 to 12 percent slopes	1,630	0.6
Yo	Yosemite gravelly silt loam, frequently flooded	6,220	2.2
	Water areas more than 40 acres in size	128	*
	Total	285,107	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY 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	Tobacco	Soybeans	Wheat	Grass-legume hay	Pasture
		Bu	Lb	Bu	Bu	Ton	AUM*
BeB------------- Berea	IIe	100	2,600	35	35	4.0	8.0
CaC------------- Caneyville	IIIe	75	2,200	25	30	3.5	7.0
CaD, CaE-------- Caneyville	VIs	---	---	---	---	---	4.0
CgB------------- Carpenter	IIe	110	2,650	35	35	4.0	7.5
CgC------------- Carpenter	IIIe	100	2,300	30	30	3.5	7.0
CoF------------- Colyer	VIIs	---	---	---	---	---	---
CpD**----------- Colyer-Trappist	VIs	---	---	---	---	2.0	4.5
CrB------------- Crider	IIe	130	3,600	45	50	5.5	10.0
EkB------------- Elk	IIe	125	3,200	45	45	5.5	9.0
FaF------------- Fairmount	VIIe	---	---	---	---	---	---
FdD2------------ Faywood	IVe	75	1,900	---	25	3.0	5.5
FfE2**----------		---	---	---	---	---	---
Faywood--------	VIe						
Fairmount------	VIe						
Rock outcrop---	VIIIs						
FkB------------- Frankstown	IIe	95	2,400	30	35	4.0	7.0
FkC------------- Frankstown	IIIe	85	2,200	25	30	3.5	6.5
FkD------------- Frankstown	IVe	75	1,800	---	25	3.0	5.5
FrB------------- Frederick	IIe	110	2,500	35	40	4.0	8.0
FrC------------- Frederick	IIIe	100	2,300	30	35	3.5	7.0
FrD------------- Frederick	IVe	75	2,000	---	30	3.0	6.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Pasture
		Bu	Lb	Bu	Bu	Ton	AUM*
GaF-------------- Garmon	VIIe	---	---	---	---	---	---
Jo-------------- Johnsburg	IIIw	80	1,800	30	30	3.0	6.0
La-------------- Lawrence	IIIw	80	1,800	30	30	3.0	6.0
LcE**----------- Lenberg-Carpenter	VIe	---	---	---	---	---	4.0
Ln-------------- Lindside	IIw	120	2,800	40	40	4.5	9.0
LoC------------- Lowell	IIIe	100	2,300	30	35	4.0	8.0
LoD------------- Lowell	IVe	75	1,900	---	30	3.0	6.0
Me-------------- Melvin	IIIw	80	---	35	---	3.5	7.0
Ne-------------- Newark	IIw	110	2,500	35	35	4.0	8.5
No-------------- Nolin	IIw	125	3,000	40	40	5.0	9.0
PrB------------- Pricetown	IIe	115	3,200	45	50	5.0	9.0
PrC------------- Pricetown	IIIe	100	2,900	35	45	4.5	8.0
Rb-------------- Robertsville	IVw	70	---	30	---	3.0	5.5
RoE**:							
Rock outcrop---	VIIIs	---	---	---	---	---	---
Caneyville-----	VIe	---	---	---	---	---	4.0
Sk-------------- Skidmore	IIw	80	2,500	30	30	3.5	7.0
TeB------------- Teddy	IIe	100	2,500	35	40	4.5	8.0
TrB------------- Trappist	IIe	80	2,500	35	35	4.0	7.0
TrC------------- Trappist	IIIe	75	2,300	30	30	3.5	6.5
Yo-------------- Yosemite	IIw	100	2,250	30	---	4.0	8.0

* 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 6.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	59,320	32,510	26,810	---
III	51,889	44,389	7,500	---
IV	40,110	39,090	1,020	---
V	---	---	---	---
VI	48,116	37,976	---	10,140
VII	82,670	73,620	---	9,050
VIII	2,874	---	---	2,874

