Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

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 in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

The soils in the survey area are assigned to various interpretive groups at the end of each map unit description and in some of the tables. The groups for each map unit also are shown under the heading "Interpretive Groups," which follows the tables at the back of this survey.

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 Natural Resources 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 Natural Resources Conservation Service or the Cooperative Extension Service.

At the end of each map unit description, the soil has been assigned to a pasture and hayland suitability group. These groups are based primarily on the suitability of the soil for certain pasture species, management needs, and potential productivity. Detailed interpretations for each pasture and hayland suitability group in the county are provided in the "Technical Guide," which is available in the local office of the Natural Resources Conservation Service.

Trends in Land Use

Farming is the primary land use in Muskingum County. Only about 6 percent of the county is urban or built-up land *(23)*. In 1967, more than 92,521 acres in the survey area was used for crops and 117,767 acres was used for pasture *(34)*. Of this total, about 23,750 acres was used for row crops, mainly corn; 8,450 acres was used for close-growing crops, mainly wheat and oats; and 18,610 acres was used for hay and pasture. In 1982, about 91,000 acres was used for crops and 102,900 acres was used for pasture *(23)*.

The potential for increasing the acreage of cropland in Muskingum County is good. Approximately 3 percent of the 285,200 acres of pasture, woodland, and other land has a high potential for conversion to cropland. About 94,100 acres of potential cropland is currently

used as woodland, and about 77,200 acres is pasture. About 64 percent of this reserve acreage, or about 136,200 acres, is in land capability classes III and IV, which are described under the heading "Land Capability Classification" on page 133. Good management is needed on this acreage to minimize the hazard of erosion.

Although corn is the main grain crop grown in Muskingum County, the soils and climate are suitable for grain sorghum, sunflowers, and similar crops. Wheat and oats are common close-growing crops. Barley, rye, and buckwheat could be grown, and grass seed could be produced from bromegrass, timothy, fescue, redtop, and bluegrass.

Soil Management Problems

Different kinds of soil in the survey area have different management needs. The paragraphs that follow describe the major management concerns affecting cropland and pasture in Muskingum County.

Erosion is a major management concern on more than three-fourths of the cropland and pasture in Muskingum County *(23)*. Erosion is generally a hazard in areas where slopes are more than 2 percent. The hazard of erosion increases as the slope gradient increases. Generally, the hazard of erosion in cultivated or overgrazed areas is moderate on gently sloping soils (2 to 6 percent slopes), severe on strongly sloping soils (6 to 15 percent slopes), and very severe on moderately steep to very steep soils (more than 15 percent slopes). Some soils that are susceptible to erosion have additional limitations. For example, the hazard of erosion is moderate in areas of Fitchville silt loam, 2 to 6 percent slopes, and wetness is an additional limitation.

Erosion can remove the surface layer of the soil. The surface layer is the layer that has received most of the residue from the native and cultivated plants that have grown on the soil over the years. As topsoil is removed, the more acid subsoil becomes incorporated into the surface layer through subsequent tillage. Applications of lime and fertilizer are needed to replace lost plant nutrients and maintain productivity. If the amount of annual soil loss exceeds the rate at which the soil forms, productivity and natural fertility decrease. Loss of the original topsoil is especially damaging on soils that have a high content of clay in the subsoil, such as Aaron and Guernsey soils, and on soils that have a fragipan in the subsoil that limits the rooting depth, such as Cincinnati, Omulga, and Zanesville soils.

Tilling and preparing a good seedbed are difficult on the more eroded spots in sloping areas where most of the original surface layer has been lost. Stands are poorer in these spots because less moisture is available and soil-seed contact is reduced. Severely eroded spots are common in areas of eroded soils, such as Aaron, Gilpin, and Lowell soils.

Sediment, chemical fertilizer, herbicides, and pesticides are carried downstream from eroding fields by runoff and enter waterways, streams, ponds, and lakes. The sediment can fill drainage ditches and block drainage outlets, and costly maintenance commonly is needed.

Controlling erosion protects the soil, maintains productivity, helps to prevent the pollution of streams, and improves the quality of water for municipal and recreational uses and for fish and wildlife. Management practices that help to control erosion include rotating crops; contour farming, or tilling across the slope; contour stripcropping; planting cover crops; returning crop residue to the surface; establishing grassed waterways, terraces, and diversions; and using conservation tillage methods.

Crop rotations that include cover crops, grasses, and legumes improve tilth and reduce the hazard of erosion by providing plant cover for extended periods. Crop rotation is an effective erosion-control practice in gently sloping areas and in the steeper areas. The amount of time that hay or pasture should remain in the rotation increases as the slope increases. Erosion can be minimized during the establishment of forage plantings by planting companion crops or by using no-till seeding methods. In areas where slopes are relatively long and uniform, contour farming is an effective erosion-control method on gently sloping soils and contour stripcropping is an effective method on the steeper soils. In many areas, slopes are so short and irregular that contour stripcropping is not practical. In such areas, conservation tillage, which leaves crop residue on the surface, or a cropping system that provides substantial vegetative cover is needed to control erosion.

Diversions help to control erosion by intercepting runoff and diverting it across the slope. They are best suited to deep, well drained and moderately well drained, gently sloping and sloping soils that have relatively long and uniform slopes. They are well suited to soils that are in areas below the steeper slopes, such as Glenford soils.

Conservation tillage practices that leave crop residue on the surface, including no-till farming, can be adapted to most of the soils in the survey area. These practices are best suited to well drained and moderately well drained soils that dry and warm up early in spring. Adequate drainage is important if conservation tillage systems are used on very poorly drained to somewhat poorly drained soils. Conservation tillage requires a high level of management, including weed and insect control *(31)*.

Contour farming, contour stripcropping, and grassed waterways can be used along with conservation tillage methods to reduce the hazard of erosion in some areas. Nearly level, very poorly drained and somewhat poorly drained soils in areas where the hazard of erosion is slight are well suited to conventional fall plowing. If gently sloping to moderately steep soils are plowed during the fall, however, excessive erosion can result during the winter and spring.

Slippage is a major management concern on some soils, regardless of the planned land use. In areas used for crops or pasture, slips make operating machinery difficult or hazardous. In areas where soils have slipped, the surface is broken or undulating, which makes mowing, planting, or harvesting difficult. Soils in the survey area that are susceptible to slippage include Brookside, Claysville, Guernsey, Lowell, and Upshur soils. The high content of clay in these soils causes them to swell when wet, which creates tremendous lateral pressure. This pressure, combined with gravitational pull, causes the soil to slip downslope in sheets or blocky masses *(11, 14)*.

After slippage occurs, it is difficult to repair and stabilize the soil. Excess water swells and lubricates the soil, and removing excess water can help to stabilize the soil. Surface and subsurface drains can be installed above the slip to reduce ponding and to intercept the lateral movement of water. This procedure is very difficult, however, and has proven to be only moderately successful *(29)*. After it is drained, the land should be restored to an even grade, which allows positive surface drainage. Disturbing the land as little as possible, leaving tree roots that help to hold the soil in place, minimizing water infiltration, and leaving foot slopes undisturbed are some precautions that can be taken in areas where slips are likely.

Information on soil management practices for erosion control on each kind of soil is available from the local office of the Natural Resources Conservation Service.

Wetness is an important management concern in Muskingum County. A drainage system is the primary management need on about 20 percent of the cropland in the county. It is a secondary need in many other areas. Oxygen is not available in soils that are saturated with water, and most plant roots cannot grow without oxygen. Also, wet soils remain cold in the spring, and planting is delayed. Livestock that graze on wet, soft soils compact the surface layer and damage pasture plants.

Some of the soils in the county, such as the poorly drained and very poorly drained Killbuck, Lorain, Luray, Melvin, and Sebring soils, are naturally so wet that the production of the commonly grown crops is not possible unless a drainage system is installed. Such soils make up about 9,100 acres in the survey area. Undrained areas of these soils are considered to be potential wetland areas that are important as habitat for waterfowl and other wetland wildlife.

Unless artificially drained, the somewhat poorly drained soils are so wet that crops are damaged during most years and planting or harvesting may be delayed. Claysville, Guernsey, Fitchville, Jimtown, McGary, and Newark soils, which make up about 17,000 acres in the survey area, are examples of somewhat poorly drained soils. Areas of these soils include significant areas of potential wetlands.

Small areas of wet soils in seepy areas along drainageways and in swales are commonly included in areas of Clarksburg, Guernsey, Keene, Zanesville, and other moderately well drained soils. Artificial drainage is needed in areas of these wet soils.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and subsurface drainage is needed in most areas of the poorly drained and very poorly drained soils that are used for intensive row cropping. Drains should be more closely spaced in slowly permeable soils than in the more rapidly permeable soils. Establishing adequate natural outlets for subsurface drainage systems can be difficult in many areas of the Melvin and Sebring soils. A pump drainage system may be needed.

Periodic inspection and maintenance are needed to keep a drainage system working properly. Outlet ditches need regular cleaning to prevent sediment from blocking drain outlets and to keep brush from restricting water flow. Controlling weeds and brush and maintaining grass cover along the ditchbanks keep the ditchbanks stable and reduce streambank erosion. Subsurface drain outlets should be protected from erosion. Using animal guards prevents rodents from entering outlets and blocking drains. Replacing broken drains prevents sediment from accumulating and restricting water flow. Information on the design of drainage systems for each kind of soil is provided in the "Technical Guide," which is available in local offices of the Natural Resources Conservation Service.

Droughtiness is a major concern on some soils in Muskingum County. Some of the most droughty soils, including Berks and Rodman soils, are primarily used as woodland. Shortages of available water commonly occur in some areas used as cropland, hay, or pasture. Lakin and Watertown soils are the most droughty soils in the county. Droughtiness is less common in areas of Chili, Stonelick, and Tioga soils and in areas of soils that have a restricted root zone, such as Homewood and Gilpin soils.

Many of the soils in which moisture shortages occur

are well suited to conservation tillage or no-till farming methods. The crop residue left on the surface by these methods conserves soil moisture by increasing the rate of water infiltration and by reducing the runoff and evaporation rates.

Soil fertility is an important management concern on all soils used as cropland or pasture. About 16 chemical elements are essential to the growth of plants *(26)*. Adequate levels of plant nutrients, lime, and organic matter are needed for sustained high crop yields and productive pastures. The fertility of a soil depends on its natural fertility and its past use and management, including applications of lime and fertilizer. For this reason, soil fertility can vary widely from field to field, even on the same kind of soil.

The ability of a soil to store and release plant nutrients is affected by factors such as texture, reaction, the content of organic matter, and the type of clay minerals that are present. Many nutrients are most available to plants when the reaction of the soil is nearly neutral. These nutrients become less available as the soil becomes more acid or more alkaline. Most of the soils in Muskingum County are typically medium acid or strongly acid in the root zone and need periodic applications of lime to increase the availability of plant nutrients. The texture of the soil, the content of organic matter, and the type of clay minerals in the soil affect the cation-exchange capacity of the soil. The cation-exchange capacity affects the ability of a soil to store and release plant nutrients. In general, the capacity to store and release plant nutrients increases as the content of clay and organic matter increases.

Claysville and Lorain soils, which have a high content of clay and organic matter, have a high capacity to store and release plant nutrients. Chili and Rigley soils, which have a low content of clay and organic matter, have a lower capacity to store and release nutrients and are subject to higher nutrient losses caused by leaching. On soils that are subject to leaching, frequent, light applications of lime and fertilizer are preferable to less frequent, heavy applications. Applying lime and fertilizer more frequently minimizes the loss of nutrients.

On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Organic matter is an important part of the soil. It influences many soil properties, including color, structure, tilth, the rate of water infiltration, available water capacity, and cation-exchange capacity. The content of organic matter in the surface layer of the light-colored mineral soils in Muskingum County generally ranges from moderate in uneroded soils to low in eroded soils. The content of organic matter is generally high in the surface layer of the dark mineral soils in the county. Cultivation on sloping soils tends to reduce the content of organic matter through increased oxidation and erosion. Returning crop residue to the soil helps to maintain the content of organic matter. Planting cover crops, sod crops, and green manure crops and adding barnyard manure also help to maintain or increase the content of organic matter.

Sewage sludge can be a source of organic matter and plant nutrients. Using a proper application rate is important if sewage sludge is applied to the soil. Potential management concerns associated with the application of sewage sludge include hazards caused by heavy metals, odor problems, and other health hazards. The chemical composition of the sludge should be determined prior to application. Applications of sludge to cropland should be based on the sludge analysis, soil tests, plant tissue tests, and the expected level of yields. The Cooperative Extension Service can provide information on application of sewage sludge.

Tillage management involves the selection of the method and time for tillage and is an important factor in the germination of seeds and the rate of water infiltration. Soils that have good tilth are granular and porous. Maintaining tilth is a management concern on many of the soils in Muskingum County.

Most of the soils used for crops in the survey area have a light-colored surface layer of silt loam that has a moderate to low content of organic matter. Generally, the structure of such cultivated soils is relatively weak, and heavy rainfall causes the unvegetated surface to form a crust. The crust is hard when it is dry, and it reduces the rate of water infiltration and the movement of air. A crust also retards the emergence of seedlings and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can improve soil structure and minimize the formation of crusts. Using a system of conservation tillage, such as no-till farming, that leaves crop residue on the surface also can improve tilth. Conservation tillage methods can minimize crusting because the crop residue protects the surface from the force of falling raindrops.

If no-till farming methods are used, organic matter is not incorporated into the soil but instead accumulates on the surface. The organic matter binds the small silt and clay particles into larger aggregates, which are more difficult to dislodge when struck by raindrops than the individual particles. Also, the larger spaces between the aggregates permit a more rapid rate of water infiltration, which helps to control runoff.

Fall plowing is generally not a good practice on light-colored soils that have a surface layer of silt loam because of crusting during winter and spring. If plowed,

many of the soils are nearly as dense and hard at planting time as they were before they were plowed. Also, about one-half of the cropland in the survey area consists of sloping soils that are subject to erosion if they are plowed in the fall.

The very poorly drained Lorain soils have a high content of clay, and tilth is a problem because the soils often remain wet until late in spring. If plowed when too wet, these soils tend to become very compacted and cloddy when dry. The cloddiness makes preparing a good seedbed difficult. Plowing these soils in the fall generally results in good tilth in the spring because freezing and thawing during winter help to break up the clods.

Flooding is a major management concern on about 7 percent of the land in Muskingum County. Flooding occurs occasionally on about 23,600 acres and frequently on about 5,200 acres. Normally, flooding during the growing season severely reduces yields of grain crops. Flooding during the dormant season limits the use of the soils for some grain crops, such as winter wheat. The quality and longevity of forage plants are affected by longer periods of flooding. An additional 4,500 acres is on flood plains that are subject to only rare flooding. The development of upstream dams, such as the Dillon Lake dam and the Wills Creek Reservoir dam, has reduced the hazard of flooding in these areas.

The stability of streambanks is another management concern associated with flooding. Some soils on flood plains, such as Tioga fine sandy loam, are very unstable and move freely when saturated. Streambank erosion along meandering channels can occur during periods of high water, when the flow is increased and the soil is saturated. Revegetating the banks with shrubs that have a fibrous root system and shaping the land help to stabilize the banks and minimize erosion. Management is more intensive and also more costly if the area to be stabilized is on the outside radius of a meander. Commonly, stone riprap or other protective measures are required in addition to revegetation.

Pasture

More than one-fourth of the land area in the county is used for pasture. Pasture and hay plants commonly grown include alfalfa, red clover, alsike clover, bluegrass, orchardgrass, tall fescue, timothy, and bromegrass. In most areas, pastures can be improved by using the methods described in the following paragraphs.

The ability of a pasture to produce forage and an adequate plant cover for erosion control is affected by the number of livestock, the grazing period, the grazing season, and the availability of water. Using proper stocking rates, rotating pastures, deferring grazing, grazing during the proper season, mowing or using herbicides for weed control, applying lime and fertilizer, and controlling insects help to maintain key forage species.

Intensive grazing is a method of pasture management that is used in Muskingum County. This method consists of a cycle of controlled grazing, in which forage plants are grazed to a predetermined height by a large number of livestock in a small, confined area. Electric fences are used to form small paddocks, and they are frequently moved to permit the grazing of the next forage area. The closely grazed area is allowed to recover during a rest period before the animals are returned. This system requires a much higher level of management than other methods, beginning with the planning phase. Water management, erosion control, and frequent soil tests are needed.

Erosion is a management concern on sloping to steep soils used for pasture. The hazard of erosion increases as the slope gradient increases, and many of the soils are already eroded. Erosion also is a hazard in areas that have been overgrazed. Control of erosion is particularly important when plants are being seeded. No-till seeding, mulching, or planting a companion crop of small grain helps to prevent further erosion.

The need for applications of lime and fertilizer should be determined by soil tests, and adequate amounts should be supplied to meet the requirements of the grasses or legumes to be grown.