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
BeB------------- Berea	Slight	Slight	Slight	Severe	Virginia pine-------	70	109	Shortleaf pine, eastern white pine, sweetgum, yellow-poplar, white ash, white oak.
					White oak-----------	70	52	
					Black oak-----------	70	52	
					Hickory-------------	---	---	
					Yellow-poplar-------	---	---	
					Scarlet oak---------	---	---	
					Sugar maple---------	---	---	
CaC, CaD-------- Caneyville	Moderate	Moderate	Slight	Severe	Black oak-----------	65	47	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	38	
					Chinquapin oak------	44	29	
					Scarlet oak---------	50	34	
CaE------------- Caneyville (warm aspect)	Severe	Moderate	Moderate	Severe	Black oak-----------	65	47	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					Eastern redcedar----	36	38	
					Chinquapin oak------	44	29	
					Scarlet oak---------	50	34	
CaE------------- Caneyville (cool aspect)	Severe	Moderate	Slight	Severe	Black oak-----------	71	53	White oak, yellow-poplar, white ash, eastern white pine, northern red oak.
					White oak-----------	64	47	
					Sugar maple---------	---	---	
					Hickory-------------	---	---	
					White ash-----------	72	---	
					Eastern redcedar----	46	54	
					Yellow-poplar-------	90	90	
CgB, CgC-------- Carpenter	Slight	Slight	Slight	Severe	White oak-----------	71	53	Yellow-poplar, black walnut, northern red oak, white oak, eastern white pine, shortleaf pine, white ash.
					Black oak-----------	74	56	
					Chestnut oak--------	70	52	
					Hickory-------------	---	---	
					Scarlet oak---------	75	57	
					Northern red oak----	71	53	
					Virginia pine-------	74	114	
CoF------------- Colyer (warm aspect)	Severe	Severe	Severe	Slight	Virginia pine-------	52	73	Virginia pine, shortleaf pine.
					Chestnut oak--------	51	35	
					Scarlet oak---------	53	37	
					White oak-----------	52	36	
					Shortleaf pine------	50	68	
					Pitch pine----------	48	---	
CoF------------- Colyer (cool aspect)	Severe	Severe	Moderate	Slight	Virginia pine-------	60	91	Virginia pine, shortleaf pine.
					Chestnut oak--------	65	47	
					Scarlet oak---------	56	39	
					Black oak-----------	66	48	
					Hickory-------------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
CpD**:								
Colyer (warm aspect)	Moderate	Moderate	Moderate	Slight	Virginia pine	52	73	Virginia pine, shortleaf pine.
					Chestnut oak	51	35	
					Scarlet oak	53	37	
					White oak	52	36	
					Shortleaf pine	50	68	
					Pitch pine	48	---	
Trappist (warm aspect)	Moderate	Moderate	Slight	Moderate	Virginia pine	62	95	Virginia pine, white oak.
					White oak	62	45	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
					Scarlet oak	---	---	
					American beech	---	---	
CpD**:								
Colyer (cool aspect)	Moderate	Moderate	Moderate	Slight	Virginia pine	60	91	Virginia pine, shortleaf pine.
					Chestnut oak	65	47	
					Scarlet oak	56	39	
					Black oak	66	48	
					Hickory	---	---	
Trappist (cool aspect)	Moderate	Moderate	Slight	Moderate	Virginia pine	62	95	Virginia pine, white oak.
					White oak	62	45	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
					Scarlet oak	---	---	
					American beech	---	---	
CrB: Crider	Slight	Slight	Slight	Severe	Yellow-poplar	97	102	Eastern white pine, yellow-poplar, black walnut, loblolly pine, white ash, northern red oak, white oak, shortleaf pine.
					Sugar maple	---	---	
					Black oak	84	66	
					White ash	87	---	
					Black walnut	80	---	
					White oak	72	54	
					Hickory	---	---	
					Northern red oak	84	66	
EkB: Elk	Slight	Slight	Slight	Severe	Yellow-poplar	94	97	Eastern white pine, yellow-poplar, black walnut, loblolly pine, white oak, northern red oak, white ash, shortleaf pine, sweetgum.
					Pin oak	96	93	
					Hackberry	---	---	
					Red maple	---	---	
					American sycamore	---	---	
					Black walnut	---	---	
					Sweetgum	98	132	
					Black cherry	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
FaF------------- Fairmount	Severe	Severe	Severe	Moderate	Black oak-----------	65	47	White oak, Virginia pine, white ash.
					Eastern redcedar----	41	44	
					Scarlet oak---------	60	43	
					White ash-----------	---	---	
					Black locust--------	---	---	
					Black walnut--------	---	---	
					Chinquapin oak------	---	---	
FdD2------------ Faywood	Moderate	Moderate	Slight	Moderate	Northern red oak----	70	52	White oak, eastern white pine, white ash, northern red oak.
					Scarlet oak---------	72	54	
					White oak-----------	60	43	
					Hickory-------------	---	---	
					White ash-----------	---	---	
					Chinquapin oak------	---	---	
					Sugar maple---------	---	---	
					Southern red oak----	---	---	
FfE2**:								
Faywood--------	Moderate	Moderate	Slight	Moderate	Northern red oak----	70	52	White oak, eastern white pine, white ash, northern red oak.
					Scarlet oak---------	72	54	
					White oak-----------	60	43	
					Hickory-------------	---	---	
					White ash-----------	---	---	
					Chinquapin oak------	---	---	
					Sugar maple---------	---	---	
					Southern red oak----	---	---	
Fairmount------	Moderate	Moderate	Severe	Moderate	Black oak-----------	65	47	White oak, Virginia pine, white ash.
					Eastern redcedar----	41	44	
					Scarlet oak---------	60	43	
					White ash-----------	---	---	
					Black locust--------	---	---	
					Black walnut--------	---	---	
					Chinquapin oak------	---	---	
Rock outcrop.								
FkB, FkC-------- Frankstown	Slight	Slight	Slight	Severe	Northern red oak----	79	61	Eastern white pine, yellow-poplar, shortleaf pine, white ash, northern red oak, white oak.
					Yellow-poplar-------	85	81	
					Shortleaf pine------	80	130	
					Virginia pine-------	80	122	
					White oak-----------	80	62	
					Black walnut--------	---	---	
					Black locust--------	---	---	
					White ash-----------	---	---	
FkD------------- Frankstown	Moderate	Slight	Slight	Severe	Northern red oak----	79	61	Eastern white pine, yellow-poplar, shortleaf pine, white ash, northern red oak, white oak.
					Yellow-poplar-------	85	81	
					Shortleaf pine------	80	130	
					Virginia pine-------	80	120	
					White oak-----------	80	62	
					Black walnut--------	---	---	
					Black locust--------	---	---	
					White ash-----------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
FrB, FrC-------- Frederick	Slight	Moderate	Moderate	Severe	Black oak-----------	83	65	Eastern white pine, yellow-poplar, white oak, white ash, northern red oak.
					Yellow-poplar-------	95	98	
					Black locust--------	80	---	
					White oak-----------	76	58	
					Southern red oak----	77	59	
					Virginia pine-------	68	105	
FrD------------- Frederick (warm aspect)	Moderate	Moderate	Moderate	Severe	Black oak-----------	74	56	Eastern white pine, white oak.
					Scarlet oak---------	66	48	
					Hickory-------------	---	---	
					White oak-----------	61	44	
					Black cherry--------	---	---	
FrD------------- Frederick (cool aspect)	Moderate	Moderate	Moderate	Severe	Black oak-----------	83	65	Eastern white pine, yellow-poplar, white oak, white ash, northern red oak.
					Yellow-poplar-------	95	98	
					Black locust--------	80	---	
					White oak-----------	76	58	
					Southern red oak----	77	59	
					Virginia pine-------	68	105	
GaF------------- Garmon (warm aspect)	Severe	Severe	Severe	Moderate	Chestnut oak--------	60	43	Virginia pine, eastern redcedar, white oak.
					White oak-----------	60	43	
					Black oak-----------	68	50	
					Hickory-------------	---	40	
					Eastern redcedar----	38	---	
					Sugar maple---------	---	---	
GaF------------- Garmon (cool aspect)	Severe	Severe	Slight	Moderate	Northern red oak----	72	54	Yellow-poplar, white ash, white oak, northern red oak, eastern white pine.
					White oak-----------	75	57	
					Yellow-poplar-------	99	105	
					Hickory-------------	---	---	
					Sugar maple---------	---	---	
					Chestnut oak--------	65	47	
					Red maple-----------	---	---	
Jo-------------- Johnsburg	Slight	Moderate	Slight	Severe	Yellow-poplar-------	94	97	Yellow-poplar, sweetgum, white oak.
					White ash-----------	---	---	
					Black oak-----------	77	59	
					Sweetgum------------	---	---	
					Hickory-------------	---	---	
					Red maple-----------	---	---	
					White oak-----------	73	55	
La-------------- Lawrence	Slight	Moderate	Moderate	Severe	Yellow-poplar-------	85	81	Yellow-poplar, green ash, American sycamore, white oak, sweetgum, willow oak, eastern white pine.
					Sweetgum------------	89	103	
					White oak-----------	74	56	
					Black oak-----------	78	60	
					Willow oak----------	76	68	
					Red maple-----------	---	---	
					Pin oak-------------	---	---	
					Hackberry-----------	---	---	
					American beech------	---	---	
					Southern red oak----	---	---	
					Blackgum------------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	Volume*	
LcE**:								
Lenberg (warm aspect)-------	Severe	Severe	Slight	Moderate	Virginia pine-------	61	93	Shortleaf pine, loblolly pine, white oak.
					White oak-----------	62	45	
					Hickory-------------	---	---	
					Chestnut oak--------	56	39	
					Scarlet oak---------	66	48	
					Black oak-----------	60	43	
					Post oak------------	46	31	
Carpenter (warm aspect)--------	Moderate	Moderate	Moderate	Severe	White oak-----------	58	41	Shortleaf pine, white oak.
					Scarlet oak---------	---	---	
					Black oak-----------	---	---	
					Chestnut oak--------	58	41	
					Hickory-------------	---	---	
					Post oak------------	---	---	
					Virginia pine-------	64	98	
LcE**:								
Lenberg (cool aspect)-------	Severe	Severe	Slight	Moderate	Virginia pine-------	61	93	Shortleaf pine, loblolly pine, white oak.
					White oak-----------	62	45	
					Hickory-------------	---	---	
					Chestnut oak--------	56	39	
					Scarlet oak---------	66	48	
					Black oak-----------	60	43	
					Post oak------------	46	31	
Carpenter (cool aspect)-------	Moderate	Moderate	Slight	Severe	White oak-----------	91	53	Yellow-poplar, black walnut, northern red oak, white oak, eastern white pine, shortleaf pine, white ash.
					Black oak-----------	74	56	
					Virginia pine-------	74	114	
					Chestnut oak--------	67	49	
					Hickory-------------	---	---	
					Scarlet oak---------	75	57	
					Northern red oak----	71	53	
Ln-------------- Lindside	Slight	Slight	Moderate	Severe	Northern red oak----	86	68	Eastern white pine, yellow-poplar, black walnut, northern red oak, shortleaf pine, white ash, white oak.
					Yellow-poplar-------	95	98	
					Black walnut--------	---	---	
					White ash-----------	85	---	
					White oak-----------	85	67	
					Red maple-----------	---	---	
LoC------------- Lowell	Slight	Slight	Slight	Severe	Black oak-----------	88	70	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
					White ash-----------	78	---	
					Hickory-------------	---	---	
					Virginia pine-------	78	119	
					Black locust--------	77	---	
					Sugar maple---------	---	---	
					Northern red oak----	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	Trees to plant
LoD------------- Lowell	Moderate	Moderate	Slight	Severe	Black oak-----------	88	70	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
					White ash-----------	78	---	
					Hickory-------------	---	---	
					Virginia pine-------	78	119	
					Black locust--------	77	---	
					Sugar maple---------	---	---	
					Northern red oak----	---	---	
Me-------------- Melvin	Slight	Moderate	Moderate	Severe	Pin oak-------------	99	97	Pin oak, American sycamore, sweetgum, loblolly pine, green ash, willow oak.
					Sweetgum------------	89	112	
					Green ash-----------	---	---	
					Hackberry-----------	---	---	
					Hickory-------------	---	---	
					Red maple-----------	---	---	
					American elm--------	---	---	
Ne-------------- Newark	Slight	Moderate	Moderate	Severe	Pin oak-------------	100	98	Eastern cottonwood, sweetgum, American sycamore, green ash.
					Eastern cottonwood--	94	113	
					Sweetgum------------	85	93	
					Green ash-----------	100	82	
					Swamp chestnut oak--	---	---	
					Shumard oak---------	---	---	
					Virginia pine-------	80	122	
No-------------- Nolin	Slight	Slight	Moderate	Severe	Yellow-poplar-------	107	119	Yellow-poplar, eastern white pine, eastern cottonwood, white ash, sweetgum, black walnut.
					Sweetgum------------	92	112	
					Eastern cottonwood--	---	---	
					Black walnut--------	100	---	
					American sycamore---	---	---	
					River birch---------	---	---	
					White ash-----------	102	---	
PrB, PrC-------- Pricetown	Slight	Slight	Slight	Severe	White oak-----------	70	52	Shortleaf pine, white oak, white ash, northern red oak.
					Yellow-poplar-------	87	84	
					Black oak-----------	85	67	
					Hickory-------------	---	---	
					Red maple-----------	---	---	
					Sugar maple---------	---	---	
					American beech------	---	---	
					Scarlet oak---------	71	53	
					Virginia pine-------	66	102	
					Southern red oak----	83	65	
Rb-------------- Robertsville	Slight	Moderate	Moderate	Severe	Pin oak-------------	96	93	Sweetgum, loblolly pine, American sycamore, pin oak, green ash, willow oak.
					Yellow-poplar-------	93	95	
					Sweetgum------------	94	119	
					Red maple-----------	---	---	
					Green ash-----------	---	---	
					Swamp chestnut oak--	---	---	
					Shumard oak---------	90	86	
RoE**: Rock outcrop.								

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
RoE**: Caneyville (warm aspect)	Severe	Moderate	Moderate	Severe	Black oak	65	47	Virginia pine, eastern redcedar, white oak.
					White oak	60	43	
					Sugar maple	---	---	
					Hickory	---	---	
					Eastern redcedar	36	38	
					Chinquapin oak	44	29	
					Scarlet oak	50	34	
RoE**: Rock outcrop.								
Caneyville (cool aspect)	Severe	Moderate	Slight	Severe	Black oak	71	53	White oak, yellow-poplar, white ash, eastern white pine.
					White oak	64	47	
					Sugar maple	---	---	
					Hickory	---	---	
					White ash	72	---	
					Eastern redcedar	46	54	
					Yellow-poplar	90	90	
Sk: Skidmore	Slight	Slight	Moderate	Severe	Yellow-poplar	103	112	Yellow-poplar, white ash, eastern white pine, American sycamore, white oak, sweetgum.
					Sweetgum	---	---	
					American sycamore	---	---	
					River birch	---	---	
					Eastern cottonwood	---	---	
					Blackgum	---	---	
					White oak	---	---	
					Black oak	---	---	
					Black walnut	---	---	
TeB: Teddy	Slight	Slight	Slight	Severe	Yellow-poplar	103	---	Yellow-poplar, eastern white pine, shortleaf pine, white oak, loblolly pine.
					Black oak	73	55	
					American beech	---	---	
					Southern red oak	---	---	
					Sugar maple	---	---	
					Eastern redcedar	---	---	
TrB, TrC: Trappist	Slight	Moderate	Slight	Moderate	Virginia pine	62	95	Virginia pine, white oak, northern red oak.
					White oak	62	45	
					Hickory	---	---	
					Black oak	62	45	
					Red maple	---	---	
					Eastern redcedar	---	---	
					Chestnut oak	58	41	
					Scarlet oak	---	---	
Yo: Yosemite	Slight	Moderate	Moderate	Severe	Pin oak	95	92	Eastern cottonwood, sweetgum, American sycamore, pin oak, green ash, loblolly pine.
					Sweetgum	86	95	
					Eastern cottonwood	89	100	
					American sycamore	---	---	
					Red maple	---	---	
					Green ash	---	---	
					White oak	62	45	
					Yellow-poplar	109	122	
					Virginia pine	80	122	

* Volume is the yield in cubic feet per acre 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 8.--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
BeB: Berea	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness, thin layer.
CaC: Caneyville	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
CaD: Caneyville	Moderate: percs slowly, depth to rock.	Moderate: slope, percs slowly, depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: depth to rock.
CaE: Caneyville	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, depth to rock.
CgB: Carpenter	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
CgC: Carpenter	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
CoF: Colyer	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: droughty, slope, thin layer.
CpD*:					
Colyer	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: droughty, slope, thin layer.
Trappist	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
CrB: Crider	Slight	Slight	Moderate: slope.	Slight	Slight.
EkB: Elk	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
FaF: Fairmount	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, small stones.	Severe: erodes easily, slope.	Severe: large stones, slope, thin layer.
FdD2: Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
FfE2*:					
Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FfE2*:					
Fairmount	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, small stones.	Severe: erodes easily, slope.	Severe: large stones, slope, thin layer.
Rock outcrop.					
FkB Frankstown	Slight	Slight	Moderate: slope, small stones.	Severe: erodes easily.	Slight.
FkC Frankstown	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
FkD Frankstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
FrB Frederick	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
FrC Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FrD Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GaF Garmon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Jo Johnsburg	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
La Lawrence	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
LcE*:					
Lenberg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Carpenter	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Ln Lindside	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: flooding.
LoC Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
LoD Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Me: Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ne: Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
No: Nolin	Severe: flooding.	Slight	Slight	Severe: erodes easily.	Moderate: flooding.
PrB: Pricetown	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
PrC: Pricetown	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Rb: Robertsville	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RoE*: Rock outcrop.					
Caneyville	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: slope, depth to rock.
Sk: Skidmore	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones, flooding.	Moderate: flooding.	Severe: small stones, flooding.
TeB: Teddy	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Slight.
TrB: Trappist	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Slight	Moderate: thin layer.
TrC: Trappist	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
Yo: Yosemite	Severe: flooding, wetness.	Severe: wetness.	Severe: small stones, wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--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: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
BeB----------------- Berea	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CaC----------------- Caneyville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaD, CaE----------- Caneyville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CgB----------------- Carpenter	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CgC----------------- Carpenter	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CoF----------------- Colyer	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
CpD*:										
Colyer-------------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Trappist----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CrB----------------- Crider	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EkB----------------- Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FaF----------------- Fairmount	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
FdD2---------------- Faywood	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FfE2*:										
Faywood-----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Fairmount---------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
FkB----------------- Frankstown	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FkC----------------- Frankstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FkD----------------- Frankstown	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
FrB---------------- Frederick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FrC---------------- Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FrD---------------- Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GaF---------------- Garmon	Very poor.	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Jo----------------- Johnsburg	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
La----------------- Lawrence	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
LcE*:										
Lenberg-----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Carpenter---------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ln----------------- Lindside	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
LoC---------------- Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoD---------------- Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Me----------------- Melvin	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ne----------------- Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
No----------------- Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PrB---------------- Pricetown	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PrC---------------- Pricetown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rb----------------- Robertsville	Poor	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
RoE*:										
Rock outcrop.										
Caneyville--------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Sk----------------- Skidmore	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
TeB----------------- Teddy	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TrB----------------- Trappist	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TrC----------------- Trappist	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Yo------------------ Yosemite	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--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
BeB: Berea	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Severe: wetness, depth to rock.	Moderate: wetness, slope, depth to rock.	Severe: low strength.	Moderate: wetness, depth to rock.
CaC: Caneyville	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
CaD: Caneyville	Severe: depth to rock.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength.	Severe: slope.
CaE: Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CgB: Carpenter	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
CgC: Carpenter	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
CoF: Colyer	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: droughty, slope, depth to rock.
CpD*:						
Colyer	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: droughty, slope, depth to rock.
Trappist	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CrB: Crider	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
EkB: Elk	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
FaF: Fairmount	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: large stones, slope, depth to rock.
FdD2: Faywood	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.

See footnote at end of table.

TABLE 10.--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
FfE2*:						
Faywood	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Fairmount	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: large stones, slope, depth to rock.
Rock outcrop.						
FkB: Frankstown	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
FkC: Frankstown	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
FkD: Frankstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
FrB: Frederick	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
FrC: Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
FrD: Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
GaF: Garmon	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Jo: Johnsburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness.
La: Lawrence	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength.	Moderate: wetness.
LcE*:						
Lenberg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Carpenter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ln: Lindside	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

See footnote at end of table.

TABLE 10.--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
LoC: Lowell	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
LoD: Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Me: Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
Ne: Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
No: Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
PrB: Pricetown	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
PrC: Pricetown	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Rb: Robertsville	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
RoE*: Rock outcrop.						
Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Sk: Skidmore	Moderate: depth to rock, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones, flooding.
TeB: Teddy	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Slight.
TrB: Trappist	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: low strength.	Moderate: depth to rock.
TrC: Trappist	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.

See footnote at end of table.

TABLE 10.--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
Yo----------------Yosemite	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "poor," 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
BeB: Berea	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock.
CaC: Caneyville	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
CaD: Caneyville	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: too clayey, depth to rock, hard to pack.
CaE: Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
CgB: Carpenter	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
CgC: Carpenter	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
CoF: Colyer	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, slope.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
CpD*:					
Colyer	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, slope.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
Trappist	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
CrB: Crider	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
EkB: Elk	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.

See footnote at end of table.

TABLE 11.--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
FaF: Fairmount	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
FdD2: Faywood	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock.	Poor: depth to rock, too clayey, hard to pack.
FfE2*:					
Faywood	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Fairmount	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
Rock outcrop.					
FkB: Frankstown	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: hard to pack.
FkC: Frankstown	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: hard to pack.
FkD: Frankstown	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, slope.
FrB: Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
FrC: Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
FrD: Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
GaF: Garmon	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: slope, seepage, depth to rock.	Poor: slope, depth to rock.
Jo: Johnsburg	Severe: wetness, percs slowly.	Slight	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.