Soil compaction is caused by grazing when the soils are wet. It can greatly reduce the vigor of pasture plants. On sloping soils, it can also increase the hazard of erosion and the rate of runoff. Timely deferment of grazing during wet periods minimizes soil compaction. Subsurface drains can remove excess water from pastures. Installing a drainage system is expensive, however, and it is rarely practical unless the pastures are very intensely managed.

Seeding mixtures should be based on the soil type and the pasture management system to be used. Legumes increase the nutrient value of the forage and provide nitrogen for grasses. Alfalfa should be seeded on soils that have good drainage and adequate levels of plant nutrients and lime. Alsike clover is better adapted than red clover to the wetter soils. Information about seeding mixtures, herbicides, and management practices for specific soils can be obtained from local offices of the Cooperative Extension Service and the Natural Resources Conservation Service.

Specialty Crops

Specialty crops that are grown commercially in Muskingum County include vegetables, nursery stock, Christmas trees, and fruits. Throughout the county, a

small acreage is used for melons, strawberries, raspberries, sweet corn, tomatoes, vegetables, or small fruits. Potatoes and melons are grown commercially in extensive areas along the Muskingum River. Apples and peaches are the most important tree fruits grown in the county. Large areas can be adapted to specialty crops, such as tomatoes and vegetables. Most of the well drained soils are suitable for orchards and nursery plants. Orchards that are established on sites in the higher landscape positions have good cold air drainage, which is effective in reducing the hazard of frost damage. Soils in the lower landscape positions, where frost is common, generally are less well suited to early vegetables, small fruits, and orchards. The latest information about growing specialty crops can be obtained from local offices of the Cooperative Extension Service and the Natural Resources Conservation Service.

Management of Disturbed Lands

In 1987, about 39,261 acres in Muskingum County had been affected by surface mining. About 46 percent of this land was mined prior to the enactment of the 1972 Ohio Reclamation Law and has not been reclaimed. The unreclaimed land consists mostly of graded and ungraded ridges and piles of spoil. Soils in these unreclaimed areas include Bethesda, Fairpoint, and Morristown soils.

Legislation enacted in 1972 requires the reclamation of all land that is mined after that time. Reclamation consists of restoring the land to the approximate original contour and blanketing the surface with natural topsoil and subsoil material. Reclaimed soils make up about 21,330 acres in Muskingum County. Fairpoint silty clay loam, 15 to 25 percent slopes, and Morristown silty clay loam, 1 to 8 percent slopes, are examples. Reclaimed soils have a greater potential for agricultural production than unreclaimed mine soils, but they have limitations that should be considered in management.

The current law requires that natural soils identified as prime farmland be restored in natural sequence to a depth of as much as 48 inches following mining. Most soils in surface-mined areas do not meet the requirements for prime farmland. As a result, most of the mined land in the county has been reclaimed by spreading only 6 inches of soil material over the spoil. Soil properties must be considered in managing these soils. The content of organic matter is considerably lower in mined soils than in natural soils *(30)*.

A high bulk density is common in both the replacement soil material and in the underlying graded spoil. This compaction is caused by heavy machinery, especially wheeled vehicles used in reclamation; by excessive handling of topsoil material during stockpiling and spreading; and by performing mining and reclamation activities under unfavorable moisture conditions. There has been an insufficient amount of time for soil-forming processes to loosen the soil on these reclaimed sites. The high bulk density restricts root development, resulting in decreased crop yields.

Mine spoil typically has 35 to 60 percent rock fragments. In contrast, most unmined soils have 0 to 15 percent coarse fragments in the surface layer. Soil material used to blanket the spoil during reclamation commonly has less than 20 percent rock fragments. Coarse fragments reduce the effective root zone and the available water capacity in mine soils. Roots tend to be concentrated along the contact between the soil and the coarse fragments, and few roots can penetrate the compact, massive spoil material.

Seeding forage plants is the best means of restoring the productivity of mine spoil. Adapted forage plants can be used to increase the content of organic matter, improve soil structure, reduce compaction, and increase the rate of water infiltration and the pore space in the mine spoil. Forage crops are better soil-building crops than row crops and are more effective in minimizing runoff and erosion. Reseeding may be needed if stands are thin. Seeding companion crops, using no-till seeding methods, or adding mulch can help to control erosion. Mine soils are generally unsuited to winter grazing when they are wet. Grazing in winter can compact the surface layer, damage plants, and increase the hazard of erosion. These soils are better suited to frequent, light applications of fertilizer than to heavier applications because plant nutrients are lost through runoff and because the roots are concentrated in the upper few inches of the soil.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification 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 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit *(33)*. Only class and subclass are used in this survey.

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 have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

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

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of the map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Woodland makes up approximately 152,800 acres, or about 37 percent of the total land area in Muskingum County *(23)*. Most of this woodland is privately owned, but about 6,000 acres is State or Federal land. Extensive clearing of woodland areas prior to mining has occurred in Adams, Madison, Meigs, Monroe, and Rich Hill Townships. These townships are the main coal-producing areas in Muskingum County. Most areas in these townships are reclaimed land and have been seeded with grasses rather than replanted with trees. Some abandoned pastures are reverting to woodland.

The woodland in Muskingum County includes several forest types. Mixed oak forest is most common on upland hillsides and ridges. White oak is more dominant on the broader ridgetops. In the southern part of the county, droughty sites on southern aspects are dominated by chestnut oak and north-facing, very steep hillsides support isolated stands of hemlock. Mixed mesophytic forests are most commonly on moderately well drained soils on the lower parts of hillsides. Beech-

maple forests are in glaciated areas along the western edge of the county. Swamp forests are on the more poorly drained soils in valleys and on flood plains. Bottom-land hardwood forests, which include maples, sycamore, and black walnut, are in the better drained areas on flood plains.

Woodland management, including improvement of existing timber stands and reservation of areas for woodland expansion, is sporadic in the county. Many woodland areas show evidence of abuse and neglect. Woodland grazing combined with excessive harvesting of high-grade trees has resulted in stands that are understocked or that contain trees of little value. Culls and trees of low value now occupy many of the best woodland soils. Development of woodland areas could provide a source of future income for the county.

Woodland productivity of the soils varies. The available water capacity of a soil is an important factor that affects tree growth. It is influenced by soil depth, texture, permeability, and internal drainage. Other properties that affect woodland productivity are the slope, the degree of past erosion, acidity, and the natural fertility of the soil. Very steep slopes limit the types of equipment and management practices that can be used. Also, runoff and erosion increase as the slope gradient increases. Erosion reduces the amount of soil available for water storage. Severe erosion removes the porous surface layer and exposes the less porous subsoil. This process increases runoff and reduces the rate of water infiltration and thus severely inhibits tree growth and natural reseeding.

The aspect and landscape position of the soil also are important factors that affect tree growth *(8)*. Aspect refers to the compass direction in which the slope faces. Trees grow better on north aspects and in coves than on other sites because they are less exposed to the prevailing winds and the sun. They grow more slowly on south aspects because of higher soil temperatures and a higher evaporation rate resulting from more direct exposure to the wind and sun. The landscape position of a soil determines the availability of moisture for tree growth. Soil moisture tends to increase downslope because of the lateral downhill movement of water. Generally, the soils are deeper, the rate of evaporation of soil moisture is lower, and the soil temperature is lower on the lower parts of slopes.

Management and productivity of a plantation or forest also are affected by factors that are not directly related to the soil. Tree species that can withstand environmental conditions in a particular area should be selected, and the proper planting procedures for tree seedlings should be followed. Protecting the plantations from grazing by livestock helps to prevent damage to the stands and the entry of disease and harmful insects into tree butts and exposed roots. Trees and shrubs in woodlands that are grazed commonly are replaced by less desirable species, such as multiflora rose, hawthorn, and crabapple.

Improving timber stands is a good practice if the woodland is managed for timber. Removing the less desirable trees, vines, and shrubs allows the more desirable trees, such as oaks, walnut, and yellow-poplar, to achieve an optimum growth rate. Thinning promotes vigorous growth and reduces plant competition.

Fire prevention is an important part of good woodland management. Debris and downed timber should be removed as soon as possible. Firebreaks should be established, especially on large tracts of timber. Mowing grassed areas along roads and deferring or controlling the burning of trash during periods of extreme drought also are good practices.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *N*, snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under

ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Woodland Harvesting and Regeneration Activities

Table 9 gives information about the operation of equipment used for harvesting and regeneration in woodland areas. Limitations affecting the use of equipment are shown for haul roads, log landings, skid trails and logging areas, and site preparation and planting. The limitations are considered *slight* if the physical characteristics of the site impose few or no restrictions on the kind of equipment that can be used or on the time of operation, and they are considered *moderate* if the characteristics impose some restrictions. Limitations are considered *severe* if the physical conditions of the site require special equipment or techniques or if the time of efficient operation is very limited. The ratings are based on soil properties, site features, and observed performance of the soils.

Most *haul roads* are access roads that lead from log landings to primary or surfaced roads. Generally, these roads are unpaved and are not graveled. Some haul roads are constructed for access to gas or oil well sites, and the ratings given apply to these roads as well. Wetness, rockiness, depth to hard bedrock, stoniness, soil strength, slope, soil texture, and flooding are soil properties and hazards that should be considered in selecting routes for haul roads. Wetness and flooding affect the use of equipment. Rock outcrops, stones, and boulders are difficult to remove and hinder construction if cutting and filling are needed. Soil strength is a measure of the traffic-supporting capacity of the soil. Slope is a concern if cutting and filling are required.

Log landings are areas where logs are assembled for transportation. Commonly, these areas require little or no surface preparation or filling. Sites chosen for development of oil and gas wells have similar properties. Considerable soil compaction can be

expected in these areas. Wetness, flooding, rockiness, stoniness, slope, depth to hard bedrock, soil strength, soil texture, and coarse fragments are soil properties and hazards that should be considered in selecting sites for log landings. Wetness and flooding affect the use of equipment. Rock outcrops, stones, and boulders affect the configuration and location of landings. The slope and the depth to hard bedrock are concerns if cutting and filling are required. The texture of the soil affects trafficability.

Skid trails and logging areas include areas where some or all of the trees are being cut. Skid trails are roads over which logs are dragged or hauled with rubber-tired equipment from the stump to a log landing. Wetness, flooding, rockiness, stoniness, soil texture, and slope affect the use of equipment during logging activities in these areas. Other types of equipment can sometimes be used to minimize or overcome site limitations. Special equipment is usually required during periods when the surface layer is saturated, but the use of equipment during such periods should be avoided. Avoiding the use of sites that are susceptible to flooding for long periods helps to prevent damage to equipment and the environment. Surface stones and boulders and rock outcrops hinder the efficient and safe use of equipment. Traction problems increase as the slope increases. Clayey and sandy soils have special traction problems. Traction is reduced on clayey soils when they are wet and on sandy soils when they are dry. Using rubber-tired or tracked equipment on organic soils results in severe environmental damage, unless the soils are frozen.

Site preparation and planting include mechanized site preparation, planting, and row seeding. Wetness, flooding, rockiness, stoniness, coarse fragments, depth to hard bedrock, soil texture, and slope affect the use of equipment during site preparation and planting. Special equipment is usually required during wet periods, but operating equipment should be avoided in areas that are flooded for long periods or during periods when the surface layer is saturated. Surface stones, boulders, and rock outcrops hinder the efficient and safe operation of equipment. Coarse fragments and hard bedrock that is very close to the surface can interfere with the use of equipment. Traction problems increase as the slope increases. Clayey and sandy soils have special traction problems. Traction is reduced on clayey soils when they are wet and on sandy soils when they are dry.

Christmas Tree Production

Christmas trees are an important specialty crop in Muskingum County. Christmas tree production is increasing in the county, and there is good potential for expansion of the industry. Because of its proximity to highly populated areas, the county is in a favorable location for marketing Christmas trees.

In the past, Christmas tree plantations were commonly located on marginal sites that were too steep, infertile, or severely eroded for other types of agricultural production. Emphasis has now shifted toward the production of high-quality trees, which requires more intensive cultural practices and higher soil productivity. Areas of nearly level to strongly sloping soils are the most desirable for Christmas tree production. All phases of production, from site preparation to harvesting, are easier and less expensive in these areas than in areas on the steeper slopes. The steeper slopes are more vulnerable to erosion and generally are drier and less fertile. Also, areas that are relatively free of large rocks, brush, and other obstacles are preferred for Christmas tree production.

The soils in the survey area vary in their suitability for producing each of several species of Christmas trees that are commonly grown. For example, a soil that is well suited to Scotch pine may be unsuited to the less tolerant Fraser fir. Determining the suitability of the soil for the species to be planted is very important because it can take several years for a soil-related problem to become evident.

In table 10, the soils in Muskingum County are rated for their suitability for nine of the commonly grown Christmas tree species. A rating of *S* indicates that the soil is generally suited to the species. A rating of *L* indicates that the soil has limited suitability for the species. A rating of *N* indicates that the soil is generally unsuited to the species. Numbers following each rating of *L* or *N* indicate reasons for the rating. The numbered reasons are described in the following paragraphs.

The number *1* indicates that damage caused by frost is possible. Soils in depressional areas and narrow valleys, which are susceptible to frost in late spring, are poorly suited to spruce and fir trees.

The number *2* indicates that drought is a hazard. Some species, particularly spruce and fir trees, cannot withstand prolonged shortages of available moisture. Soils that have a limited available moisture capacity, such as Berks soils, have limited suitability for these species.

The number *3* indicates that wetness is a limitation. For example, Fitchville soils have only limited suitability for Scotch pine because of seasonal wetness. Maximum tree growth occurs early in the growing season. In most of the somewhat poorly drained and poorly drained soils, the root zone is saturated during this time of the year.

Soils that are somewhat poorly drained, poorly drained, or very poorly drained have only limited

suitability for Christmas trees. The roots of species that need considerable oxygen, such as Colorado blue spruce, do not grow well under saturated conditions. Even the root systems of more tolerant species, such as white pine, are restricted by a high water table. Many of the wetter soils are otherwise well suited to trees, however, and many growers believe that the cost of artificial drainage is justified.

The number *4* indicates that damage caused by frost heave is a limitation. Damage to young Christmas trees caused by frost heave can be severe, especially for shallow-rooted species, such as white pine. Soils that have a high content of silt hold a large amount of water. When the water freezes, it can force tree seedlings upward.

Frost heave is commonly most severe in silty soils that have a fragipan or some other restrictive layer that holds water near the surface. Zanesville and Keene soils are examples of soils that have a silty surface layer and a restrictive underlying layer. The damage caused by frost heave can be minimized by adding mulch or by maintaining ground cover around the seedlings.

The number *5* indicates that growth is limited by moisture shortages and that more time is required to produce a marketable tree. This limitation is considerably less severe than droughtiness.

The number *6* indicates that the delineation of the soil is likely to include seep spots that are too wet for a given species. It may be desirable to plant a different species if the seep spots are more than one-half acre in size. Hand planting may be necessary.

The number *7* indicates that soil cracking is a hazard. Soils that have a high content of clay, such as Upshur and Aaron soils, are susceptible to soil cracking. If a mechanical tree planter is pulled through such soils under wet conditions, the sides of the slot tend to smear or seal. Later in the season, when the soil dries, a crack opens along the slot. The crack allows the roots of young seedlings to dry out. Also, an open crack around the base of a seedling permits the wind to bend the seedling. This can cause a bend in the trunk, which results in the loss of a foot or more of height at maturity.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 11 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 11 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

The potential for developing recreational areas in Muskingum County is good. Many open areas and areas of woodland could be developed for parks, nature preserves, or other recreational facilities.

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 12, 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 12 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 15 and interpretations for dwellings without basements and for local roads and streets in table 14.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 13, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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, timothy, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface

stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are foxtail, goldenrod, smartweed, ragweed, and fall panicum.

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, beech, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and black raspberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are shrub honeysuckle, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, cedar, and juniper.

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 swamp smartweed, wild millet, cattails, willow, yellow nutsedge, 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, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, 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, 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. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan

detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 14 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. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and toxic substances 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 15 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 15 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and

one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. 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 15 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 15 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction 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 soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 16 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 16, 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 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 or stones, 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 or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 17 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are

easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders or organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as 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 soil blowing 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 soil blowing, low available water capacity, restricted rooting depth, 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 21.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

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.