See footnote at end of table.

TABLE 11.--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
La: Lawrence	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
LcE*:					
Lenberg	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Carpenter	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Ln: Lindside	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
LoC: Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
LoD: Lowell	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Me: Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ne: Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
No: Nolin	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
PrB: Pricetown	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
PrC: Pricetown	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Rb: Robertsville	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RoE*:					
Rock outcrop.					
Caneyville	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.

See footnote at end of table.

TABLE 11.--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
Sk------------------ Skidmore	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, depth to rock, seepage.	Severe: flooding, seepage, wetness.	Poor: seepage, small stones.
TeB----------------- Teddy	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
TrB----------------- Trappist	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
TrC----------------- Trappist	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Yo------------------ Yosemite	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: small stones, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--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
BeB------------------- Berea	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, depth to rock.
CaC------------------- Caneyville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CaD------------------- Caneyville	Poor: depth to rock, low strength.	Improbable: excess fines, depth to rock.	Improbable: excess fines, depth to rock.	Poor: too clayey.
CaE------------------- Caneyville	Poor: depth to rock, low strength, slope.	Improbable: excess fines, depth to rock.	Improbable: excess fines, depth to rock.	Poor: too clayey, slope.
CgB, CgC-------------- Carpenter	Fair: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CoF------------------- Colyer	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
CpD*:				
Colyer---------------	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
Trappist-------------	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CrB------------------- Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
EkB------------------- Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
FaF------------------- Fairmount	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, large stones.
FdD2------------------ Faywood	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
FfE2*:				
Faywood	Poor: depth to rock, slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Fairmount	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, large stones.
Rock outcrop.				
FkB, FkC Frankstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
FkD Frankstown	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
FrB, FrC Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
FrD Frederick	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
GaF Garmon	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Jo Johnsburg	Fair: wetness, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
La Lawrence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
LcE*:				
Lenberg	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Carpenter	Fair: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Ln Lindside	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
LoC Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LoD: Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Me: Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ne: Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
No: Nolin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
PrB, PrC: Pricetown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Rb: Robertsville	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RoE*: Rock outcrop.				
Caneyville	Poor: area reclaim, low strength.	Improbable: excess fines, depth to rock.	Improbable: excess fines, depth to rock.	Poor: too clayey, slope.
Sk: Skidmore	Fair: area reclaim.	Improbable: small stones.	Probable	Poor: small stones.
TeB: Teddy	Fair: shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
TrB, TrC: Trappist	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Yo: Yosemite	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--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)

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
BeB----------- Berea	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Depth to rock, slope.	Depth to rock, wetness.	Erodes easily, depth to rock.
CaC----------- Caneyville	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock.	Slope, depth to rock.
CaD----------- Caneyville	Severe: depth to rock.	Severe: thin layer.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CaE----------- Caneyville	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CgB----------- Carpenter	Moderate: seepage.	Severe: piping.	Deep to water----	Favorable--------	Favorable.
CgC----------- Carpenter	Moderate: seepage.	Severe: piping.	Deep to water----	Slope------------	Slope.
CoF----------- Colyer	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Depth to rock, erodes easily.	Slope, erodes easily, droughty.
CpD*:					
Colyer-----------	Severe: depth to rock.	Severe: thin layer.	Deep to water----	Depth to rock, erodes easily.	Slope, erodes easily, droughty.
Trappist---------	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CrB----------- Crider	Moderate: seepage.	Severe: piping.	Deep to water----	Favorable--------	Favorable.
EkB----------- Elk	Moderate: seepage, slope.	Severe: piping.	Deep to water----	Erodes easily----	Erodes easily.
FaF----------- Fairmount	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
FdD2---------- Faywood	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
FfE2*:					
Faywood----------	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
FfE2*:					
Fairmount	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Rock outcrop.					
FkB Frankstown	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Erodes easily	Erodes easily.
FkC, FkD Frankstown	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
FrB Frederick	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Favorable	Favorable.
FrC, FrD Frederick	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope.
GaF Garmon	Severe: seepage, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Jo Johnsburg	Moderate: seepage.	Severe: piping.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
La Lawrence	Slight	Severe: piping.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
LcE*:					
Lenberg	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Carpenter	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.
Ln Lindside	Moderate: seepage.	Severe: piping.	Flooding	Wetness, erodes easily.	Erodes easily.
LoC, LoD Lowell	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Me Melvin	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
Ne Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
No Nolin	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
PrB: Pricetown	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
PrC: Pricetown	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Rb: Robertsville	Slight	Severe: piping, wetness.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
RoE*: Rock outcrop.					
Caneyville	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Sk: Skidmore	Severe: seepage.	Severe: seepage.	Deep to water	Large stones	Large stones, droughty.
TeB: Teddy	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
TrB: Trappist	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Depth to rock, erodes easily.	Erodes easily, depth to rock.
TrC: Trappist	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Yo: Yosemite	Severe: seepage.	Severe: wetness.	Flooding	Wetness	Wetness, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--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: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
BeB-------------- Berea	0-8	Silt loam--------	ML, CL	A-4	0-5	90-100	85-100	75-100	60-90	25-35	3-10
	8-36	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4	0-5	90-100	85-100	75-100	65-95	25-40	5-20
	36-39	Shaly silty clay loam, very shaly silty clay, clay.	GC, CL, MH, CH	A-6, A-2, A-7	0-10	40-90	20-85	20-85	15-80	35-60	15-30
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CaC, CaD, CaE---- Caneyville	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	7-30	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CgB, CgC--------- Carpenter	0-4	Gravelly silt loam.	ML, CL-ML	A-4	0-10	70-95	60-85	55-80	55-80	<35	NP-10
	4-9	Gravelly silt loam, silt loam, loam.	CL, CL-ML	A-4, A-6	0-10	60-95	60-90	55-80	55-80	20-40	5-20
	9-42	Gravelly silty clay loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0-10	60-95	60-90	55-80	55-80	25-45	5-20
	42-57	Channery silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-10	65-95	65-95	65-90	65-90	30-60	15-40
	57-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
CoF-------------- Colyer	0-3	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	80-100	80-95	65-95	55-90	25-40	5-15
	3-10	Channery clay, very channery silty clay, very channery silty clay loam.	GC, GM	A-2, A-6, A-7	0-10	25-60	20-50	20-50	15-45	35-55	11-30
	10-14	Channery clay, very channery silty clay, very channery silty clay loam.	GC, GM	A-2, A-6, A-7	0-15	25-60	20-50	20-50	15-45	35-55	11-30
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CpD*:											
Colyer----------	0-3	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	80-100	80-95	65-95	55-90	25-40	5-15
	3-10	Channery clay, very channery silty clay, channery silty clay loam.	GC, GM	A-2, A-6, A-7	0-10	25-60	20-50	20-50	15-45	35-55	11-30
	10-14	Channery clay, very channery silty clay, very channery silty clay loam.	GC, GM	A-2, A-6, A-7	0-15	25-60	20-50	20-50	15-45	35-55	11-30
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Trappist--------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	20-35	2-14
	6-26	Silty clay, clay, channery silty clay loam.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	26-34	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	34-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CrB-------------- Crider	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	3-12
	8-30	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	3-20
	30-62	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
EkB-------------- Elk	0-7	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	7-62	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	5-15
FaF-------------- Fairmount	0-9	Silty clay loam	CL	A-6, A-7	8-50	80-100	70-100	65-100	60-95	35-45	15-22
	9-20	Flaggy silty clay loam, flaggy clay, flaggy silty clay.	CH, CL	A-7	8-50	80-100	70-100	65-100	60-100	40-70	20-40
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
FdD2------------- Faywood	0-4	Silt loam--------	ML, CL, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
	4-32	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
FfE2*:											
Faywood----------	0-4	Silt loam--------	ML, CL, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
	4-32	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Fairmount-------	0-9	Silty clay loam	CL	A-6, A-7	8-50	80-100	70-100	65-100	60-95	35-45	15-22
	9-20	Flaggy silty clay loam, flaggy clay, flaggy silty clay.	CH, CL	A-7	8-50	80-100	70-100	65-100	60-100	40-70	20-40
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
FkB, FkC, FkD---- Frankstown	0-8	Silt loam--------	ML, CL-ML	A-4, A-6	0	85-100	80-100	75-100	70-90	25-40	4-12
	8-34	Gravelly silty clay loam, silt loam, silty clay loam.	ML, CL, GC	A-6, A-7	0	60-100	55-100	50-100	45-95	25-50	11-23
	34-41	Gravelly silty clay loam, silt loam, channery clay.	MH, CL, CH, GC	A-6, A-7	0-5	45-100	40-95	40-95	35-95	30-65	11-35
	41-54	Weathered bedrock	---	---	---	---	---	---	---	---	---
FrB, FrC, FrD---- Frederick	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	7-18	Silty clay loam, silty clay, clay.	CH, MH	A-7	0-5	80-100	75-100	70-95	60-90	50-70	20-40
	18-86	Clay, silty clay	CH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
GaF-------------- Garmon	0-4	Silt loam--------	CL, CL-ML	A-4, A-6	0	75-95	75-95	65-95	55-90	20-35	5-15
	4-21	Loam, channery silt loam, channery silty clay loam.	GM-GC, CL-ML, CL, SC-SM	A-4, A-6	0-15	60-85	50-85	45-80	36-70	20-40	5-20
	21-28	Channery silt loam, very channery silty clay loam, channery loam.	GM-GC, CL-ML, CL, SC-SM	A-4, A-6	0-15	60-85	50-85	45-80	36-70	20-40	5-20
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Jo--------------- Johnsburg	0-6	Silt loam--------	CL, ML	A-4, A-6	0	100	100	90-100	70-95	30-40	5-15
	6-26	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	85-95	35-50	20-30
	26-62	Loam, silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0-5	95-100	90-95	85-95	60-85	20-35	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
La---------------- Lawrence	0-9	Silt loam--------	ML	A-4	0	100	95-100	90-100	80-100	25-35	2-10
	9-20	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	20-42	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	42-62	Silty clay, silty clay loam, silt loam.	ML, CL, MH, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	75-100	25-60	5-25
LcE*:											
Lenberg---------	0-5	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0-5	75-100	75-100	75-95	65-90	20-45	2-22
	5-10	Silty clay loam, silty clay, gravelly clay.	CL, CH	A-6, A-7	0-5	75-100	60-100	55-95	50-90	35-70	15-40
	10-26	Silty clay, clay, gravelly clay.	CL, CH, ML, MH	A-7	0-5	75-100	55-100	54-95	50-90	45-70	19-40
	26-36	Channery silty clay, clay, silty clay.	CL, CH, SC, GC	A-7	0-40	60-95	40-95	40-95	36-90	45-70	20-40
	36-46	Weathered bedrock	---	---	---	---	---	---	---	---	---
Carpenter-------	0-4	Gravelly silt loam.	ML, CL-ML	A-4	0-10	70-95	60-85	55-80	55-80	<35	NP-10
	4-9	Gravelly silt loam, silt loam, loam.	CL, CL-ML	A-4, A-6	0-10	60-95	60-90	55-80	55-80	20-40	5-20
	9-42	Gravelly silty clay loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0-10	60-95	60-90	55-80	55-80	25-45	5-20
	42-57	Channery silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-10	65-95	65-95	65-90	65-90	30-60	15-40
	57-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ln---------------- Lindside	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	80-100	55-90	20-35	2-15
	9-62	Silty clay loam, silt loam, very fine sandy loam.	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	70-95	25-40	4-18
LoC, LoD--------- Lowell	0-9	Silt loam--------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	9-38	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	38-80	Clay, silty clay	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40
Me---------------- Melvin	0-8	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	8-22	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-98	25-40	5-20
	22-68	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-98	25-40	5-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Ne---------------Newark	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	8-39	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	39-62	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
No---------------Nolin	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	8-43	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
	43-65	Loam, silt loam, gravelly silty clay loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
PrB, PrC---------Pricetown	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	90-100	85-100	20-30	2-7
	7-29	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	95-100	90-100	85-100	30-42	8-20
	29-70	Silty clay loam, clay, gravelly clay.	MH, CL	A-6, A-7	0-15	75-100	65-100	60-100	50-100	35-65	15-30
Rb---------------Robertsville	0-8	Silt loam--------	ML	A-4	0	95-100	95-100	85-100	75-100	25-35	2-10
	8-15	Silt loam, silty clay loam.	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	80-100	25-45	3-20
	15-40	Silty clay loam, silt loam.	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	80-100	25-45	3-20
	40-62	Silty clay loam, silty clay, silt loam.	CL, CH, CL-ML	A-6, A-7, A-4	0-5	80-100	75-100	70-100	60-100	25-60	5-35
RoE*: Rock outcrop.											
Caneyville------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	7-30	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sk---------------Skidmore	0-10	Very gravelly loam.	GM, SM, ML	A-4, A-2	0-10	60-90	40-85	40-75	25-60	<30	NP-7
	10-60	Gravelly fine sandy loam, very channery sandy loam, very gravelly loam.	GM, GP-GM	A-2, A-1	5-30	35-60	20-50	15-40	10-35	<30	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
TeB-------------- Teddy	0-9	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	95-100	90-95	80-95	20-30	3-10
	9-21	Silt loam, loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-95	75-90	25-40	5-20
	21-46	Clay loam, silt loam, loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-95	75-90	25-40	5-20
	46-79	Clay loam, silty clay loam, silty clay.	CL, ML, CL-ML	A-4, A-6, A-7	0	85-100	75-100	70-95	55-95	25-50	5-30
	79-89	Silty clay, very gravelly clay loam, silty clay loam.	CL-ML, CL, GC	A-4, A-6	0-10	55-90	50-85	45-80	35-75	25-40	5-20
TrB, TrC--------- Trappist	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	20-35	2-14
	6-26	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	26-34	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	34-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Yo--------------- Yosemite	0-10	Gravelly silt loam.	GM, GM-GC, ML	A-2, A-4	0-10	60-80	55-75	40-65	30-60	20-35	2-10
	10-17	Very gravelly loam, very gravelly sandy clay loam, very gravelly silt loam.	GM, GM-GC, SM	A-2, A-4, A-1	0-10	50-75	45-70	40-65	20-50	20-35	2-10
	17-31	Extremely gravelly loam, very gravelly loam, extremely gravelly clay loam.	GM, GC, GM-GC	A-2, A-4, A-6, A-1	0-10	40-60	30-50	20-50	20-40	25-40	2-20
	31-64	Extremely gravelly sandy clay loam, extremely gravelly clay loam, very gravelly clay loam.	GC, GM-GC	A-2, A-4, A-6, A-1	0-10	40-60	25-50	25-50	20-40	25-40	5-20