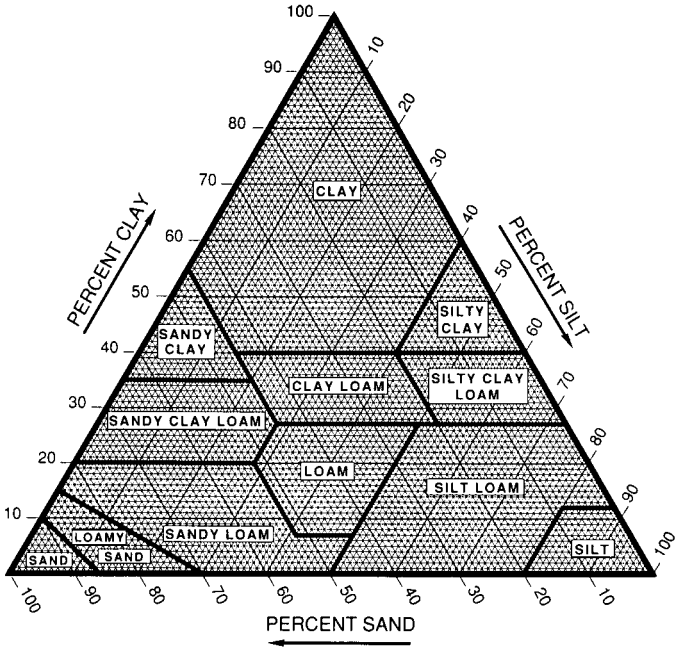

Figure 15.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 18 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 (fig. 15). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and

highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 19 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for

fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater 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 in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 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 without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 19, 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 20 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 not protected by vegetation 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.

If a soil is assigned to two hydrologic groups in table 20, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 20 gives the frequency and duration of flooding and the time of year when flooding is most likely.

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

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 20 are 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 high. A water table that is seasonally high for less than 1 month is not indicated in table 20.

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.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced

electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of 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 amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

Samples of many of the soils in Muskingum County were analyzed by the Soil Characterization Laboratory, Department of Agronomy, Ohio State University, Columbus, Ohio. The physical and chemical data obtained from the samples include particle-size distribution, reaction, organic matter content, calcium carbonate equivalent, and extractable cations. These data were used in classifying and correlating the soils and in evaluating their behavior under various land uses.

Eleven of the sampled pedons were selected as representative of their respective series. These pedons are described in the section "Soil Series and their Morphology." The series and their laboratory identification numbers are Alford (MS-20), Claysville (MS-32), Coshocton (MS-29), Keene (MS-25), Lowell (MS-24), Morristown (MS-23), Upshur (MS-31), Watertown (MS-30), Westgate (MS-28), Westmoreland (MS-22), and Zanesville (MS-10).

In addition to the data from Muskingum County, laboratory data are available from nearby counties that have many of the same soils. These data and the data from Muskingum County are on file at the Department of Agronomy, Ohio State University, Columbus, Ohio; the Ohio Department of Natural Resources, Division of Soil and Water Conservation, Columbus, Ohio; and the Natural Resources Conservation Service, State Office, Columbus, Ohio.

Engineering Index Test Data

Table 21 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Ohio Department of Transportation, Division of Highways, Testing Laboratory.

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 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(35)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aqualf (*Aqu*, meaning water, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; 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 Ochraqualfs (*Ochr*, meaning light-colored surface layer, plus *aqualf*, the suborder of the Alfisols 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. An example is Aeric Ochraqualfs.

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, mixed, mesic Aeric Ochraqualfs.

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. The texture of the surface layer or of the underlying material can differ 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" *(36)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(35)*. 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."

Aaron Series

The Aaron series consists of deep, moderately well drained, slowly permeable soils on ridgetops, hillsides, and benches. These soils formed in material weathered from slightly acid to calcareous clay shale and in

material weathered from limestone. Slopes range from 2 to 25 percent.

Aaron soils are similar to Guernsey, Lowell, and Keene soils and commonly are adjacent to Coshocton and Upshur soils. Guernsey soils have a higher content of coarse fragments in the subsoil than the Aaron soils. Lowell soils are well drained. Keene and Coshocton soils are in landscape positions similar to those of the Aaron soils. Keene soils have less clay and more silt in the upper part of the solum than the Aaron soils, and Coshocton soils have a higher content of coarse fragments in the upper part of the solum. Upshur soils are redder than the Aaron soils.

Typical pedon of Aaron silt loam, 8 to 15 percent slopes, eroded, about 2 miles south of Sonora, in Perry Township; 1,100 feet south of the intersection of Hicks Road and U.S. Route 40 along Hicks Road, about 550 feet east; T. 1 N., R. 6 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; common distinct specks of yellowish brown (10YR 5/4) silty clay loam; weak medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many distinct grayish brown (10YR 5/2) clay films on vertical faces of peds; few coarse fragments of weathered siltstone; medium acid; clear smooth boundary.

Bt2—16 to 26 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct light brownish gray (2.5YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; very dark brown (10YR 2/2) oxide stains; many distinct brown (10YR 5/3) clay films on faces of peds; few coarse fragments of weathered siltstone; neutral; clear smooth boundary.

Bt3—26 to 33 inches; light olive brown (2.5YR 5/4) clay; few medium distinct gray (10YR 5/1) and yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; many distinct grayish brown (2.5YR 5/2) clay films on faces of peds; few coarse fragments of weathered siltstone; neutral; clear smooth boundary.

BC—33 to 46 inches; light olive brown (2.5YR 5/4) silty clay loam; few medium distinct olive gray (5YR 5/2) and brownish yellow (10YR 6/6) mottles; weak very coarse prismatic structure; firm; black (10YR 2/1) oxide stains; about 5 percent fragments of weathered siltstone; neutral; gradual smooth boundary.

Cr—46 to 48 inches; grayish brown (2.5YR 5/2), soft clay shale bedrock; massive; olive (5YR 5/6) streaks of lime; slight effervescence.

The thickness of the solum ranges from 30 to 50 inches. The depth to bedrock is 40 to 60 inches. The depth to free calcium carbonate is more than 30 inches. Coarse fragments of siltstone, shale, limestone, and sandstone make up 0 to 10 percent of the Ap and Bt horizons and 0 to 35 percent of the BC and C horizons.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons have an A horizon and an E horizon. The Bt horizon has hue of 10YR or 2.5YR, value of 4 to 6, and chroma of 4 to 8. It is silty clay, clay, or silty clay loam. The BC horizon has hue of 2.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. It is silty clay loam, silty clay, clay, or the channery or shaly analogs of those textures. Some pedons have a C horizon.

Alford Series

The Alford series consists of deep, well drained, moderately permeable soils on broad ridgetops and at the margin of terraces in valleys that were formerly glacial lakes. These soils formed in silty material deposited by the wind. Slopes range from 2 to 15 percent.

Alford soils are similar to Wellston and Cidermill soils and are commonly adjacent to Cincinnati, Lakin, Westgate, and Zanesville soils. Wellston soils have a higher content of coarse fragments in the lower part of the solum than the Alford soils. Cidermill soils are on glacial outwash terraces. They have loamy and sandy layers in the lower part of the subsoil. Cincinnati and Zanesville soils are in landscape positions similar to those of the Alford soils. They have a fragipan in the lower part of the subsoil. Lakin soils are on dunes. They have more fine sand throughout than the Alford soils. Westgate soils are in landscape positions similar to those of the Alford soils. They have slowly permeable, clayey layers in the lower part of the subsoil.

Typical pedon of Alford silt loam, 2 to 8 percent slopes, 6 miles north of Zanesville, in Muskingum Township; 3,400 feet west and 2,000 feet north of the southeast corner of sec. 21, T. 2 N., R. 8 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; very strongly acid; abrupt smooth boundary.

Bt1—10 to 20 inches; yellowish brown (10YR 5/4) silt

loam; moderate fine subangular blocky structure; friable; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—20 to 27 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—27 to 36 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; many faint brown (10YR 5/3) silt coatings and dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent dark brown (10YR 3/3) stains; medium acid; clear wavy boundary.

BC—36 to 50 inches; yellowish brown (10YR 5/4) silt loam; common medium faint brown (10YR 5/3) and distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; common fine distinct dark brown (10YR 3/3) stains; medium acid; gradual wavy boundary.

C—50 to 80 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; massive; friable; few pebbles; neutral in the upper part and alkaline in the lower part.

The solum ranges from 45 to more than 70 inches in thickness. It typically does not contain coarse fragments.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. 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 and has thin layers of very fine sandy loam, loam, or clay loam in the lower part.

Berks Series

The Berks series consists of moderately deep, well drained, moderately permeable or moderately rapidly permeable soils on ridgetops and hillsides. These soils formed in material weathered from shale, siltstone, and sandstone. Slopes range from 2 to 70 percent.

Berks soils are similar to Mertz soils and commonly are adjacent to Gilpin, Westmoreland, Lowell, and Rigley soils. Mertz soils contain chert fragments in the upper part of the solum. Gilpin, Westmoreland, Lowell, and Rigley soils are in landscape positions similar to those of the Berks soils. All of the associated soils contain fewer coarse fragments than the Berks soils, and all but the Gilpin soils are deep over bedrock.

Typical pedon of Berks channery silt loam, 15 to 25 percent slopes, eroded, about 4 miles west of Zanesville, in Springfield Township; 3,550 feet north and 550 feet east of the southwest corner of sec. 8, T. 16 N., R. 14 W.

Ap—0 to 8 inches; brown (10YR 4/3) channery silt loam, pale brown (10YR 6/3) dry; moderate medium and fine granular structure; friable; common fine roots; many faint dark grayish brown (10YR 4/2) organic coatings; common medium distinct yellowish brown (10YR 5/4) fragments of subsoil material; many worm channels; about 20 percent coarse fragments; medium acid; abrupt smooth boundary.

Bw1—8 to 16 inches; yellowish brown (10YR 5/4) very channery silt loam; moderate medium subangular blocky structure; firm; few medium roots; about 50 percent coarse fragments; strongly acid; gradual wavy boundary.

Bw2—16 to 28 inches; yellowish brown (10YR 5/4) very channery silt loam; moderate medium subangular blocky structure; firm; few medium roots; about 50 percent coarse fragments; common medium distinct black (10YR 2/1) stains of iron and manganese oxide; few faint strong brown (7.5YR 5/6) clay films; very strongly acid; gradual wavy boundary.

BC—28 to 35 inches; yellowish brown (10YR 5/4) very channery silt loam; moderate coarse subangular blocky structure; firm; about 50 percent coarse olive brown (2.5YR 4/4) fragments of siltstone; very strongly acid; clear wavy boundary.

Cr—35 to 47 inches; light olive brown (2.5Y 5/4), soft, fractured, laminated siltstone and fine grained sandstone bedrock; rippable.

R—47 to 49 inches; hard, fractured siltstone and sandstone bedrock.

The depth to bedrock is 20 to 40 inches. The content of fragments of shale, thin, flat siltstone, or fine grained sandstone ranges from 15 to 50 percent in the Ap horizon and from 15 to 75 percent in the B horizon.

The Ap horizon has value of 3 to 5 and chroma of 2 to 4. Some pedons have an A horizon. This horizon has value of 2 and chroma of 1. The B horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 3 to 8, but the hue of 5YR is restricted to the lower part. The B horizon is silt loam, loam, or silty clay loam in the fine-earth fraction. The Cr horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6.

Bethesda Series

The Bethesda series consists of deep, well drained soils that formed in extremely acid to strongly acid, excavated fine earth material and coarse rock fragments in areas used for surface mining of coal. The fine earth material is mainly weathered shale, and the coarse rock fragments are mainly siltstone, fine grained

sandstone, and hard shale. Permeability is moderately slow. Slopes range from 1 to 70 percent.

Bethesda soils are similar to Fairpoint soils and are commonly adjacent to Westmoreland and Morristown soils. Fairpoint soils are mine spoil. They are less acid than the Bethesda soils. Westmoreland soils are on nearby unmined hillsides. They are less stony than the Bethesda soils. Morristown soils are in landscape positions similar to those of the Bethesda soils. They are alkaline.

Typical pedon of Bethesda shaly silt loam, 1 to 15 percent slopes, about 2 miles northwest of White Cottage, in Springfield Township; 900 feet north and 400 feet west of the southeast corner of sec. 6, T. 15 N., R. 14 W.

A—0 to 1 inch; dark grayish brown (2.5Y 4/2) shaly silt loam, light brownish gray (2.5Y 6/2) dry; moderate thin platy structure; friable; many medium pores; about 30 percent soft shale chips; extremely acid; clear smooth boundary.

C1—1 to 12 inches; variegated dark grayish brown (2.5Y 4/2), gray (N 5/0), and yellowish brown (10YR 5/6) very shaly silty clay loam; massive; friable; patchy dark reddish brown (5YR 3/2), hard mineral coatings on shale and siltstone fragments; about 40 percent partially weathered shale, siltstone, and coal chips; extremely acid; gradual wavy boundary.

C2—12 to 33 inches; olive gray (5Y 4/2) extremely channery clay loam; massive; friable; continuous thick dark reddish brown (5YR 3/2), hard mineral coatings on the surface of shale and siltstone fragments; about 70 percent shale, siltstone, and sandstone fragments and a few stones; extremely acid; clear wavy boundary.

C3—33 to 50 inches; yellowish brown (10YR 5/4) very channery clay loam and very channery loam; massive; firm; about 35 percent shale, siltstone, and sandstone fragments; extremely acid; clear wavy boundary.

C4—50 to 60 inches; dark grayish brown (5YR 4/2) very channery silty clay loam; massive; firm; about 35 percent coarse fragments; strongly acid.

The depth to bedrock is more than 5 feet. The coarse fragments are shale, sandstone, siltstone, and coal. They are mostly gravel or channers, but some are flagstones and boulders. The content of coarse fragments ranges from 20 to 35 percent in the A horizon and from 35 to 80 percent in the C horizon. The average content of coarse fragments in the C horizon is 45 percent.

The A horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 8. The A horizon is dominantly shaly or flaggy silty clay loam or silt loam, but in some pedons it is channery or gravelly silty clay loam, clay loam, silt loam, or loam. The C horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 8. The C horizon is the very shaly, extremely shaly, very gravelly, extremely gravelly, very channery, and extremely channery analogs of silty clay loam, clay loam, silt loam, or loam.

Brookside Series

The Brookside series consists of deep, moderately well drained soils on benched foot slopes below the steeper hillsides. These soils formed in colluvium derived from clay shale and siltstone. Permeability is moderately slow. Slopes range from 8 to 40 percent.

Brookside soils are similar to Lowell and Guernsey soils and commonly are adjacent to Claysville soils. Guernsey soils have low-chroma mottles that are closer to the surface than those of the Brookside soils. The well drained Lowell soils are not so wet as the Brookside soils. The somewhat poorly drained Claysville soils are on benches. They have a surface layer that is darker than that of the Brookside soils.

Typical pedon of Brookside silty clay loam, 15 to 40 percent slopes, about 1.1 miles southwest of Gaysport, in Blue Rock Township; 6,000 feet southwest of the intersection of State Route 376 and State Route 60, and 120 feet southeast of State Route 60; in sec. 29, T. 12 N., R. 12 W.

A—0 to 3 inches; dark brown (10YR 3/3) silty clay loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine and medium roots; dark grayish brown (10YR 4/2) organic coatings on peds; about 10 percent gravel and stones; strongly acid; clear smooth boundary.

AB—3 to 10 inches; brown (10YR 4/3) silty clay loam; moderate coarse granular structure; friable; many medium and fine roots; dark grayish brown (10YR 4/2) organic coatings on peds; about 10 percent gravel and stones; very strongly acid; clear smooth boundary.

Bt1—10 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common medium and fine roots; brown (10YR 4/3) organic coatings on peds; about 10 percent gravel and stones; strongly acid; gradual smooth boundary.

Bt2—16 to 24 inches; yellowish brown (10YR 5/6) gravelly silty clay; moderate medium subangular blocky structure; firm; common medium and fine roots; many distinct brown (10YR 5/3) clay films on peds; about 15 percent gravel and stones; strongly acid; clear smooth boundary.

Bt3—24 to 30 inches; yellowish brown (10YR 5/4) channery silty clay; common medium distinct gray (10YR 5/1) and yellowish brown (10YR 5/8) mottles; moderate coarse subangular blocky structure; firm; few fine and medium roots; many distinct grayish brown (10YR 5/2) clay films on peds; about 15 percent channers and stones; strongly acid; gradual smooth boundary.

Bt4—30 to 45 inches; yellowish brown (10YR 5/4) channery silty clay loam; common medium distinct gray (10YR 5/1) mottles; moderate coarse prismatic structure; firm; few fine roots; common distinct gray (10YR 5/1) clay films on faces of peds; about 20 percent coarse fragments; strongly acid; gradual smooth boundary.

BC—45 to 63 inches; yellowish brown (10YR 5/4) channery silty clay loam; massive; common coarse distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; firm; about 20 percent channers and stones; strongly acid; abrupt smooth boundary.

C—63 to 70 inches; very dark grayish brown (10YR 3/2) channery silty clay loam; massive; very firm; common medium distinct black (10YR 2/1) stains of iron and manganese oxide; about 15 percent channers and stones; medium acid.

The thickness of the solum ranges from 40 to 80 inches. The depth to bedrock is more than 60 inches. The content of rock fragments is less than 15 percent in the A horizon, 5 to 25 percent in the Bt horizon, and 0 to 35 percent in the BC and C horizons.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. Some pedons have a BE horizon. The Bt horizon has hue of 10YR, 7.5YR, or 2.5YR, value of 4 or 5, and chroma of 3 to 6. It is silty clay loam, silty clay, clay, or the gravelly or channery analogs of those textures. The BC and C horizons have hue of 7.5YR, 10YR, or 2.5YR, value of 3 to 5, and chroma of 2 to 6. They are commonly mottled. They are silty clay loam, silty clay, clay, or the channery analogs of those textures.

Chagrin Series

The Chagrin series consists of deep, well drained, moderately permeable soils on the higher parts of flood plains. These soils formed in alluvial sediments along the major streams. They are subject to only rare flooding because of flood control provided by the dams of the Muskingum Conservancy District reservoirs. Slopes range from 0 to 3 percent.

Chagrin soils are similar to Tioga, Lobdell, and Stonelick soils and are commonly adjacent to Lindside, Nolin, and Chavies soils. Nolin, Lindside, and Lobdell soils are on bottom land and are more frequently flooded than the Chagrin soils. Nolin soils have less sand and more silt in the subsoil than the Chagrin soils. Lindside and Lobdell soils have gray mottles in the lower part of the subsoil and are moderately well drained. Stonelick and Tioga soils have less clay in the subsoil than the Chagrin soils. Chavies soils are on nearby terraces. They have an argillic horizon.

Typical pedon of Chagrin loam, rarely flooded, about 3 miles northeast of Dresden, in Cass Township; 600 feet north of the intersection of Gene Cox Drive and Burvil Road, and 500 feet east; T. 3 N., R. 7 W.

Ap1—0 to 7 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many fine roots; very dark grayish brown (10YR 3/2) organic coatings on peds; medium acid; clear smooth boundary.

Ap2—7 to 12 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable; many fine roots; slightly acid; clear wavy boundary.

Bw1—12 to 20 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; dark grayish brown (10YR 4/2) organic coatings and wormcasts; slightly acid; gradual wavy boundary.

Bw2—20 to 30 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; common fine roots; slightly acid; gradual wavy boundary.

Bw3—30 to 43 inches; brown (7.5YR 4/4) fine sandy loam; moderate coarse subangular blocky structure; friable; few fine roots; neutral; clear wavy boundary.

C1—43 to 51 inches; brown (7.5YR 4/4) loamy fine sand; single grained; loose; very friable; neutral; abrupt wavy boundary.

C2—51 to 77 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; medium acid; abrupt wavy boundary.

C3—77 to 83 inches; brown (7.5YR 4/4) sandy loam; moderate coarse subangular blocky structure; very friable; medium acid.

The thickness of the solum ranges from 24 to 48 inches. The content of coarse fragments, mostly pebbles, ranges from 0 to 5 percent in the solum and from 0 to 30 percent in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. It is typically loam, but in some pedons it is silt loam or fine sandy loam. The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. Some pedons have mottles with chroma of 2 or less at a depth of more than 40 inches. The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is loam, fine sandy loam, sandy loam, loamy fine sand, fine sand, or the gravelly analogs of those textures.

Chavies Series

The Chavies series consists of deep, well drained soils on glacial outwash terraces along major valleys. These soils formed in loamy alluvium and in the underlying sandy and gravelly outwash deposits. Permeability is moderately rapid. Slopes range from 0 to 6 percent.

Chavies soils are similar to Chili and Watertown soils and are commonly adjacent to Cidermill, Glenford, and Chagrin soils. Chili soils have more clay and gravel in the subsoil than the Chavies soils. Watertown soils have less clay and more sand in the surface layer and subsoil than the Chavies soils. Cidermill soils are in landscape positions similar to those of the Chavies soils. They have more silt and clay in the subsoil than the Chavies soils. Glenford soils are on nearby lacustrine terraces and are moderately well drained. Chagrin soils are on nearby flood plains. They do not have an argillic horizon.

Typical pedon of Chavies loam, 0 to 2 percent slopes, 2 miles south of Zanesville, in Wayne Township; 1,000 feet east-northeast of the intersection of State Route 60 and Deitz Lane, and 200 feet south; in sec. 15, T. 12 N., R. 13 W.

Ap—0 to 12 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; moderate medium platy structure parting to weak fine granular; friable; common fine roots; strongly acid; abrupt smooth boundary.

BE—12 to 15 inches; yellowish brown (10YR 5/4) loam; moderate medium platy structure parting to moderate fine subangular blocky; few fine silt coatings on faces of peds; firm; few fine roots; common brown (10YR 4/3) wormcasts; strongly acid; gradual smooth boundary.

Bt1—15 to 30 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct strong brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—30 to 42 inches; strong brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; clay bridges between sand grains; strongly acid; clear smooth boundary.

2BC—42 to 48 inches; strong brown (7.5YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; friable; about 25 percent gravel; strongly acid; gradual smooth boundary.

2C1—48 to 70 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; massive; very friable; about 25 percent gravel; strongly acid; clear smooth boundary.

2C2—70 to 80 inches; brown (10YR 5/3) gravelly loamy sand; single grained; loose; about 25 percent gravel; medium acid.

The thickness of the solum ranges from 40 to 60 inches. The content of coarse fragments ranges from 0 to 15 percent in the Ap and Bt horizons. It generally ranges from 15 to 30 percent in the 2Bt and 2C horizons, but some thin layers are as much as 50 percent gravel.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons in a few uncultivated areas have a thin A horizon and an E horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loam, fine sandy loam, or sandy loam. The 2C horizon is stratified beds of sand, loamy sand, sandy loam, or the gravelly analogs of those textures.

Chili Series

The Chili series consists of deep, well drained soils on glacial outwash terraces. These soils formed in stratified sand and gravel deposits. Permeability is moderately rapid. Slopes range from 0 to 15 percent.

Chili soils are similar to Chavies soils and are commonly adjacent to Cidermill, Rawson, and Watertown soils. Chavies soils have less gravel and clay in the upper part of the subsoil than the Chili soils. Cidermill soils are in landscape positions similar to those of the Chili soils. They are more silty in the upper part of the solum than the Chili soils. The moderately well drained Rawson soils are on the margin of lake plains in areas where the outwash deposits are underlain by lacustrine sediments. Watertown soils are in landscape positions similar to those of the Chili soils. They have more sand and less clay in the upper part of the solum than the Chili soils.

Typical pedon of Chili gravelly loam, 0 to 3 percent slopes, about 1.4 miles south of Nashport, in Licking Township; along the railroad tracks, 5,300 feet east of the crossing at Pleasant Valley Road, and 500 feet north of the tracks; T. 2 N., R. 9 W.

Ap—0 to 9 inches; dark brown (10YR 3/3) gravelly loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; many fine roots; about 20 percent fine gravel; medium acid; abrupt smooth boundary.

Bt1—9 to 14 inches; dark yellowish brown (10YR 4/4) gravelly loam; weak medium subangular blocky structure; very friable; common fine roots; thin, very patchy clay bridges; about 30 percent fine gravel; very strongly acid; clear smooth boundary.

Bt2—14 to 24 inches; dark yellowish brown (10YR 4/4) gravelly clay loam; moderate medium subangular

blocky structure; friable; few fine roots; medium continuous clay bridges; about 30 percent fine gravel; strongly acid; gradual smooth boundary.

Bt3—24 to 36 inches; dark yellowish brown (10YR 4/4) gravelly clay loam; weak coarse subangular blocky structure; friable; few fine roots; many medium distinct yellowish brown (10YR 5/4) clay bridges and coatings; about 30 percent fine gravel; strongly acid; abrupt smooth boundary.

Bt4—36 to 43 inches; brown (10YR 4/3) gravelly sandy loam; weak coarse subangular blocky structure; friable; many medium distinct yellowish brown (10YR 5/4) clay bridges and coatings; thin layer of gravelly clay loam in the lower part; about 30 percent fine gravel; slightly acid; abrupt irregular boundary.

C—43 to 60 inches; dark grayish brown (10YR 4/2) very gravelly sand; single grained; loose; about 45 percent fine gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 80 inches. The content of gravel is variable in most pedons because of stratification. It ranges from 0 to 30 percent in the A horizon and in the B horizon to a depth of less than 20 inches. It ranges from 15 to 50 percent in the B horizon to a depth of 20 to 40 inches and from 25 to 60 percent in the B and C horizons to a depth of more than 40 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. Some pedons have an A or E horizon. This horizon commonly is loam or gravelly loam, but in some pedons it is sandy loam, silt loam, or gravelly sandy loam. Some pedons have a BE horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It commonly is sandy loam, loam, clay loam, sandy clay loam, or the gravelly analogs of those textures. In some pedons it is silt loam or silty clay loam to a depth of 24 inches and is the very gravelly analogs of sandy loam, loam, clay loam, and sandy clay loam below a depth of 40 inches.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. It is uniform or is stratified with the gravelly or very gravelly analogs of loamy sand or sand.

Cidermill Series

The Cidermill series consists of deep, well drained soils on broad terraces or plains in filled valleys. These soils formed in silty deposits and in the underlying loamy glacial outwash. Permeability is moderate in the solum and rapid in the underlying material. Slopes range from 0 to 3 percent.

Cidermill soils are similar to Alford soils and are commonly adjacent to Glenford, Tioga, Nolin, Watertown, and Chavies soils. Alford soils are on terraces and ridgetops. They have silty deposits that are deeper than those of the Cidermill soils. Chavies and Watertown soils are in landscape positions similar to those of the Cidermill soils. They have more sand and less clay in the upper part of the subsoil than the Cidermill soils. Glenford soils are on lacustrine terraces and are moderately well drained. Tioga and Nolin soils are on nearby flood plains. They do not have an argillic horizon.

Typical pedon of Cidermill silt loam, 0 to 3 percent slopes, about 0.1 mile north of Frazeysburg, in Jackson Township; 1,600 feet east and 200 feet south of the northwest corner of sec. 19, T. 3 N., R. 9 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; few medium distinct yellowish brown (10YR 5/4) mottles; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

BE—8 to 16 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium subangular blocky structure; friable; common fine roots; many distinct dark grayish brown (10YR 4/2) organic coatings on vertical faces of peds; few faint yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt1—16 to 24 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—24 to 36 inches; yellowish brown (10YR 5/4) silt loam; moderate coarse prismatic structure parting to moderate coarse angular blocky; friable; common faint yellowish brown (10YR 5/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

2Bt3—36 to 43 inches; yellowish brown (10YR 5/4) loam; few fine faint pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; common faint dark yellowish brown (10YR 4/4) clay films on vertical faces of peds; very strongly acid; abrupt wavy boundary.

2BC—43 to 56 inches; yellowish brown (10YR 5/4) fine sandy loam; weak coarse subangular blocky structure; very friable; common faint brown (10YR 5/3) clay films on vertical faces of peds; strongly acid; abrupt smooth boundary.

2C1—56 to 62 inches; yellowish brown (10YR 5/4) loamy fine sand; many fine faint brown (10YR 5/3) and pale brown (10YR 6/3) mottles; single grained; loose; medium acid; clear smooth boundary.

2C2—62 to 80 inches; stratified sand and gravelly sand; single grained; loose; medium acid.

The thickness of the solum ranges from 40 to 72 inches. The content of coarse fragments ranges from 15 to 35 percent in the loamy and sandy layers, but there are no coarse fragments in the overlying silty mantle.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons in uncultivated areas have A and E horizons. The BE and Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. They are silt loam or silty clay loam. The 2BC horizon has colors similar to those of the Bt horizon. It is loam, fine sandy loam, sandy loam, or sandy clay loam. The 2C horizon has textures ranging from loamy fine sand to gravelly sand. In some pedons it has strata of very gravelly sand.

Cincinnati Series

The Cincinnati series consists of deep, well drained soils on glaciated ridgetops and hillsides. These soils formed in a mantle of loess and in the underlying glacial till over shale and siltstone bedrock. They have a fragipan. Permeability is moderate above the fragipan and moderately slow or slow in the fragipan. Slopes range from 2 to 15 percent.

Cincinnati soils are similar to Zanesville soils and are commonly adjacent to Alford and Homewood soils. Homewood soils are in the more dissected glaciated areas. They do not have a mantle of loess, and they have more sand and less silt in the upper part of the subsoil than the Cincinnati soils. Zanesville soils do not have glacial erratics in the lower part of the subsoil. Alford soils are on ridgetops. They do not have a fragipan.

Typical pedon of Cincinnati silt loam, 2 to 6 percent slopes, about 0.5 mile south of Gratiot, in Hopewell Township; 1,100 feet west and 650 feet north of the southeast corner of sec. 6, T. 18 N., R. 15 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; strong fine granular structure in the upper part and weak medium granular structure in the lower part; very friable in the upper part and friable in the lower part; many medium roots; medium acid; abrupt smooth boundary.

BE—8 to 12 inches; brown (10YR 5/3) silt loam; moderate medium subangular blocky structure; firm; common medium roots; many faint brown (10YR 5/3) silt coatings on vertical faces of peds; common distinct dark grayish brown (10YR 4/2) organic coatings on vertical faces of peds; strongly acid; clear wavy boundary.

Bt1—12 to 22 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm; common fine roots; many faint yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—22 to 28 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm; common fine roots; many distinct brown (10YR 5/3) silt coatings and many distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear wavy boundary.

2Btx1—28 to 40 inches; yellowish brown (10YR 5/6) silty clay loam; moderate very coarse prismatic structure; very firm, slightly brittle; few fine roots along faces of prisms; many distinct brown (7.5YR 5/4) clay films on horizontal faces of peds and many distinct grayish brown (10YR 5/2) clay films on vertical faces of peds; about 5 percent gravel; strongly acid; clear wavy boundary.

2Btx2—40 to 50 inches; yellowish brown (10YR 5/4) clay loam; moderate very coarse prismatic structure; very firm, slightly brittle; common distinct brown (7.5YR 4/4) and grayish brown (10YR 5/2) clay films on vertical faces of peds; many coarse black (10YR 2/1) concretions and stains of iron and manganese oxide; about 10 percent gravel; medium acid; clear wavy boundary.

2BC1—50 to 62 inches; yellowish brown (10YR 5/4) silty clay loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; common faint yellowish brown (10YR 5/4) clay films on vertical faces of peds; few fine black (10YR 2/1) concretions and stains of iron and manganese oxide; about 10 percent gravel; medium acid; clear wavy boundary.

2BC2—62 to 69 inches; yellowish brown (10YR 5/6) silty clay loam; weak coarse prismatic structure; firm; common faint yellowish brown (10YR 5/4) clay films on vertical and horizontal faces of peds; few fine black (10YR 2/1) concretions and stains of iron and manganese oxide; few medium light gray (10YR 6/1), weathered pebbles; about 10 percent gravel; strongly acid; gradual wavy boundary.

3Cr—69 to 80 inches; interbedded dark yellowish brown (10YR 4/4), soft, weathered shale and olive brown (2.5YR 4/4) siltstone bedrock; common distinct reddish brown (5YR 4/4) clay films on faces of vertical cracks and common faint grayish brown (10YR 4/2) clay films between beds; thin black (10YR 2/1) seam of weathered coal.

The thickness of the solum ranges from 48 to 120 inches. The depth to bedrock is more than 60 inches. Thickness of the loess mantle ranges from 18 to 40

inches. Depth to the fragipan ranges from 24 to 36 inches in uneroded areas. The content of coarse fragments ranges from 2 to 15 percent in the 2Btx and 2BC horizons.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons have A and E horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is typically not mottled, but in some pedons it has mottles with chroma of 3 or more. The Bt horizon is silty clay loam or silt loam. Pale brown (10YR 6/4) to grayish brown (10YR 5/2) silt coatings are in the lower part of the Bt horizon of some pedons and in the upper part of the 2Btx horizon in most pedons. The 2Btx horizon has colors similar to those of the Bt horizon. It is clay loam, silt loam, or silty clay loam.

Clarksburg Series

The Clarksburg series consists of deep, moderately well drained soils on foot slopes and benches. These soils formed in colluvium derived from fine grained sandstone, siltstone, and clay shale. They have a fragipan. Permeability is moderate above the fragipan and slow or moderately slow in the fragipan. Slopes range from 8 to 15 percent.

Clarksburg soils are similar to Homewood and Omulga soils and are commonly adjacent to Coshocton, Glenford, and Rigley soils. Homewood soils have glacial erratics throughout. Omulga soils are in landscape positions similar to those of the Clarksburg soils. They do not have coarse fragments in the lower part of the solum. Coshocton soils are on hillsides above the Clarksburg soils. They do not have a fragipan. Glenford soils have fewer coarse fragments in the lower part of the subsoil than the Clarksburg soils and do not have a fragipan. Rigley soils are on nearby hillsides and are well drained. They have a higher content of sand and coarse fragments throughout than the Clarksburg soils.