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BeB-------------- Berea	0-8	12-27	1.20-1.40	0.6-2.0	0.18-0.23	3.6-5.5	Low----------	0.37	3	.5-3
	8-36	18-35	1.25-1.45	0.2-2.0	0.16-0.22	3.6-5.5	Low----------	0.32		
	36-39	27-60	1.30-1.50	0.2-0.6	0.08-0.15	3.6-5.5	Moderate-----	0.28		
	39	---	---	---	---	---	-------------	----		
CaC, CaD, CaE---- Caneyville	0-7	12-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	7-30	27-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.8	Moderate-----	0.28		
	30	---	---	---	---	---	-------------	----		
CgB, CgC--------- Carpenter	0-4	12-27	1.20-1.40	2.0-6.0	0.16-0.22	4.5-6.5	Low----------	0.28	4	1-4
	4-9	18-27	1.20-1.50	0.6-2.0	0.10-0.20	4.5-6.5	Low----------	0.28		
	9-42	18-35	1.20-1.50	0.6-2.0	0.10-0.20	4.5-6.5	Low----------	0.28		
	42-57	30-55	1.20-1.60	0.06-0.6	0.07-0.16	4.5-6.0	Moderate-----	0.28		
	57-65	---	---	---	---	---	-------------	----		
CoF-------------- Colyer	0-3	12-27	1.20-1.50	0.6-2.0	0.15-0.21	3.6-6.0	Low----------	0.37	2	.5-2
	3-10	35-59	1.30-1.60	0.06-0.2	0.03-0.10	3.6-5.0	Low----------	0.17		
	10-14	35-59	1.30-1.60	0.06-0.2	0.03-0.10	3.6-5.0	Low----------	0.17		
	14	---	---	---	---	---	-------------	----		
CpD*:										
Colyer----------	0-3	12-27	1.20-1.50	0.6-2.0	0.15-0.21	3.6-6.0	Low----------	0.37	2	.5-2
	3-10	35-59	1.30-1.60	0.06-0.2	0.03-0.10	3.6-5.0	Low----------	0.17		
	10-14	35-59	1.30-1.60	0.06-0.2	0.03-0.10	3.6-5.0	Low----------	0.17		
	14	---	---	---	---	---	-------------	----		
Trappist--------	0-6	12-27	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low----------	0.37	3	1-3
	6-26	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	26-34	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	34-38	---	---	---	---	---	-------------	----		
CrB-------------- Crider	0-8	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	5	2-4
	8-30	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low----------	0.28		
	30-62	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.28		
EkB-------------- Elk	0-7	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.37	5	.5-3
	7-62	18-34	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.28		
FaF-------------- Fairmount	0-9	27-40	1.20-1.40	0.06-0.6	0.12-0.20	6.6-8.4	Moderate-----	0.37	2	3-7
	9-20	35-60	1.40-1.60	0.06-0.6	0.10-0.18	6.6-8.4	Moderate-----	0.37		
	20	---	---	---	---	---	-------------	----		
FdD2------------- Faywood	0-4	15-27	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37	3	1-4
	4-32	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	32	---	---	---	---	---	-------------	----		
FfE2*:										
Faywood---------	0-4	15-27	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37	3	1-4
	4-32	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
	32	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
FfE2*:										
Fairmount-------	0-9	27-40	1.20-1.40	0.06-0.6	0.12-0.20	6.6-8.4	Moderate-----	0.37	2	3-7
	9-20	35-60	1.40-1.60	0.06-0.6	0.10-0.18	6.6-8.4	Moderate-----	0.37		
	20	---	---	---	---	---	-------------	----		
Rock outcrop.										
FkB, FkC, FkD---- Frankstown	0-8	12-27	1.20-1.40	0.6-2.0	0.18-0.22	5.1-6.0	Low----------	0.37	3	1-4
	8-34	25-35	1.30-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-----	0.28		
	34-41	25-45	1.30-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-----	0.28		
	41-54	---	---	---	---	---	-------------	----		
FrB, FrC, FrD---- Frederick	0-7	13-27	1.25-1.50	2.0-6.0	0.16-0.24	4.5-6.0	Low----------	0.32	4	1-2
	7-18	35-75	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Moderate-----	0.24		
	18-86	40-80	1.20-1.50	0.6-2.0	0.10-0.18	4.5-6.0	Moderate-----	0.24		
GaF-------------- Garmon	0-4	12-27	1.20-1.40	2.0-6.0	0.14-0.20	4.5-7.3	Low----------	0.32	3	<3
	4-21	18-34	1.20-1.50	2.0-6.0	0.05-0.16	4.5-7.3	Low----------	0.28		
	21-28	18-34	1.20-1.50	2.0-6.0	0.05-0.16	5.6-7.3	Low----------	0.20		
	28	---	---	---	---	---	-------------	----		
Jo--------------- Johnsburg	0-6	12-20	1.30-1.45	0.6-2.0	0.20-0.24	4.5-6.5	Low----------	0.43	4	1-2
	6-26	24-32	1.40-1.55	0.6-2.0	0.18-0.22	3.6-5.5	Moderate-----	0.43		
	26-62	22-30	1.60-1.80	<0.06	0.06-0.08	3.6-5.5	Low----------	0.43		
La--------------- Lawrence	0-9	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.43	3	1-4
	9-20	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.37		
	20-42	18-35	1.50-1.70	0.06-0.2	0.08-0.12	4.5-6.5	Low----------	0.43		
	42-62	18-60	1.50-1.70	0.06-0.6	0.08-0.12	4.5-7.3	Low----------	0.37		
LcE*:										
Lenberg---------	0-5	12-27	1.30-1.50	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.43	3	.5-3
	5-10	35-60	1.40-1.60	0.2-0.6	0.10-0.19	4.5-5.5	Moderate-----	0.37		
	10-26	40-60	1.40-1.65	0.2-0.6	0.10-0.18	4.5-5.5	Moderate-----	0.37		
	26-36	40-60	1.40-1.65	0.2-0.6	0.10-0.16	4.5-5.5	Moderate-----	0.28		
	36-46	---	---	---	---	---	-------------	----		
Carpenter-------	0-4	12-27	1.20-1.40	2.0-6.0	0.16-0.22	4.5-6.5	Low----------	0.28	4	1-4
	4-9	18-27	1.20-1.50	0.6-2.0	0.10-0.20	4.5-6.5	Low----------	0.28		
	9-42	18-35	1.20-1.50	0.6-2.0	0.10-0.20	4.5-6.5	Low----------	0.28		
	42-57	30-55	1.20-1.60	0.06-0.6	0.07-0.16	4.5-6.0	Moderate-----	0.28		
	57-65	---	---	---	---	---	-------------	----		
Ln--------------- Lindside	0-9	15-27	1.20-1.40	0.6-2.0	0.20-0.26	5.1-7.8	Low----------	0.32	5	2-4
	9-62	18-35	1.20-1.40	0.2-2.0	0.17-0.22	5.1-7.8	Low----------	0.37		
LoC, LoD--------- Lowell	0-9	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low----------	0.37	3	1-4
	9-38	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate-----	0.28		
	38-80	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-7.8	Moderate-----	0.28		
Me--------------- Melvin	0-8	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	.5-3
	8-22	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	22-68	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low----------	0.43		
Ne--------------- Newark	0-8	12-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low----------	0.43	5	1-4
	8-39	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	39-62	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low----------	0.43		
No--------------- Nolin	0-8	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	2-4
	8-43	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43		
	43-65	10-30	1.30-1.55	0.6-6.0	0.10-0.23	5.6-7.8	Low----------	0.43		

See footnote at end of table.

TABLE 15.--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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
PrB, PrC---------Pricetown	0-7	12-27	1.35-1.55	0.6-2.0	0.18-0.24	4.5-6.0	Low----------	0.43	5	1-4
	7-29	18-35	1.40-1.65	0.6-2.0	0.16-0.22	4.5-6.0	Low----------	0.43		
	29-70	30-60	1.40-1.70	0.6-2.0	0.10-0.18	4.5-5.5	Moderate-----	0.28		
Rb---------------Robertsville	0-8	12-27	1.30-1.50	0.6-2.0	0.19-0.23	3.6-5.5	Low----------	0.43	3	1-3
	8-15	15-35	1.40-1.60	0.6-2.0	0.18-0.22	3.6-5.5	Low----------	0.43		
	15-40	18-35	1.50-1.65	0.06-0.2	0.08-0.12	3.6-5.5	Low----------	0.43		
	40-62	15-45	1.40-1.60	0.2-0.6	0.08-0.12	4.5-7.3	Low----------	0.37		
RoE*: Rock outcrop.										
Caneyville------	0-7	12-27	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	3	2-4
	7-30	27-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.8	Moderate-----	0.28		
	30	---	---	---	---	---	-------------	----		
Sk---------------Skidmore	0-10	7-18	1.20-1.40	2.0-6.0	0.07-0.13	5.6-7.8	Low----------	0.17	5	<2
	10-60	7-18	1.30-1.60	2.0-6.0	0.04-0.10	5.6-7.8	Low----------	0.17		
TeB--------------Teddy	0-9	12-25	1.35-1.60	0.6-2.0	0.20-0.22	4.5-6.5	Low----------	0.43	3	0-2
	9-21	18-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.5	Low----------	0.43		
	21-46	18-35	1.55-1.80	0.06-0.2	0.08-0.12	4.5-5.5	Low----------	0.43		
	46-79	27-50	1.50-1.80	0.6-2.0	0.08-0.12	4.5-5.5	Moderate-----	0.32		
	79-89	27-45	1.50-1.70	0.6-2.0	0.04-0.08	4.5-5.5	Moderate-----	0.32		
TrB, TrC---------Trappist	0-6	12-27	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low----------	0.37	3	1-3
	6-26	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	26-34	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	34-38	---	---	---	---	---	-------------	----		
Yo---------------Yosemite	0-10	18-27	1.20-1.40	2.0-6.0	0.10-0.18	5.6-7.8	Low----------	0.20	5	1-4
	10-17	18-27	1.20-1.40	2.0-6.0	0.07-0.13	5.6-7.8	Low----------	0.17		
	17-31	18-35	1.20-1.40	2.0-6.0	0.04-0.10	5.6-7.8	Low----------	0.15		
	31-64	18-35	1.20-1.50	2.0-6.0	0.04-0.10	5.6-7.8	Low----------	0.15		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--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	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
BeB---------------- Berea	C	None----------	---	---	1.5-3.0	Apparent	Dec-Apr	20-40	Hard	Moderate	High.
CaC, CaD, CaE----- Caneyville	C	None----------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
CgB, CgC---------- Carpenter	B	None----------	---	---	>6.0	---	---	>40	Soft	Low------	Moderate.
CoF---------------- Colyer	D	None----------	---	---	>6.0	---	---	8-20	Hard	High-----	High.
CpD*:											
Colyer------------	D	None----------	---	---	>6.0	---	---	8-20	Hard	High-----	High.
Trappist----------	C	None----------	---	---	>6.0	---	---	20-40	Hard	High-----	High.
CrB---------------- Crider	B	None----------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
EkB---------------- Elk	B	None----------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FaF---------------- Fairmount	D	None----------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
FdD2--------------- Faywood	C	None----------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
FfE2*:											
Faywood-----------	C	None----------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Fairmount---------	D	None----------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
Rock outcrop.											
FkB, FkC, FkD----- Frankstown	B	None----------	---	---	>6.0	---	---	>40	Soft	Moderate	Moderate.
FrB, FrC, FrD----- Frederick	B	None----------	---	---	>6.0	---	---	>72	---	Moderate	High.
GaF---------------- Garmon	C	None----------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
Jo----------------- Johnsburg	D	None----------	---	---	1.0-3.0	Perched	Jan-Apr	48-72	Soft	High-----	High.
La----------------- Lawrence	C	Rare----------	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High-----	High.
LcE*:											
Lenberg-----------	C	None----------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
Carpenter---------	B	None----------	---	---	>6.0	---	---	>40	Soft	Low------	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
Ln---------------- Lindside	C	Occasional	Very brief to brief.	Dec-Apr	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low.
LoC, LoD---------- Lowell	C	None--------	---	---	>6.0	---	---	>40	Hard	High-----	Moderate.
Me---------------- Melvin	D	Occasional	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High-----	Low.
Ne---------------- Newark	C	Occasional	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High-----	Low.
No---------------- Nolin	B	Occasional	Brief-----	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	Low------	Moderate.
PrB, PrC---------- Pricetown	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Rb---------------- Robertsville	D	Rare--------	---	---	0-1.0	Perched	Dec-May	>60	---	High-----	High.
RoE*: Rock outcrop.											
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Sk---------------- Skidmore	B	Frequent----	Very brief	Dec-May	3.0-4.0	Apparent	Dec-Mar	>40	Hard	Low------	Moderate.
TeB--------------- Teddy	C	None--------	---	---	2.0-3.0	Perched	Jan-Apr	>60	---	Moderate	High.
TrB, TrC---------- Trappist	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	High.
Yo---------------- Yosemite	B	Frequent----	Very brief	Jan-May	0.5-1.5	Apparent	Dec-May	>60	---	Low------	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL ANALYSIS OF SELECTED SOILS