Typical pedon of Clarksburg silt loam, 8 to 15 percent slopes, eroded, about 2 miles southeast of Frazeysburg, in Jackson Township; 3,400 feet southeast of the intersection of Shannon Road and Baker Road; 700 feet east of Baker Road, and 100 feet north of a fence row; in sec. 21, T. 3 N., R. 9 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine and medium roots; dark grayish brown (10YR 4/2) organic coatings on peds; specks of yellowish brown (10YR 5/4) subsoil material; about 10 percent coarse fragments of sandstone; slightly acid; abrupt smooth boundary.

BE—9 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; many faint brown (10YR 5/3) silt coatings; common dark grayish brown (10YR 4/2) krotovinas and few faint dark yellowish brown (10YR 4/4) clay films on peds; about 10 percent coarse fragments of sandstone; slightly acid; clear smooth boundary.

Bt1—12 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine and medium roots; many faint brown (10YR 5/3) silt coatings; many faint dark yellowish brown (10YR 4/4) clay films on peds; about 10 percent coarse fragments of sandstone; slightly acid; clear smooth boundary.

Bt2—18 to 25 inches; yellowish brown (10YR 5/4) channery clay loam; weak medium subangular blocky structure; firm; few fine roots; many faint brown (10YR 5/3) silt coatings and dark yellowish brown (10YR 4/4) clay films on peds; about 20 percent coarse fragments of sandstone; medium acid; gradual wavy boundary.

Btx1—25 to 33 inches; yellowish brown (10YR 5/4) channery clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium platy; very firm and brittle; about 15 percent coarse fragments of sandstone and siltstone; many distinct grayish brown (10YR 5/2) and dark yellowish brown clay films on prisms; many medium prominent black (10YR 2/1) stains of iron and manganese oxide; few fine roots along faces of prisms; strongly acid; gradual wavy boundary.

Btx2—33 to 44 inches; yellowish brown (10YR 5/4) clay loam; common medium faint yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic structure; very firm and brittle; many distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/4) clay films on prisms; many medium prominent black (10YR 2/1) stains of iron and manganese oxide; about 10 percent coarse fragments; few fine roots; strongly acid; gradual wavy boundary.

BC—44 to 65 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct gray (10YR 6/1) and common fine faint yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure; firm; few faint dark yellowish brown (10YR 4/4) clay films; common medium prominent black (10YR 2/1) stains of iron and manganese oxide; 5 to 10 percent coarse fragments; very strongly acid; clear wavy boundary.

C1—65 to 72 inches; dark brown (7.5YR 4/4) clay loam; common medium distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; massive; firm; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

C2—72 to 80 inches; yellowish brown (10YR 5/4)

channery clay loam; many medium distinct gray (N 6/0) and few medium faint yellowish brown (10YR 5/6) mottles; massive; firm; about 20 percent coarse fragments of sandstone; strongly acid.

The thickness of the solum ranges from 50 to 70 inches. Depth to the fragipan ranges from 24 to 36 inches. The content of coarse fragments of fine grained sandstone or siltstone ranges from 0 to 20 percent by volume in the Bt horizon above the fragipan, from 5 to 30 percent in the Btx horizon, and from 5 to 60 percent in the BC and C horizons.

The Ap horizon has hue of 10YR and value of 4 or 5. The A horizon typically is silt loam, but in some pedons it is loam. The Bt horizon has hue of 10YR or 7.5YR and chroma of 4 to 6. It is silt loam, clay loam, silty clay loam, or the channery analogs of those textures. The Btx horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam, clay loam, silty clay loam, or the channery analogs of those textures. The C horizon has value of 4 or 5. It is silt loam, clay loam, silty clay loam, or the channery or very channery analogs of those textures.

Claysville Series

The Claysville series consists of deep, somewhat poorly drained soils on benches and foot slopes below steep hillsides. These soils formed in colluvium derived from clay shale, limestone, and siltstone. Permeability is slow. Seepage from limestone outcrops contributes to the wetness of the soils. Slopes range from 8 to 15 percent.

Claysville soils are commonly adjacent to Berks, Brookside, Gilpin, Guernsey, and Lowell soils. Guernsey and Brookside soils are in landscape positions similar to those of the Claysville soils but are on the more convex parts of benches. They do not have a mollic epipedon. Berks soils have less clay and a higher content of coarse fragments than the Claysville soils. Berks and Gilpin soils are moderately deep. Berks, Gilpin, and Lowell soils are well drained and are generally on the steeper slopes.

Typical pedon of Claysville silty clay loam, in an area of Claysville-Guernsey silty clay loams, 8 to 15 percent slopes, about 3.5 miles east of Gaysport, in Blue Rock Township; 2,400 feet east of the intersection of Imlay Road and Cutler Lake Road and 300 feet north of Cutler Lake Road; in sec. 24, T. 12 N., R. 12 W.

A1—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, gray (10YR 5/1) dry; strong medium granular structure; friable; many fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—8 to 13 inches; very dark grayish brown (10YR 3/2) silty clay, gray (10YR 5/1) dry; strong coarse granular structure; friable; many fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

BA—13 to 22 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine prominent yellowish brown (10YR 5/4) mottles; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; many fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw1—22 to 38 inches; light olive brown (2.5Y 5/4) silty clay loam; many coarse prominent grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; few distinct grayish brown (2.5Y 5/2) coatings on faces of peds; common very fine very dark brown (10YR 2/2), soft stains and concretions of iron and manganese oxide; few slickensides; neutral; gradual smooth boundary.

Bw2—38 to 45 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure; firm; common fine roots; few distinct grayish brown (2.5Y 5/2) coatings on faces of peds; common fine very dark brown (10YR 2/2), soft stains and concretions of iron and manganese oxide; few slickensides; about 10 percent rock fragments; neutral; clear smooth boundary.

BC—45 to 54 inches; light brownish gray (10YR 6/2) shaly silty clay; common medium prominent olive yellow (2.5Y 6/6) mottles; weak coarse subangular blocky structure; firm; few medium roots; about 20 percent light yellowish brown (2.5Y 6/4) fragments of shale and siltstone; neutral; clear wavy boundary.

C1—54 to 75 inches; light brownish gray (2.5Y 6/2) silty clay loam; common coarse prominent dark yellowish brown (10YR 3/4) mottles; massive; firm; few medium roots; about 5 percent light yellowish brown (2.5Y 6/4) fragments of shale and siltstone; neutral; clear wavy boundary.

C2—75 to 84 inches; yellowish brown (10YR 5/4) shaly silty clay loam; common medium prominent gray (10YR 6/1) mottles; massive; firm; about 20 percent light yellowish brown (2.5Y 6/4) fragments of shale and siltstone; neutral within a depth of 80 inches; slight effervescence and mildly alkaline at a depth of more than 80 inches.

The thickness of the solum ranges from 40 to 60 inches. The depth to weathered, soft clay shale, siltstone, or limestone bedrock ranges from 60 to 100

inches. The content of rock fragments ranges from 0 to 20 percent in the subsoil and from 0 to 30 percent in the C horizon.

The mollic epipedon is 10 to 16 inches thick. Some pedons in cultivated areas have an Ap horizon. The surface layer is dominantly silty clay loam, but in some pedons it is silty clay. It has value and chroma of 2 or 3. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is silty clay loam, silty clay, clay, or the channery, gravelly, or shaly analogs of those textures. The C horizon has hue of 5YR, 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is silty clay loam, silty clay, clay, or the channery, gravelly, or shaly analogs of those textures.

Coshocton Series

The Coshocton series consists of deep, moderately well drained, moderately slowly permeable or slowly permeable soils on the concave lower parts of hillsides and on the concave parts of ridgetops. These soils formed in colluvium and residuum derived from shale, siltstone, and sandstone. Slopes range from 8 to 40 percent.

Coshocton soils are similar to Keene soils and are commonly adjacent to Guernsey, Rigley, Homewood, Omulga, and Westmoreland soils. Rigley and Westmoreland soils are on the more convex parts of hillsides and are well drained. Keene soils are on ridgetops. They have more silt and a lower content of coarse fragments in the upper part of the profile than the Coshocton soils. Guernsey soils are on benches. They have more clay in the subsoil than the Coshocton soils. Omulga and Homewood soils have a fragipan. Omulga soils are on foot slopes, and Homewood soils are on glaciated landforms.

Typical pedon of Coshocton silt loam, 15 to 25 percent slopes, about 4.5 miles southeast of Nashport, in Licking Township; 1,000 feet south of the intersection of Pleasant Valley Road and Sportsman Center Road; T. 2 N., R. 9 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine and very fine granular structure; friable; common fine roots; very dark gray (10YR 3/1) in the upper 3 inches; about 5 percent coarse fragments; very strongly acid; abrupt smooth boundary.

BE—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; firm; few fine roots; many faint brown (10YR 5/3) coatings; about 5 percent coarse fragments; very strongly acid; gradual wavy boundary.

Bt1—12 to 20 inches; yellowish brown (10YR 5/4) clay loam; moderate medium and coarse subangular blocky structure; firm; few fine roots; many faint yellowish brown (10YR 5/4) clay films; about 10 percent coarse fragments; very strongly acid; clear smooth boundary.

Bt2—20 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; many faint brown (10YR 5/3) coatings; about 5 percent coarse fragments; very strongly acid; gradual wavy boundary.

BC—29 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct gray (10YR 6/1) and many medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm; many faint light brownish gray (2.5Y 6/2) clay films on faces of prisms; about 10 percent coarse fragments; strongly acid; gradual wavy boundary.

C—40 to 65 inches; dark yellowish brown (10YR 4/4) silty clay loam; many medium distinct grayish brown (10YR 5/2) mottles; massive; very firm; about 5 percent coarse fragments; strongly acid; clear wavy boundary.

Cr—65 to 80 inches; dark gray (10YR 4/1) and very dark grayish brown (10YR 3/2), soft shale bedrock; very firm; very strongly acid.

The thickness of the solum ranges from 24 to 50 inches. The depth to bedrock ranges from 40 to 84 inches. The content of coarse fragments of shale, siltstone, or sandstone increases with increasing depth. It ranges from 2 to 20 percent in the upper part of the solum, from 10 to 35 percent in the lower part, and from 2 to 60 percent in the C horizon.

The Ap horizon has chroma of 2 to 4. Some pedons have an A horizon. 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. It is silty clay loam, silt loam, clay loam, or sandy clay loam. The lower part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6. It is silty clay, silty clay loam, clay loam, loam, or the shaly or channery analogs of those textures. The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is silty clay loam, silty clay, or the channery or very channery analogs of those textures.

Fairpoint Series

The Fairpoint series consists of deep, well drained soils that formed in medium acid to neutral excavated

mine spoil in areas used for surface mining of coal. The mine spoil is siltstone, shale, and sandstone that has been mixed during mining. Permeability is moderately slow. Slopes range from 1 to 70 percent.

Fairpoint soils are similar to Bethesda and Morristown soils and are commonly adjacent to the loamy Udorthents. Bethesda soils are more acid than the Fairpoint soils. Morristown soils are more alkaline than the Fairpoint soils. Udorthents have fewer coarse fragments than the Fairpoint soils.

Typical pedon of Fairpoint silty clay loam, 1 to 15 percent slopes, about 3 miles northwest of Roseville, in Newton Township; 1,700 feet south and 300 feet east of the center of sec. 21, T. 11 N., R. 14 W.

Ap—0 to 7 inches; dark brown (10YR 3/3) and yellowish brown (10YR 5/6) silty clay loam, pale brown (10YR 6/3) dry; weak medium and coarse subangular blocky structure; firm; many fine roots; about 10 percent shale fragments; medium acid; abrupt smooth boundary.

C1—7 to 16 inches; variegated yellowish brown (10YR 5/4) (80 percent) and dark grayish brown (10YR 4/2) (20 percent) shaly silty clay loam; massive; firm; few fine roots; about 30 percent coarse fragments, mostly shale, siltstone, and fine grained sandstone; medium acid; abrupt wavy boundary.

C2—16 to 30 inches; variegated dark gray (10YR 4/1) (60 percent) and brown (10YR 4/3) (40 percent) very shaly silty clay loam; massive; very firm; about 50 percent shale fragments; medium acid; diffuse smooth boundary.

C3—30 to 60 inches; variegated dark gray (10YR 4/1) (90 percent) and dark brown (10YR 4/3) (10 percent) very shaly silty clay loam; massive; very firm; about 50 percent shale fragments; medium acid.

The depth to bedrock is more than 5 feet. In unreclaimed areas, the A horizon is gravelly or channery silty clay loam. In reclaimed areas, the A horizon is derived from natural soil material and is 4 to 12 inches thick. It is typically silty clay loam, but in some pedons it is loam, silt loam, or clay loam. The A horizon has hue of 7.5YR to 2.5YR or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 6.

Some pedons in unreclaimed areas have a weakly developed Bw horizon that has subangular blocky structure. The C horizon is gravelly or very gravelly, channery to extremely channery, or shaly to extremely shaly clay loam, silty clay loam, silt loam, or loam. It has hue of 7.5YR to 5YR or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 8.

Fitchville Series

The Fitchville series consists of deep, somewhat poorly drained, moderately slowly permeable soils on terraces in valleys that formerly held glacial lakes. These soils formed in silty slackwater sediments. Slopes range from 0 to 6 percent.

Fitchville soils are commonly adjacent to Glenford, Jimtown, McGary, Melvin, Newark, and Sebring soils. Jimtown and McGary soils are in landscape positions similar to those of the Fitchville soils. McGary soils have more clay in the subsoil than the Fitchville soils. Jimtown soils have more sand and gravel in the subsoil than the Fitchville soils. The poorly drained Sebring soils are on flats. Glenford soils are moderately well drained and are in landscape positions similar to those of the Fitchville soils or are on more dissected landforms. Newark and Melvin soils are on nearby flood plains. They do not have an argillic horizon.

Typical pedon of Fitchville silt loam, 0 to 2 percent slopes, about 4.2 miles southwest of Dresden, in Muskingum Township; 700 feet north and 1,700 feet west of the southeast corner of sec. 4, T. 2 N., R. 8 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium granular structure; friable; many fine roots; many faint grayish brown (10YR 5/2) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

BE—10 to 20 inches; brown (10YR 5/3) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and many medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; common fine roots; many distinct gray (10YR 6/1) silt coatings on faces of peds; very strongly acid; clear wavy boundary.

Bt1—20 to 27 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and many medium faint grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; few fine roots; many faint light brownish gray (2.5Y 6/2) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—27 to 32 inches; pale brown (10YR 6/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; few fine roots; few fine black (10YR 2/1) stains of iron and manganese oxide; many faint light brownish gray (2.5Y 6/2) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—32 to 40 inches; pale brown (10YR 6/3) silty clay loam; many medium distinct yellowish brown (10YR

5/6) and many fine distinct light brownish gray (2.5Y 6/2) mottles; moderate coarse prismatic structure; firm; common fine black (10YR 2/1) stains of iron and manganese oxide; common faint light brownish gray (2.5Y 6/2) clay films on faces of peds; medium acid; clear smooth boundary.

BC—40 to 58 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; many distinct gray (10YR 6/1) clay films on vertical faces of peds; thin strata of silty clay; slightly acid; gradual wavy boundary.

C—58 to 70 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and many medium distinct gray (10YR 6/1) mottles; massive; firm; laminated; neutral.

The thickness of the solum ranges from 30 to 70 inches. The Ap horizon has value of 4 or 5. Some pedons in uncultivated areas have A and E horizons. The Bt horizon has hue of 10YR or 2.5YR, value of 4 to 6, and chroma of 1 to 6. It has few to many mottles that have coatings with dominant chroma of 2. It is silty clay loam or silt loam that has thin layers of loam or clay loam. Some pedons have a thin, brittle horizon. The C horizon has colors similar to those of the Bt horizon. It is silt loam or silty clay loam that has thin layers of loam, fine sandy loam, or silty clay.

Frankstown Variant

The Frankstown Variant consists of moderately deep, well drained, moderately permeable soils on ridgetops in an area that is known locally as Flint Ridge. These soils formed in a mixture of loess and underlying material weathered from flinty limestone. Slopes range from 3 to 8 percent.

Frankstown Variant soils are similar to Gilpin soils and are commonly adjacent to Keene and Mertz soils. Gilpin and Keene soils are in landscape positions similar to those of the Frankstown Variant soils. Gilpin soils are moderately deep over sandstone or siltstone. Keene soils are moderately well drained. They are underlain by clay shale material. Mertz soils are on steep slopes and are downslope from the Frankstown Variant soils. They are deep and have many fragments of fractured flint in the subsoil.

Typical pedon of Frankstown Variant silt loam, in an area of Frankstown Variant-Mertz complex, 3 to 8 percent slopes, about 3.5 miles north-northeast of Gratiot, in Hopewell Township; 200 feet south and 200 feet west of the center of sec. 6, T. 1 N., R. 9 W.

A—0 to 4 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; many coarse to fine roots; about 10 percent cherty angular gravel and stones; slightly acid; abrupt smooth boundary.

BE—4 to 9 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure parting to weak thin platy; friable; many coarse to fine roots; about 10 percent cherty angular gravel and stones; medium acid; clear smooth boundary.

Bt1—9 to 16 inches; yellowish brown (10YR 5/6) cherty silt loam; moderate medium subangular blocky structure; firm; common fine and medium roots; common faint brown (10YR 4/4) clay films on faces of peds; about 15 percent cherty gravel and stones; strongly acid; clear smooth boundary.

Bt2—16 to 22 inches; yellowish brown (10YR 5/4) cherty silt loam; moderate fine subangular blocky structure; firm; few fine roots; many distinct strong brown (7.5YR 5/6) clay films on faces of peds; about 20 percent cherty gravel and stones; strongly acid; abrupt irregular boundary.

2R—22 to 25 inches; light gray (N 7/0) to very dark gray (N 3/0), hard flint bedrock.

The thickness of the solum and the depth to flint bedrock range from 20 to 40 inches. Rock fragments are mostly angular coarse gravel, cobbles, and stones of flint. The content of coarse fragments ranges from 0 to 15 percent in the upper part of the solum and from 20 to 60 percent in the lower part. Pedons in cultivated areas have an Ap horizon.

The A horizon has value of 3 or 4 and chroma of 1 to 3. The Bt horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 6. It is silt loam, silty clay loam, or the cherty or very cherty analogs of those textures.

Gilpin Series

The Gilpin series consists of moderately deep, well drained soils on ridgetops and hillsides. These soils formed in material weathered from interbedded siltstone and sandstone. Permeability is moderate. Slopes range from 2 to 70 percent.

Gilpin soils are similar to Frankstown Variant and Westmoreland soils and commonly are adjacent to Berks, Lowell, Rigley, and Upshur soils. Berks soils have a higher content of coarse fragments in the subsoil than the Gilpin soils. Frankstown Variant soils have chert fragments in the subsoil. Lowell, Rigley, Upshur, and Westmoreland soils are deep over bedrock. Lowell, Upshur, and Rigley soils are in landscape positions similar to those of the Gilpin soils.

Typical pedon of Gilpin silt loam, 2 to 8 percent slopes, about 2 miles southwest of Frazeysburg, in Licking Township; 1 mile south of the intersection of

Canal Road and Vickers Hill Road, 600 feet south of the township line, along Vicker Hill Road, and 450 feet east of the road; T. 2 N., R. 9 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine and medium roots; common medium distinct yellowish brown (10YR 5/4) specks of subsoil material; strongly acid; abrupt smooth boundary.

Bt1—9 to 16 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common fine roots; many distinct dark brown (10YR 4/4) clay films; strongly acid; clear smooth boundary.

Bt2—16 to 23 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; many faint brown (7.5YR 5/4) clay films; many light olive brown (2.5Y 5/4), very soft siltstone fragments; 5 percent coarse siltstone fragments; strongly acid; clear wavy boundary.

Bt3—23 to 30 inches; yellowish brown (10YR 5/4) channery clay loam; moderate coarse subangular blocky structure parting to moderate medium platy; friable; common faint brown (7.5YR 5/4) clay films on vertical faces of peds; many light olive brown (2.5Y 5/4), soft siltstone fragments; 15 percent coarse siltstone fragments; strongly acid; abrupt smooth boundary.

R—30 to 40 inches; light olive brown (2.5Y 5/4), interbedded, fractured siltstone, soft shale, and fine grained sandstone bedrock; few distinct brown (7.5YR 5/4) clay films on vertical faces of fractures.

The thickness of the solum ranges from 18 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. The content of flagstones and smaller fragments of siltstone, shale, or fine grained sandstone ranges from 5 to 15 percent in the A horizon and from 5 to 40 percent in individual subhorizons of the B horizon. Some pedons have a few limestone fragments.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. Pedons in uncultivated areas have thin A and E horizons. Some pedons have a BE horizon. The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 4 to 6. It is loam, clay loam, silt loam, silty clay loam, or the shaly or channery analogs of those textures. Individual subhorizons are very shaly or very channery. Some pedons have a thin BC, C, or Cr horizon.

Glenford Series

The Glenford series consists of deep, moderately well drained, moderately slowly permeable soils on terraces in former glacial lake valleys. These soils formed in silty lacustrine sediments. Slopes range from 0 to 35 percent.

Glenford soils are commonly adjacent to Alford, Markland, Fitchville, Omulga, Chavies, Cidermill, and Lakin soils. Alford, Chavies, Cidermill, and Lakin soils are well drained. Alford soils are on terraces and ridgetops and are not stratified. Chavies and Cidermill soils are on glacial outwash terraces. Lakin soils are on dunes. Fitchville soils are somewhat poorly drained and are in the flatter areas. Omulga soils are on foot slopes. They have a fragipan. Markland soils are in landscape positions similar to those of the Glenford soils. They contain more clay than the Glenford soils.

Typical pedon of Glenford silt loam, 0 to 2 percent slopes, about 1 mile north of Frazeysburg, in Jackson Township; 1,800 feet north of the intersection of Eddelblute Drive and Scout Road, and 400 feet east; T. 3 N., R. 9 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bt1—10 to 18 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many faint brown (10YR 5/3) silt coatings and few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—18 to 26 inches; dark yellowish brown (10YR 4/4) silt loam; many medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; firm; common fine roots; many prominent light brownish gray (2.5Y 6/2) silt coatings and common faint brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—26 to 34 inches; dark yellowish brown (10YR 4/4) silt loam; many medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to medium platy; firm; slightly brittle; common prominent light brownish gray (2.5Y 6/2) silt coatings on vertical faces of peds and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; abrupt wavy boundary.

BC—34 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common black (10YR 2/1) stains of iron and manganese oxide; many

distinct gray (10YR 6/1) clay films on vertical faces of peds; neutral; clear wavy boundary.

C—50 to 60 inches; brown (10YR 4/3) silty clay loam; massive; firm; gray (10YR 6/1) clay films on vertical faces of widely spaced cracks; light gray (10YR 7/2) streaks of calcium carbonate; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 30 to 60 inches.

The Ap horizon has chroma of 2 or 3. Some pedons have an A, E, or BE horizon. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is silty clay loam or silt loam. It has few or common high- and low-chroma mottles. In some pedons it has a thin, slightly brittle layer in the middle or lower part. The C horizon has value of 4 or 5 and chroma of 3 to 6. It is dominantly stratified silt loam and silty clay loam but includes thin strata of loam, fine sandy loam, or silty clay and lenses of very fine sand and fine sand. The content of coarse fragments ranges from 0 to 5 percent in the C horizon.

Guernsey Series

The Guernsey series consists of deep, moderately well drained, slowly permeable or moderately slowly permeable soils on benches and dissected hillsides. These soils formed in colluvium and material weathered from slightly acid to calcareous clay shale, siltstone, and thinly bedded limestone. Slopes range from 6 to 40 percent.

Guernsey soils are similar to Aaron, Brookside, and Lowell soils and are commonly adjacent to Upshur and Westmoreland soils. Aaron soils are on ridgetops and shoulders. They have fewer coarse fragments in the subsoil than the Guernsey soils. Brookside soils are on foot slopes and benches. They have a higher content of coarse fragments in the subsoil than the Guernsey soils. Lowell soils are on the steeper hillsides and are well drained. The well drained Upshur soils are in landscape positions similar to those of the Guernsey soils. They have a redder subsoil than the Guernsey soils. The well drained Westmoreland soils are on the steeper hillsides. They have more sand and less clay throughout than the Guernsey soils.

Typical pedon of Guernsey silty clay loam, in an area of Guernsey-Upshur silty clay loams, 6 to 15 percent slopes, eroded, about 4 miles southwest of New Concord, in Union Township; 2,200 feet west of the intersection of Rix Mills Road and Clay Pike, and 1,350 feet north of the road; T. 1 N., R. 5 W.

Ap—0 to 7 inches; brown (10YR 4/3) silty clay loam, light gray (10YR 7/2) dry; moderate very fine subangular blocky structure; friable; many fine roots; common flecks of light olive brown (2.5Y 5/4) silty clay subsoil material; about 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

Bt1—7 to 13 inches; light olive brown (2.5Y 5/4) silty clay; moderate fine subangular blocky structure; firm; common fine roots; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

Bt2—13 to 20 inches; brown (10YR 4/3) silty clay; many medium distinct light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; firm; common fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 10 percent coarse fragments; slightly acid; gradual smooth boundary.

Bt3—20 to 28 inches; brown (10YR 4/3) channery silty clay; many coarse distinct grayish brown (10YR 5/2) mottles; moderate coarse angular blocky structure; firm; common fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; many slickensides; about 20 percent coarse fragments; neutral; clear smooth boundary.

BC—28 to 39 inches; variegated olive gray (5YR 5/2) and dark brown (7.5YR 4/4) channery clay; weak very coarse prismatic structure; firm; weak red (10R 4/2) streaks; about 20 percent coarse fragments; slight effervescence; mildly alkaline; abrupt smooth boundary.

C—39 to 62 inches; variegated light olive brown (2.5Y 5/4) and light olive gray (5Y 6/2) channery silty clay; massive; very firm; weak red (10R 4/4) streaks; about 20 percent light gray (2.5Y 7/2) limestone fragments; strong effervescence; mildly alkaline; clear smooth boundary.

Cr—62 to 64 inches; soft clay shale bedrock.

The thickness of the solum ranges from 32 to 60 inches. The depth to bedrock is 60 to 80 inches. The depth to free calcium carbonate is more than 30 inches. The content of coarse fragments of siltstone, shale, limestone, and sandstone ranges from 0 to 15 percent in the Ap horizon, from 5 to 25 percent in the Bt horizon, and from 5 to 35 percent in the BC and C horizons.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. Some pedons have a thin, very dark A horizon and a light-colored E horizon. The A and E horizons are silt loam or silty clay loam. The Bt and BC horizons have hue of 2.5YR, 10YR, or 7.5YR, value of 4 to 6, and chroma of 3 to 6. Some thin horizons have hue of 5Y or 5YR and chroma of 1 or 2. The Bt and BC horizons are silty clay loam, silty clay, clay, or the

channery or shaly analogs of those textures. The C horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 6. It is silty clay loam, silty clay, clay, or the channery or shaly analogs of those textures.

Homewood Series

The Homewood series consists of deep, moderately well drained soils on dissected ridgetops and hillsides. These soils formed in loamy glacial till. They have a fragipan. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 8 to 20 percent.

Homewood soils are similar to Clarksburg soils and are commonly adjacent to Cincinnati, Coshocton, and Westmoreland soils. Clarksburg soils are on foot slopes. They do not have gravelly glacial erratics. Cincinnati soils are on the less sloping ridgetops. They have more silt in the upper part of the profile than the Homewood soils. Coshocton and Westmoreland soils are on unglaciated or dissected hillsides. They do not have a fragipan.

Typical pedon of Homewood silt loam, 15 to 20 percent slopes, eroded, about 1.8 miles south of Gratiot, in Hopewell Township; about 925 feet west and 525 feet south of the northeast corner of sec. 18, T. 18 N., R. 15 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, light gray (10YR 7/2) dry; moderate medium granular structure; friable; many fine roots; specks of strong brown (7.5YR 5/6) subsoil material; about 2 percent gravel; very strongly acid; clear smooth boundary.

Bt1—7 to 12 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; common prominent brown (10YR 4/3) organic coatings on vertical faces of peds; few brown (10YR 4/3) wormcasts; about 5 percent gravel; very strongly acid; clear wavy boundary.

Bt2—12 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; about 5 percent gravel; very strongly acid; clear wavy boundary.

Bt3—21 to 28 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct grayish brown (10YR 5/2) and few fine prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate coarse subangular blocky; firm; common fine roots; many faint brown (10YR 5/3) clay films on faces of peds; few medium black (10YR 2/1) stains of iron and manganese oxide; about 5 percent gravel; very strongly acid; abrupt irregular boundary.

Btx1—28 to 40 inches; yellowish brown (10YR 5/4) gravelly clay loam; few medium distinct grayish brown (10YR 5/2) and few medium distinct yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium platy; very firm; brittle; very few roots on faces of prisms; many faint pale brown (10YR 6/3) clay films on faces of prisms; common medium black (10YR 2/1) stains of iron and manganese oxide; about 15 percent gravel; very strongly acid; clear wavy boundary.

Btx2—40 to 46 inches; yellowish brown (10YR 5/4 and 5/6) gravelly clay loam; few fine distinct grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure; firm; common fine roots; common fine black (10YR 2/1) stains of iron and manganese oxide; about 20 percent gravel; strongly acid; clear wavy boundary.

BC—46 to 65 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure; firm; common black (10YR 2/1) stains of iron and manganese oxide; about 10 percent gravel; slightly acid; clear wavy boundary.

C—65 to 80 inches; brown (10YR 5/3) clay loam; common medium faint grayish brown (10YR 5/2) mottles; massive; firm; about 5 percent gravel; neutral.

The thickness of the solum typically ranges from 60 to 90 inches. The depth to free carbonates is more than 60 inches. Depth to the fragipan ranges from 16 to 33 inches. Some pedons have a mantle of loess as much as 16 inches thick. Coarse fragments are mostly gravel-sized fragments of sandstone and shale, but some limestone and crystalline rocks and thin, flat fragments of sandstone are in the lower part of many pedons. The content of coarse fragments ranges from 0 to 5 percent in the A horizon, from 0 to 10 percent in the Bt horizon, from 5 to 30 percent in the Btx and BC horizons, and from 5 to 35 percent in the C horizon.

The Ap horizon has chroma of 2 to 4. Some pedons have a thin A horizon and an E horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loam, silt loam, clay loam, or silty clay loam. The Btx horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is mainly loam, silt loam, clay loam, or the gravelly analogs of those textures. The C horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loam, silt

loam, clay loam, or the gravelly analogs of those textures.

Jimtown Series

The Jimtown series consists of deep, somewhat poorly drained, moderately permeable soils on outwash terraces and the margins of former glacial lakes. These soils formed in stratified loamy deposits that have a significant content of gravel. Slopes range from 0 to 3 percent.

Jimtown soils are commonly adjacent to Fitchville, Rawson, and Chili soils. These adjacent soils are in landscape positions similar to those of the Jimtown soils. Fitchville soils are less sandy throughout than the Jimtown soils and do not have gravel. Rawson soils are moderately well drained and are on gentle slopes. Chili soils are well drained.

Typical pedon of Jimtown loam, 0 to 3 percent slopes, about 3.5 miles southwest of Frazeysburg, in Licking Township; 2,100 feet southeast of the intersection of State Route 146 and State Route 586, and 1,200 feet north; T. 2 N., R. 9 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; dark gray (10YR 4/1) in the lower 2 inches; moderate medium granular structure; friable; about 10 percent gravel; slightly acid; abrupt smooth boundary.

Bg—8 to 12 inches; grayish brown (10YR 5/2) loam; common medium distinct yellowish brown (10YR 5/4) and few fine faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; about 10 percent gravel; medium acid; clear smooth boundary.

Btg—12 to 18 inches; grayish brown (10YR 5/2) loam; few medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium prominent black (N 2/0) stains of iron and manganese oxide; about 10 percent gravel; medium acid; gradual smooth boundary.

Bt1—18 to 26 inches; yellowish brown (10YR 5/4) gravelly loam; many medium faint grayish brown (10YR 5/2) and few fine distinct dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; about 20 percent gravel; medium acid; gradual smooth boundary.

Bt2—26 to 40 inches; yellowish brown (10YR 5/4) gravelly loam; many medium distinct yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; about 20 percent gravel; medium acid; gradual smooth boundary.

BC—40 to 48 inches; yellowish brown (10YR 5/4) gravelly loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; about 30 percent gravel; medium acid; clear smooth boundary.

C1—48 to 75 inches; yellowish brown (10YR 5/6) very gravelly loam; common medium distinct brown (10YR 5/3) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; about 40 percent gravel; medium acid; clear wavy boundary.

C2—75 to 80 inches; dark gray (10YR 4/1) very gravelly sandy loam; single grained; loose; about 55 percent rounded gravel; neutral.

The thickness of the solum ranges from 35 to 48 inches. The content of gravel is variable in most pedons because of stratification. It ranges from 0 to 30 percent in the A horizon and in the B horizon to a depth of about 20 inches and from 15 to 50 percent in the B and C horizons between the depths of 20 and 40 inches. It ranges from 10 to 60 percent in individual subhorizons. It is as much as 60 percent in the B and C horizons below a depth of 40 inches.