(A blank indicates that a determination was not made. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter (mm)								Coarse fragments		
				Sand						Very fine sand plus silt (0.1-0.002)				
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Sand coarser than very fine (2-0.1)		Textural class	>2 mm	2-19 mm	19-76 mm
	Pct <2 mm											Pct	Pct	Pct
Pricetown silt loam:														
(S87-KY-045-5)														
Ap----- 0 to 7	21.0	66.3	12.7	3.0	2.5	2.7	6.6	6.2	14.8	72.5	sil			
BA----- 7 to 13	16.8	69.1	14.1	1.3	1.8	2.2	5.5	6.0	10.8	75.1	sil			
Bt1---- 13 to 22	16.8	63.1	20.1	3.9	1.6	1.4	3.5	6.4	10.4	69.5	sil			
Bt2---- 22 to 29	16.4	61.0	22.6	1.1	1.6	1.4	3.7	8.6	7.8	69.6	sil			
2Bt3--- 29 to 36	15.7	50.8	33.5	0.8	1.0	1.3	3.7	8.9	6.8	59.7	sicl			
2Bt4--- 36 to 45	18.1	37.7	44.2	0.9	1.2	1.5	4.5	10.0	8.1	47.7	c			
2Bt5--- 45 to 63	13.8	34.2	52.0	0.6	1.0	1.3	3.6	7.3	6.5	41.5	c			
2Bt6--- 63 to 70	12.8	30.4	56.8	0.4	0.7	1.5	5.4	4.8	8.0	35.2	c			
Teddy silt loam:														
(S87-KY-045-1)														
Ap----- 0 to 9	22.7	59.4	17.9	2.3	2.3	2.6	11.7	3.8	18.9	63.2	sil			
Bt----- 9 to 21	25.0	53.3	21.7	1.8	1.8	1.6	13.7	6.1	18.9	59.4	sil			
Btx1--- 21 to 30	28.1	51.4	20.5	2.3	1.6	1.7	16.2	6.3	21.8	57.7	sil			
Btx2--- 30 to 46	24.2	46.9	28.9	2.0	2.0	1.7	12.2	6.3	17.9	53.2	cl			
2Bt1--- 46 to 72	35.5	27.7	36.8	1.5	1.8	2.2	24.4	5.6	29.9	33.3	cl			
2Bt2--- 72 to 79	35.1	37.8	27.1	2.5	2.7	2.8	19.3	7.8	27.3	45.6	cl			
3Bt3--- 79 to 89	37.3	25.1	37.6	2.8	3.2	2.8	14.4	14.1	23.2	39.2	cl			
Trappist silt loam:														
(S87-KY-045-6)														
Ap----- 0 to 6	9.3	69.7	21.0	2.0	2.8	1.4	1.8	1.3	8.0	71.0	sil			
Bt1---- 6 to 11	5.0	58.0	37.0	2.1	1.1	0.6	0.6	0.6	4.4	58.6	sic			
Bt2---- 11 to 26	5.0	49.9	45.1	2.8	0.9	0.3	0.5	0.5	4.5	50.4	sic	*		
C------ 26 to 34	9.7	48.1	42.2	5.7	2.3	0.5	0.6	0.6	9.1	48.7	sic	*		
Yosemite gravelly silt loam:														
(S87-KY-045-3)														
Ap----- 0 to 10	26.1	55.0	18.9	8.4	5.3	3.1	6.1	3.2	22.9	58.2	sil	48.9	20.4	28.5
Bw----- 10 to 17	50.0	27.8	22.2	20.3	12.6	7.0	7.1	3.0	47.0	30.8	l	53.5	25.0	28.5
Bg1---- 17 to 23	45.2	32.9	21.9	19.4	11.0	5.7	6.5	2.6	42.6	35.5	l	77.0	31.5	45.5
Bg2---- 23 to 31	43.6	29.8	26.6	19.7	9.3	5.1	6.5	3.0	40.6	32.8	l	90.7	12.5	78.2
Cg1---- 31 to 43	39.0	29.3	31.7	11.2	10.7	6.7	7.4	3.0	36.0	32.3	cl	94.0	15.5	78.5
Cg2---- 43 to 64	52.6	20.4	27.0	26.7	10.6	5.6	6.9	2.8	49.8	23.2	scl	93.1	19.7	78.4

* Coarse fragments broke down during processing.

TABLE 18.--CHEMICAL ANALYSIS OF SELECTED SOILS

(The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	pH (H_2O 1:1)	Extractable cations					Cation-exchange capacity		Extractable acidity	Base saturation		Organic matter	Calcium carbonate equivalent	Phosphorus	Potassium
		Ca	Mg	K	Na	Total (TEC)	Ammonium acetate	Sum of cations		Ammonium acetate	Sum of cations				
		-----Milliequivalents per 100 grams of soil-------								Pct	Pct	Pct	Pct	p/m	p/m
Pricetown silt loam:															
(S87-KY-045-5)															
Ap----- 0 to 7	6.7	6.11	0.85	0.21	0.05	7.22	7.50	7.71	0.49	96.3	93.6	1.07	0.50	218	263
BA----- 7 to 13	5.8	3.61	0.52	0.10	0.07	4.30	6.19	12.33	8.03	69.5	34.9	2.91	0.11	86	104
Bt1---- 13 to 22	4.7	2.57	0.30	0.11	0.02	3.00	8.96	9.40	6.40	33.5	31.9	0.59	0.83	2	122
Bt2---- 22 to 29	4.7	2.17	1.01	0.11	0.02	3.31	9.50	14.39	11.08	34.8	23.0	0.23	0.04	1	126
2Bt3--- 29 to 36	4.6	1.88	1.05	0.11	0.03	3.07	13.83	14.87	11.80	22.2	20.6	0.31	0.05	1	128
2Bt4--- 36 to 45	4.7	1.59	1.56	0.13	0.03	3.31	16.59	21.02	17.71	19.9	15.7	0.26	0.17	1	134
2Bt5--- 45 to 63	4.7	1.68	1.74	0.03	0.04	3.49	18.21	18.77	15.28	19.2	18.6	0.18	0.99	2	160
2Bt6--- 63 to 70	4.7	2.11	1.88	0.03	0.04	4.06	18.13	21.54	17.48	22.4	18.8	0.17	0.10	1	192
Teddy silt loam:															
(S87-KY-045-1)															
Ap----- 0 to 9	6.1	5.12	0.61	0.11	0.10	5.94	7.04	7.94	5.00	84.4	74.8	0.89	0.04	14	109
Bt----- 9 to 21	5.9	3.65	0.56	0.11	0.59	4.91	7.53	7.91	3.00	64.9	62.1	0.51	0.06	2	119
Btx1--- 21 to 30	5.2	1.51	0.30	0.08	0.18	2.07	6.75	8.04	5.97	30.7	25.7	0.25	0.05	2	90
Btx2--- 30 to 46	5.2	1.55	0.54	0.10	0.24	2.43	9.12	9.74	7.31	26.6	24.9	0.23	0.11	5	108
2Bt1--- 46 to 72	5.0	0.56	0.39	0.09	0.28	1.32	11.60	13.32	12.00	11.4	9.9	0.20	0.05	1	85
2Bt2--- 72 to 79	5.0	0.48	0.26	0.03	0.25	1.02	8.50	9.99	8.97	12.0	10.2	0.23	0.60	2	56
3Bt3--- 79 to 89	4.9	0.50	0.37	0.08	0.26	1.21	10.80	13.03	12.82	11.2	9.3	0.27	0.05	1	66
Trappist silt loam:															
(S87-KY-045-6)															
Ap----- 0 to 6	4.9	3.26	1.11	0.66	0.05	5.08	13.25	13.56	8.48	33.3	37.5	5.91	0.14	83	563
Bt1---- 6 to 11	4.9	1.75	0.43	0.39	0.04	2.61	12.35	13.18	10.57	21.1	19.8	1.60	0.60	30	392
Bt2---- 11 to 26	4.9	1.68	0.38	0.43	0.08	2.57	14.09	15.85	13.28	18.2	16.2	0.77	0.08	6	424
C------ 26 to 34	4.5	1.03	0.23	0.31	0.01	1.58	13.71	15.18	13.54	12.0	10.8	2.15	0.08	2	320
Cr----- 34 to 38	4.3	0.57	0.14	0.30	0.08	1.09	14.00	18.48	17.39	7.3	5.9	3.87	0.11	1	322
R------ 38 to 49	3.8	0.41	0.12	0.38	0.07	0.98	13.12	16.75	16.77	7.4	5.0	5.91	0.07	2	340
Yosemite gravelly silt loam:															
(S87-KY-045-3)															
Ap----- 0 to 10	6.0	2.62	2.00	0.30	0.03	4.95	10.72	11.40	6.45	46.2	43.4	4.38	0.11	10	187
Bw----- 10 to 17	6.4	5.61	1.38	0.19	0.04	7.22	10.20	11.23	4.03	71.1	64.3	0.08	0.08	5	134
Bg1---- 17 to 23	6.5	3.23	2.09	0.27	0.04	5.63	11.23	11.74	6.14	49.9	47.7	0.46	0.15	7	188
Bg2---- 23 to 31	6.6	3.46	1.92	0.25	0.05	5.68	12.52	11.05	6.37	45.4	42.4	0.57	0.13	7	199
Cg1---- 31 to 43	6.6	6.19	2.00	0.33	0.05	8.57	14.26	17.69	0.60	60.0	48.4	0.99	0.08	8	218
Cg2---- 43 to 64	6.8	6.45	1.82	0.23	0.05	8.55	10.58	15.12	6.57	80.8	56.5	1.05	0.08	8	176

TABLE 19.--ENGINEERING INDEX TEST DATA

(The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											Liquid limit	Plasticity index	Moisture density		Specific gravity
			Percentage passing sieve--								Percentage smaller than--							
	AASHTO	Unified	3 in.	2 in.	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm	Pct		Maximum dry density Lb/cu ft	Optimum moisture Pct	
Pricetown silt loam:																		
(S87-KY-045-5)																		
Bt1, Bt2---- 13 to 29	A-5(09)	CL	100	100	100	100	100	100	100	92	64	30	19	31	10	111.0	16.5	2.71
2Bt3, 2Bt4-- 29 to 45	A-7-5(24)	MH	100	100	100	100	100	100	100	92	76	55	43	56	20	98.0	25.5	2.75
Teddy silt loam:																		
(S87-KY-045-1)																		
Btx1, Btx2-- 21 to 46	A-4(6)	CL	100	100	100	100	100	100	100	81	61	32	19	31	9	111.5	16.0	2.72
2Bt1-------- 46 to 72	A-6(4)	ML	100	100	99	99	98	87	84	53	49	28	17	37	11	105.5	19.5	2.75
Trappist silt loam:																		
(S87KY-045-6)																		
Bt1, Bt2---- 6 to 26	A-7-6(23)	ML	100	100	100	100	100	100	100	100	87	58	37	47	19	99.5	23.5	2.77

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Berea	Fine-silty, mixed, mesic Aquic Hapludults
Caneyville	Fine, mixed, mesic Typic Hapludalfs
Carpenter	Fine-loamy, mixed, mesic Ultic Hapludalfs
Colyer	Clayey-skeletal, mixed, mesic Lithic Dystrochrepts
Crider	Fine-silty, mixed, mesic Typic Paleudalfs
Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Fairmount	Clayey, mixed, mesic Lithic Hapludolls
Faywood	Fine, mixed, mesic Typic Hapludalfs
Frankstown	Fine-loamy, mixed, mesic Typic Hapludults
Frederick	Clayey, mixed, mesic Typic Paleudults
Garmon	Fine-loamy, mixed, mesic Dystric Eutrochrepts
Johnsburg	Fine-silty, mixed, mesic Aquic Fragiudults
Lawrence	Fine-silty, mixed, mesic Aquic Fragiudalfs
Lenberg	Fine, mixed, mesic Ultic Hapludalfs
Lindside	Fine-silty, mixed, mesic Fluvaquentic Eutrochrepts
Lowell	Fine, mixed, mesic Typic Hapludalfs
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Pricetown	Fine-silty, siliceous, mesic Typic Paleudults
Robertsville	Fine-silty, mixed, mesic Typic Fragiaqualfs
Skidmore	Loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts
Teddy	Fine-loamy, siliceous, mesic Typic Fragiudults
Trappist	Clayey, mixed, mesic Typic Hapludults
Yosemite	Loamy-skeletal, mixed, nonacid, mesic Aeric Fluvaquents

TABLE 21.--GEOLOGIC SYSTEMS, FORMATIONS, AND MEMBERS

(Information in the table is based on Hustonville, Yosemite, and Mintonville quadrangles. The formations and members listed are not present on all geologic quadrangles)

System	Formation	Member	Thickness (feet)	Predominant soils
Quaternary-----	---	Alluvium	0-40	Nolin, Yosemite, Newark, Melvin.
	---	Loamy mantle*	0-5	Pricetown, Teddy.
Pennsylvanian-	Lee	---	0-100	---
Mississippian--	Pennington	Kidder Limestone	0-60	---
	Bangor, Hartselle	St. Genevieve	0-35	---
	Monteagle	Kidder Limestone	90-110	Caneyville, Frederick.
		St. Genevieve	70-115	Caneyville, Frederick.
	St. Louis	---	30-140	Frederick, Pricetown, Teddy.
	Salem and Warsaw	Halls Gap	40-85	Pricetown, Teddy, Frankstown.
	Borden	Muldraugh	40-75	Frankstown, Garmon.
		Halls Gap	0-120	Garmon.
		Nancy	20-80	Carpenter, Lenberg, Garmon.
		New Providence	10-120	Lenberg, Carpenter.
Devonian--------	New Albany Shale (Chattanooga Shale)	---	25-60	Colyer, Trappist.
	Boyle Dolomite	Preachersville	0-50	Crider, Fairmount, Faywood.
Ordovician------	Drakes and Ashlock	Preachersville (Cumberland)	0-80	Lowell, Faywood, Fairmount.
		Rowland	0-80	Lowell, Faywood, Fairmount.
		Reba	0-10	Faywood, Fairmount, Lowell.
		Terrill	0-10	Faywood, Fairmount, Lowell.

See footnotes at end of table.

TABLE 21.--GEOLOGIC SYSTEMS, FORMATIONS, AND MEMBERS--Continued

System	Formation	Member	Thickness (feet)	Predominant soils
Ordovician-----		Stingy Creek**	---	Faywood, Fairmount, Lowell.
		Gilbert	10-20	Faywood, Fairmount, Lowell.
		Tate	30-65	Faywood, Fairmount, Lowell.
	Calloway Creek	---	90-130	Faywood, Fairmount, Lowell.
	Garrard Siltstone	---	40-50	---

* Pricetown and Teddy soils, which are on ridgetops, formed in a loamy mantle, possibly influenced by loess, over residuum.

** The formation has small areas of exposure and is of little significance in the survey area.

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