The Ap horizon has value of 3 or 4 and chroma of 1 to 3. It is loam, silt loam, sandy loam, or the gravelly analogs of those textures. Some pedons have a BE horizon. The Bt horizon has hue of 10YR, 5Y, or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It has few to many high- and low-chroma mottles. It is loam, clay loam, or the gravelly analogs of those textures. In some pedons it has thin subhorizons of sandy loam, silt loam, or silty clay loam. The C horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 4. It commonly is the gravelly or very gravelly analogs of loam, sandy loam, loamy sand, or sand, but in some pedons it is sandy loam, loamy sand, or sand.

Keene Series

The Keene series consists of deep, moderately well drained soils on ridgetops and benches. These soils formed in a mantle of loess and in the underlying residuum derived from clay shale and siltstone. Permeability is moderate or moderately slow in the silty upper part and moderately slow or slow in the lower part. Slopes range from 2 to 15 percent.

Keene soils are similar to Aaron, Coshocton, and Westgate soils and commonly are adjacent to Wellston and Zanesville soils. Aaron soils have more clay in the subsoil and are less acid than the Keene soils. Coshocton soils have less silt and a higher content of

coarse fragments in the upper part of the subsoil than the Keene soils. Westgate soils are red and clayey in the underlying material. Wellston soils are in the more convex landscape positions and are well drained. Zanesville soils are in landscape positions similar to those of the Keene soils. They have a dense fragipan in the subsoil.

Typical pedon of Keene silt loam, 6 to 15 percent slopes, eroded, about 6 miles southwest of Dresden, in Licking Township; 1,400 feet east of the intersection of Old Stagecoach Road and Baker Road, and 150 feet south; T. 2 N., R. 9 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; common distinct yellowish brown (10YR 5/4) flecks of subsoil material; slightly acid; abrupt smooth boundary.

BE—8 to 13 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; firm; few fine roots; common faint brown (10YR 5/3) silt coatings; medium acid; clear smooth boundary.

Bt1—13 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and many medium prominent reddish brown (5YR 4/3) mottles; moderate medium subangular blocky structure; firm; few fine roots; many faint light brownish gray (10YR 6/2) clay films on faces of peds; common medium dark brown (7.5YR 3/2) nodules; strongly acid; gradual wavy boundary.

Bt2—22 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct light gray (10YR 6/1) and common medium prominent reddish brown (5YR 4/3) mottles; moderate coarse prismatic structure parting to moderate medium platy; firm; few fine roots; many distinct light gray (10YR 6/1) clay films on faces of peds; many medium dark brown (7.5YR 3/2) nodules; strongly acid; abrupt wavy boundary.

2Bt3—30 to 38 inches; light gray (10YR 6/1) silty clay loam; common medium distinct brown (10YR 5/3) mottles; moderate coarse prismatic structure parting to moderate thick platy; very firm; about 10 percent shale fragments; many faint light gray (5YR 6/1) clay films on vertical faces of prisms; strongly acid; clear wavy boundary.

2BC—38 to 58 inches; light olive brown (2.5Y 5/4) channery silty clay loam; common medium prominent light gray (10YR 6/1) mottles; moderate very coarse prismatic structure parting to moderate thick platy; very firm; about 20 percent shale and siltstone fragments; few distinct light gray (10YR 6/1) clay films on vertical faces of prisms; medium acid; gradual boundary.

2C—58 to 74 inches; dark grayish brown (2.5Y 4/2) clay; common medium distinct light olive brown (2.5Y 5/4) and prominent light gray (N 6/0) mottles; massive; very firm; laminated; about 5 percent coarse fragments; medium acid; clear boundary.

2Cr—74 to 80 inches; soft gray (10YR 5/1) clay shale bedrock; laminated; can be cut with a spade.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock ranges from 50 to 84 inches. The content of coarse fragments, mainly small siltstone and shale fragments, ranges from 0 to 5 percent in the A and Bt horizons, from 5 to 15 percent in the 2Bt horizon, and from 5 to 35 percent in the 2C horizon.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons have an A horizon. This horizon is 1 to 4 inches thick. It has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR, 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 6. It is silty clay, silty clay loam, or the channery analogs of those textures. The 2C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 to 4. It is silty clay loam, silty clay, clay, or the channery analogs of those textures.

Killbuck Series

The Killbuck series consists of deep, poorly drained, moderately slowly permeable soils on flood plains in areas where tributary streams enter broad, filled valleys and deposit alluvial fines. These soils formed in recent alluvium and in a buried, dark-surfaced lacustrine soil. Slopes range from 0 to 2 percent.

Killbuck soils are similar to Melvin soils and are commonly adjacent to Luray and Newark soils. Newark and Melvin soils are on flood plains, but they do not have a buried dark layer that is 6 inches or more thick. Newark soils are somewhat poorly drained. Melvin soils are poorly drained. Luray soils are in depressed areas that are subject to ponding. They have a mollic epipedon.

Typical pedon of Killbuck silt loam, occasionally flooded, about 3.5 miles southwest of Frazeysburg, in Licking Township; 2,200 feet north of the intersection of State Highway 146 and State Route 586, along State Route 146, and 1,800 feet east; T. 2 N., R. 9 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; weak fine granular

structure; friable; medium acid; abrupt smooth boundary.

Bg1—10 to 17 inches; gray (10YR 5/1) and grayish brown (10YR 5/2) silt loam; few fine faint brown (10YR 5/3) and prominent dark red (2.5YR 3/6) mottles; yellowish brown (10YR 5/6) streaks; weak medium prismatic structure parting to moderate medium platy; friable; many faint dark grayish brown (10YR 4/2) silt coatings on faces of peds; medium acid; gradual wavy boundary.

Bg2—17 to 24 inches; gray (10YR 5/1) silt loam; common medium dark red (2.5YR 3/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; medium acid; clear wavy boundary.

Bg3—24 to 28 inches; dark gray (10YR 4/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure; firm; medium acid; abrupt smooth boundary.

2Ab—28 to 35 inches; very dark gray (10YR 3/1) silty clay; common medium distinct yellowish brown (10YR 5/4) mottles; strong medium prismatic structure; firm; common faint dark gray (10YR 4/1) coatings on faces of peds; slightly acid; abrupt wavy boundary.

2Bgb1—35 to 48 inches; dark gray (10YR 4/1) silty clay loam; common medium faint gray (10YR 5/1) and distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure; firm; common faint very dark gray (10YR 3/1) coatings on faces of peds; medium acid; abrupt wavy boundary.

2Bgb2—48 to 80 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; few dark yellowish brown (10YR 3/4) stains; weak coarse prismatic structure; firm; common faint gray (10YR 5/1) coatings on vertical faces of peds; medium acid.

The thickness of the silty alluvium overlying the 2Ab horizon ranges from 15 to 36 inches. The content of gravel ranges from 0 to 2 percent, by volume, in the A and Bg horizons and from 0 to 10 percent in the 2Ab, 2Bgb, and 2Cg horizons.

The Ap and Bg horizons have value of 4 or 5 and chroma of 1 or 2. The 2Ab horizon has value of 2 or 3 and chroma of 1 or 2. It is silty clay loam or silty clay. The 2Bgb horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is dominantly silty clay loam, but it has layers of silt loam in some pedons.

Lakin Series

The Lakin series consists of deep, excessively drained soils on dunes at the eastern margin of former glacial lakes or outwash plains. These soils formed in eolian fine sand. They have an argillic horizon that consists of thin lamellae. Permeability is rapid. Slopes range from 8 to 25 percent.

Lakin soils are similar to Chavies and Watertown soils and are commonly adjacent to Alford and Glenford soils. Chavies and Watertown soils do not have bands in the B horizon. Alford soils are in landscape positions similar to those of the Lakin soils. They are not as sandy as the Lakin soils and have a higher content of clay and silt. Glenford soils are on nearby lacustrine terraces and are moderately well drained. They have a higher content of silt and clay than the Lakin soils.

Typical pedon of Lakin loamy fine sand, 8 to 15 percent slopes, about 1 mile east-southeast of Dresden, in Madison Township; 1,500 feet east of the intersection of State Route 666 and Copeland Road, and 200 feet south; T. 3 N., R. 7 W.

Ap—0 to 9 inches; brown (10YR 4/3) loamy fine sand, light gray (10YR 7/2) dry; moderate medium platy structure parting to weak very fine granular; friable; many fine roots; few medium distinct yellowish brown (10YR 5/4) inclusions of E material in the lower part; medium acid; abrupt smooth boundary.

E—9 to 24 inches; yellowish brown (10YR 5/4) loamy fine sand; moderate medium platy structure parting to weak fine subangular blocky; friable; common fine roots; medium acid; gradual wavy boundary.

E and Bt—24 to 55 inches; dominant bands of brown (10YR 5/3) loamy fine sand (E); massive; very friable; very strongly acid; lamellae of yellowish brown (10YR 5/6) loamy fine sand and fine sandy loam 0.25 inch to 3.5 inches thick (Bt); moderate medium subangular blocky structure; friable; few fine roots; clay bridges between sand grains in the Bt part; combined thickness of the lamellae is about 5 inches; very strongly acid; gradual wavy boundary.

C—55 to 87 inches; pale brown (10YR 6/3) fine sand; thin bands of yellowish brown (10YR 5/4) loamy fine sand; single grained; loose; very strongly acid.

The thickness of the solum ranges from 40 to 80 inches. Depth to the uppermost bands ranges from 10 to 26 inches.

The Ap horizon has hue of 10YR or 7.5YR and value and chroma of 3 or 4. The E horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The Bt part of the E and Bt horizon consists of bands that range from 0.25 inch to 4.0 inches in thickness and that have a cumulative thickness of less than 5.5 inches. The bands have hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 6. The C horizon has value

of 5 or 6 and chroma of 3 or 4. It is loamy fine sand, fine sand, or sand.

Lindside Series

The Lindside series consists of deep, moderately well drained soils on flood plains. These soils formed in recent alluvial sediments. Permeability is moderate or moderately slow. Slopes range from 0 to 3 percent.

Lindside soils are similar to Lobdell and Nolin soils and are commonly adjacent to Chagrin, Newark, and Tioga soils. Lobdell soils have more sand and gravel in the subsoil than the Lindside soils. Nolin soils are well drained. Chagrin and Tioga soils are in landscape positions similar to those of the Lindside soils and are well drained. They have more sand in the subsoil than the Lindside soils. Newark soils are somewhat poorly drained and are on the lower, wetter parts of flood plains.

Typical pedon of Lindside silt loam, occasionally flooded, about 0.5 mile southwest of Frazeysburg, in Jackson Township; 100 feet north and 2,300 feet east of the southwest corner of sec. 19, T. 3 N., R. 9 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium granular structure; friable; many fine and medium roots; medium acid; abrupt smooth boundary.

Bw1—9 to 18 inches; yellowish brown (10YR 5/4) silt loam; common medium faint brown (10YR 5/3) mottles; moderate fine subangular blocky structure; friable; many fine roots; dark grayish brown (10YR 4/2) krotovinas; many distinct dark grayish brown (10YR 4/2) organic coatings on vertical faces of peds; strongly acid; clear wavy boundary.

Bw2—18 to 30 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable; few roots; strongly acid; clear wavy boundary.

Bw3—30 to 40 inches; pale brown (10YR 6/3) silt loam; few fine distinct strong brown (7.5YR 5/6) and many coarse distinct light brownish gray (2.5Y 6/2) mottles; weak coarse subangular blocky structure; friable; medium acid; gradual wavy boundary.

C—40 to 60 inches; dark brown (7.5YR 4/4) silt loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; massive; friable; medium acid.

The thickness of the solum ranges from 25 to 50 inches. The content of coarse fragments ranges from 0 to 5 percent within a depth of 40 inches and from 0 to 30 percent below that depth.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 or 3. Pedons in undisturbed areas have a thin A horizon. This horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. It is dominantly silt loam, but in some pedons it is silty clay loam or loam. The B horizon has hue of 7.5YR to 2.5Y and value of 4 or 5. It has chroma of 3 to 6 at a depth of less than 20 inches and of 1 to 4 at a depth of more than 40 inches. It is silt loam or silty clay loam. In some pedons it has thin strata of very fine sandy loam, fine sandy loam, loam, or clay loam. The C horizon generally has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4, but it may have chroma of 6 to 8 if the colors are mixed. It is silty clay loam, silt loam, loam, clay loam, very fine sandy loam, fine sandy loam, or sandy loam. It is stratified in some pedons.

Lobdell Series

The Lobdell series consists of deep, moderately well drained soils on narrow flood plains along rapidly flowing streams and on alluvial fans. These soils formed in alluvial deposits. Permeability is moderate. Slopes are 0 to 3 percent.

Lobdell soils are similar to Chagrin and Lindside soils and are commonly adjacent to Newark and Melvin soils. Chagrin soils are well drained. Lindside soils have fewer coarse fragments in the solum and underlying material than the Lobdell soils. Newark and Melvin soils are in the lower areas on flood plains. Newark soils are somewhat poorly drained. Melvin soils are poorly drained.

Typical pedon of Lobdell loam, channery substratum, occasionally flooded, about 4 miles south-southwest of Norwich, in Salt Creek Township; 4,000 feet south of the intersection of Flat Lane and Sundale Road, and 200 feet west of Sundale Road; in sec. 1, T. 13 N., R. 12 W.

Ap—0 to 6 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; very friable; many fine roots; about 5 percent siltstone fragments; medium acid; clear wavy boundary.

Bw1—6 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; many fine roots; about 5 percent siltstone fragments; medium acid; clear wavy boundary.

Bw2—14 to 28 inches; brown (10YR 4/3) channery silt loam; common fine distinct strong brown (7.5YR 5/6) and common medium faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; common fine roots; about 20 percent siltstone fragments; many black (10YR 2/1) concretions and stains of iron and manganese oxide; medium acid; clear wavy boundary.

C1—28 to 42 inches; grayish brown (10YR 5/2) channery loam; common medium faint brown (10YR 5/3) and many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; common fine roots; about 15 percent siltstone fragments; slightly acid; clear wavy boundary.

C2—42 to 58 inches; dark brown (7.5YR 4/4) channery loam; common medium distinct dark grayish brown (10YR 4/2) mottles; massive; firm; few fine roots; common fine black (10YR 2/1) stains of iron and manganese oxide; about 15 percent siltstone fragments; slightly acid; gradual wavy boundary.

C3—58 to 63 inches; dark brown (7.5YR 4/4) channery loam; common medium distinct (10YR 5/2) mottles; massive; firm; few fine roots; common fine black (10YR 2/1) stains of iron and manganese oxide; about 35 percent siltstone fragments; neutral.

The thickness of the solum ranges from 24 to 50 inches. The content of coarse fragments ranges from 0 to 5 percent in the A horizon, from 0 to 15 percent in the upper part of the Bw horizon, from 0 to 25 percent in the lower part of the Bw horizon, and from 10 to 35 percent in the C horizon.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. Some pedons have an A horizon. The A or Ap horizon is loam, silt loam, sandy loam, or the channery analogs of those textures. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is loam, silt loam, sandy loam, or the gravelly or channery analogs of those textures. The C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 1 to 8. It is the channery or gravelly analogs of loam, silt loam, or sandy loam.

Lorain Series

The Lorain series consists of deep, very poorly drained, slowly permeable soils that are in former glacial lake valleys. These soils formed in clayey lacustrine deposits. They are in level or depressed areas that have no natural drainage outlets. Slopes range from 0 to 2 percent.

Lorain soils are commonly adjacent to Luray, McGary, and Sebring soils. Luray and Sebring soils are in landscape positions similar to those of the Lorain soils. They have less clay in the surface layer and subsoil than the Lorain soils. McGary soils are somewhat poorly drained and are in the more convex landscape positions.

Typical pedon of Lorain silty clay, about 1.5 miles north of Nashport, in Licking Township; 900 feet north of the intersection of State Route 586 and O'Bannon Road and 1,900 feet west of State Route 586; T. 2 N., R. 9 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; moderate medium granular structure; friable; many coarse to fine roots; neutral; clear wavy boundary.

Btg1—7 to 12 inches; dark gray (N 4/0) silty clay, light gray (10YR 6/1) dry; common fine distinct yellowish brown (10YR 5/4) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common fine roots; few faint clay films on faces of peds; slightly acid; clear smooth boundary.

Btg2—12 to 25 inches; gray (N 5/0) silty clay; many medium distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; krotovinas, 1 inch in diameter, filled with very dark gray (10YR 3/1) silty clay; few faint clay films on faces of peds; neutral; gradual smooth boundary.

Btg3—25 to 48 inches; gray (5Y 5/1) silty clay; moderate coarse prismatic structure; firm; few fine roots; gray (N 5/0) coatings on faces of peds; few faint clay films on faces of peds; neutral; gradual smooth boundary.

BCg—48 to 60 inches; dark grayish brown (10YR 4/2) clay; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak very coarse prismatic structure with laminations; very firm; gray (N 5/0) coatings on faces of peds; common medium distinct light gray (10YR 7/2) streaks of secondary calcium carbonate; about 5 percent fine gravel; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. No coarse fragments are within a depth of 40 inches. The content of coarse fragments ranges from 0 to 5 percent at a depth of more than 40 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is mainly silty clay but is silty clay loam in some pedons. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. It is silty clay or clay. Some pedons have a Cg horizon.

Lowell Series

The Lowell series consists of deep, well drained soils on ridgetops, hillsides, and benches. These soils formed in material weathered from interbedded shale, siltstone, and limestone. Permeability is moderately slow. Slopes range from 8 to 70 percent.

Lowell soils are similar to Aaron, Brookside, and Guernsey soils and are commonly adjacent to Gilpin and Upshur soils. Aaron and Guernsey soils are moderately well drained. Brookside soils are moderately well drained. They have a higher content of coarse

fragments throughout than the Lowell soils. Upshur soils are in landscape positions similar to those of the Lowell soils. They have a reddish subsoil. Gilpin soils are on the steeper parts of hillsides. They are moderately deep over siltstone bedrock.

Typical pedon of Lowell silt loam, 15 to 25 percent slopes, eroded, about 1.5 miles north of High Hill, in Rich Hill Township; 1,000 feet east of Freeland Road, 2,100 feet east and 1,700 feet north of the southwest corner of sec. 33, T. 13 N., R. 11 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, light gray (10YR 7/2) dry; weak medium granular structure; friable; many fine roots; about 2 percent coarse fragments; slightly acid; abrupt smooth boundary.

BE—8 to 18 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; thin continuous dark brown (7.5YR 4/4) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—18 to 27 inches; strong brown (7.5YR 5/6) silty clay; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; common fine roots; thin patchy brown (10YR 5/3) clay films on faces of peds; common very dark brown (10YR 2/2) concretions of iron and manganese oxide; strongly acid; gradual wavy boundary.

Bt2—27 to 36 inches; strong brown (7.5YR 5/6) clay; few fine distinct brown (10YR 5/3) mottles; weak coarse prismatic structure parting to moderate coarse subangular blocky; very firm; thin continuous brown (10YR 5/3) clay films on faces of peds; few very dark brown (10YR 2/2) concretions of iron and manganese oxide; medium acid; gradual wavy boundary.

Bt3—36 to 41 inches; yellowish brown (10YR 5/6) clay; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure; very firm; thin continuous brown (10YR 5/3) clay films on faces of peds; common very dark brown (10YR 2/2) concretions of iron and manganese oxide; medium acid; abrupt wavy boundary.

BC—41 to 57 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; few fine dark yellowish brown (10YR 4/4) coatings on faces of peds; common slickensides; common distinct light gray (10YR 7/2) coatings of carbonate; about 5 percent coarse fragments; violent effervescence; mildly alkaline; clear wavy boundary.

C—57 to 70 inches; brown (10YR 5/3) channery silty clay loam; massive; firm; about 25 percent coarse fragments; slight effervescence; mildly alkaline; clear wavy boundary.

Cr—70 to 80 inches; brown (10YR 5/3), soft clay shale bedrock; common distinct light gray (10YR 7/2) coatings of carbonate.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock ranges from 40 to 80 inches. The content of coarse fragments ranges from 0 to 5 percent in the upper part of the solum, from 0 to 15 percent in the lower part of the solum, and from 1 to 50 percent in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. Some pedons have a thin A horizon. Other pedons have coatings on peds that have value of 3. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam, silty clay, or clay. The C horizon has hue of 2.5Y to 7.5YR, value of 3 to 6, and chroma of 4 to 6. It is silty clay loam, silty clay, or clay.

Luray Series

The Luray series consists of deep, very poorly drained soils in former glacial lake valleys. These soils are in level or depressed areas in the lowest positions on the landscape. They formed in silty, stratified lacustrine sediments. Permeability is moderately slow. Slopes range from 0 to 2 percent.

Luray soils are commonly adjacent to Fitchville, Killbuck, Lorain, and Sebring soils. Lorain soils are in landscape positions similar to those of the Luray soils. They have a thinner dark surface layer than the Luray soils and are more clayey in the surface layer and subsoil. Fitchville and Sebring soils have a lighter colored surface layer than the Luray soils. The poorly drained Sebring soils are in landscape positions similar to those of the Luray soils. The somewhat poorly drained Fitchville soils are in the higher landscape positions. Killbuck soils are occasionally flooded. They have silty sediments over dark lacustrine deposits.

Typical pedon of Luray silty clay loam, about 0.5 mile south of Shannon, in Muskingum Township; 2,400 feet southwest of the intersection of Shannon Road and Shannon Valley Road, and 600 feet southeast; in sec. 5, T. 2 N., R. 8 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium granular structure; firm; many fine roots; neutral; clear smooth boundary.

AB—10 to 16 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine angular

blocky structure; firm; common fine roots; slightly acid; clear wavy boundary.

Btg1—16 to 34 inches; dark gray (10YR 4/1) silty clay loam; common medium distinct light olive gray (2.5Y 5/2) mottles; weak medium prismatic structure parting to weak fine subangular blocky; firm; few fine roots; many faint gray (10YR 5/1) clay films on vertical faces of peds; neutral; gradual wavy boundary.

Btg2—34 to 48 inches; gray (N 5/0) silty clay loam; common fine distinct light olive gray (2.5Y 5/2) and few fine prominent yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; many faint dark gray (N 4/0) clay films on vertical faces of peds; neutral; gradual wavy boundary.

BCg—48 to 55 inches; light olive gray (2.5Y 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure; firm; common distinct dark gray (N 4/0) clay films on vertical faces of peds; neutral; gradual wavy boundary.

C—55 to 60 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct yellowish brown (10YR 5/4) mottles; massive; firm; common coarse black (10YR 2/1) crawfish krotovinas; mildly alkaline.

The thickness of the solum ranges from 30 to 60 inches. The mollic epipedon is 10 to 18 inches thick. It extends into the Btg horizon in some pedons. No coarse fragments are in the solum. The content of coarse fragments ranges from 0 to 2 percent in the C horizon.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is silt loam or silty clay loam. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2. It is silty clay loam or silt loam. The C horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 8 and is mottled. It is mainly silt loam or silty clay loam but commonly has thin strata of loam, fine sandy loam, or sandy loam. In some pedons it has free carbonates.

Markland Series

The Markland series consists of deep, moderately well drained and well drained soils on glacial lake terraces in filled valleys. These soils formed in lacustrine sediments. Permeability is slow. Slopes range from 2 to 35 percent.

Markland soils are commonly adjacent to McGary, Rawson, Glenford, and Watertown soils. Glenford soils are in landscape positions similar to those of the Markland soils. They have more silt and less clay throughout than the Markland soils. The somewhat poorly drained McGary soils are on flats. Rawson soils are near the edges of former glacial lakes. They have more sand in the upper part than the Markland soils. The well drained Watertown soils are on the dissected parts of terraces. They have much less clay than the Markland soils.

Typical pedon of Markland silt loam, 2 to 6 percent slopes, about 0.5 mile south of Avondale, in Newton Township; 1,200 feet north and 1,800 feet west of the southeast corner of sec. 15, T. 15 N., R. 14 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, very pale brown (10YR 8/3) dry; moderate fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

Bt1—7 to 13 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; many faint brown (10YR 5/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—13 to 21 inches; yellowish brown (10YR 5/4) silty clay; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; many faint brown (10YR 5/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—21 to 28 inches; yellowish brown (10YR 5/4) silty clay; common fine distinct grayish brown (2.5Y 5/2) mottles; moderate coarse prismatic structure; firm; few fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; common black (10YR 2/1) stains of iron and manganese oxide; strongly acid; gradual smooth boundary.

BC—28 to 36 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate very coarse prismatic structure; firm; few fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; mildly alkaline; abrupt smooth boundary.

C1—36 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) mottles; massive; laminated; firm; common light gray (10YR 7/2) nodules and streaks and a secondary accumulation of calcium carbonate; slight effervescence; mildly alkaline; gradual smooth boundary.

C2—48 to 80 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct gray (10YR 5/1) mottles; massive; laminated; slight effervescence; mildly alkaline.

The thickness of the solum and the depth to free carbonates range from 20 to 40 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. Some pedons have an A horizon. This horizon has value of 3 or 4 and chroma of 1 to 3. The A or Ap horizon is silt loam or silty clay loam. The Bt horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 4 or 5, and chroma of 3 to 6. In most pedons it has mottles in the lower part. It is commonly silty clay or clay, but in some pedons the upper part is silty clay loam. The content of clay is 40 to 55 percent in the Bt horizon. The C horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 4. It is clay, silty clay, or silty clay loam and has thin strata of silt, silt loam, or very fine sand.

McGary Series

The McGary series consists of deep, somewhat poorly drained soils on glacial lake terraces in filled valleys. These soils formed in deposits of calcareous lacustrine clay and silt. Permeability is slow or very slow. Slopes range from 0 to 3 percent.

McGary soils are commonly adjacent to Lorain, Markland, and Fitchville soils. Fitchville soils are in landscape positions similar to those of the McGary soils. They have less clay and more silt in the subsoil than the McGary soils. Markland soils are moderately well drained and well drained. They are more sloping than the McGary soils. The very poorly drained Lorain soils are in nearby depressions.

Typical pedon of McGary silt loam, 0 to 3 percent slopes, about 1.5 miles northeast of Frazeysburg, in Jackson Township; about 2,250 feet north of the intersection of State Route 16 and Old Riley Road, and 350 feet east; T. 3 N., R. 9 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; moderate medium granular structure; friable; many medium and fine roots; slightly acid; abrupt smooth boundary.

Bt1—6 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; many medium faint yellowish brown (10YR 5/6) and many fine distinct gray (10YR 5/1) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; many distinct light brownish gray (2.5Y 6/2) clay films and silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt2—14 to 26 inches; yellowish brown (10YR 5/4) silty clay; many medium distinct gray (10YR 5/1) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; firm; common black (10YR 2/1) stains of iron and manganese oxide; many distinct light brownish gray (10YR 6/2) clay films on faces of peds; few fine roots; medium acid; gradual smooth boundary.

Bt3—26 to 40 inches; brown (10YR 4/3) silty clay; many medium distinct gray (10YR 5/1) mottles; moderate very coarse prismatic structure parting to moderate coarse angular blocky; firm; common black (10YR 2/1) stains of iron and manganese oxide; many faint dark grayish brown (10YR 4/2) coatings and films on vertical faces of peds; few fine roots; neutral; clear smooth boundary.

C—40 to 60 inches; brown (10YR 4/3) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and dark gray (10YR 4/1) mottles; massive with weak bedding planes; very firm; many distinct gray (N 5/0) coatings on vertical faces of widely spaced cracks; common distinct very pale brown (10YR 7/3) streaks and few nodules of secondary calcium carbonate; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 40 inches. The depth to carbonates ranges from 20 to 55 inches.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. It is silt loam or silty clay loam. The Bt horizon commonly has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The matrix is mottled with colors that have chroma of 1 to 6. The Bt horizon is silty clay loam or silty clay. Coatings on the faces of peds include clay, silt, and organic stains. They have chroma of 1 or 2. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. It is mottled. It is commonly stratified clay, silty clay loam, and silty clay, but in some pedons it has thin layers of silt or silt loam.

Melvin Series

The Melvin series consists of deep, poorly drained soils that formed in recent alluvial sediments on flood plains. Permeability is moderate. Slopes range from 0 to 2 percent.

Melvin soils are similar to Killbuck soils and are commonly adjacent to Lindside, Newark, Sebring, and Nolin soils. Killbuck soils have a very dark buried layer that is at least 6 inches thick at a depth of 15 to 36 inches. The somewhat poorly drained Newark soils are in landscape positions similar to those of the Melvin soils. Sebring soils formed in lake sediments on former glacial lake terraces. Flooding is unlikely in areas of the Sebring soils. Lindside and Nolin soils are better drained than the Melvin soils. They are in nearby areas on the higher parts of flood plains.

Typical pedon of Melvin silt loam, frequently flooded, about 4 miles southeast of Frazeysburg, in Muskingum Township; about 330 feet north and 925 feet west of the center of sec. 7, T. 2 N., R. 8 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt

loam, light brownish gray (10YR 6/2) dry; weak medium granular structure; friable; many fine and medium roots; neutral; clear smooth boundary.

Cg—3 to 24 inches; gray (10YR 5/1) silt loam; common medium prominent yellowish red (5YR 5/6) mottles; moderate fine subangular blocky structure; friable; common fine and medium roots; slightly acid; abrupt smooth boundary.

Ab—24 to 27 inches; very dark gray (10YR 3/1) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; slightly acid; abrupt smooth boundary.

C'g1—27 to 38 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse faint light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure; friable; neutral; clear wavy boundary.

C'g2—38 to 44 inches; gray (N 6/0) silt loam; many medium prominent yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable; neutral; gradual wavy boundary.

C'g3—44 to 60 inches; gray (N 6/0) loam; many medium prominent yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable; few fine black (10YR 2/1) concretions of iron and manganese oxide; neutral.

The content of coarse fragments, mostly rounded pebbles, ranges from 0 to 5 percent to a depth of 30 inches. Below a depth of 30 inches, the content of coarse fragments ranges from 0 to 20 percent, by volume, in individual subhorizons.

The A horizon has hue of 10YR or 2.5Y and chroma of 1 or 2. It is commonly silt loam but is loam, fine sandy loam, or silty clay loam in some pedons. The Cg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 2. It is silt loam or silty clay loam. Some pedons do not have an Ab horizon. In some pedons the C'g horizon has strata of sandy loam, loam, loamy sand, clay loam, or silty clay loam at a depth of more than 40 inches. In some pedons, thin layers within the Cg horizon have matrix colors with high chroma.

Mertz Series

The Mertz series consists of deep, well drained, moderately slowly permeable soils on ridgetops and hillsides. These soils formed in siltstone colluvium that has a large amount of flint and chert fragments. Slopes range from 3 to 35 percent.

Mertz soils are similar to Berks soils and are commonly adjacent to Frankstown Variant, Coshocton, and Gilpin soils. Berks soils are moderately deep and contain mostly siltstone fragments. Frankstown Variant soils are in landscape positions similar to those of the Mertz soils. They are moderately deep over flint bedrock and have fewer coarse fragments in the subsoil than the Mertz soils. Coshocton soils are on the lower concave slopes. They have a lower content of coarse fragments than the Mertz soils and are moderately well drained. Gilpin soils are on ridgetops. They are moderately deep over siltstone.

Typical pedon of Mertz very cherty silt loam, 15 to 35 percent slopes, about 3.5 miles north-northeast of Gratiot, in Hopewell Township; about 300 feet south and 200 feet west of the center of sec. 6, T. 1 N., R. 9 W.

Oe—1 inch to 0; very dark brown (10YR 2/2) litter of decomposed oak, maple, hickory, and dogwood leaves; very many fine roots.

A—0 to 3 inches; black (10YR 2/1) very cherty silt loam, gray (10YR 5/1) dry; strong very fine granular structure; very friable; many fine roots; about 50 percent flint fragments; strongly acid; clear wavy boundary.

E—3 to 7 inches; dark grayish brown (10YR 4/2) very cherty silt loam; moderate thin platy structure parting to moderate medium subangular blocky; friable; many fine roots; about 50 percent angular flint fragments; strongly acid; clear wavy boundary.

BE—7 to 13 inches; yellowish brown (10YR 5/6) very cherty silt loam; common medium faint yellowish brown (10YR 5/8) mottles; moderate medium and fine subangular blocky structure; dark grayish brown (10YR 4/2) silt coatings on faces of peds; friable; many fine roots; about 60 percent angular flint fragments; strongly acid; clear wavy boundary.

Bt1—13 to 20 inches; yellowish brown (10YR 5/4) very cherty silty clay loam; moderate medium subangular blocky structure; firm; common faint dark yellowish brown (10YR 4/4) clay films; about 50 percent angular flint fragments; common fine roots; strongly acid; gradual wavy boundary.

Bt2—20 to 30 inches; strong brown (7.5YR 5/6) cherty silty clay loam; moderate coarse subangular blocky structure; very firm; many distinct dark yellowish brown (10YR 4/4) clay films; few fine roots; about 30 percent flint fragments; very strongly acid; clear wavy boundary.

2Bt3—30 to 36 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate medium prismatic structure; very firm; few fine roots; many faint brown (7.5YR 5/4) clay films; about 20 percent siltstone and flint fragments; strongly acid; gradual wavy boundary.

2Bt4—36 to 48 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate coarse prismatic

structure; firm; common fine distinct light olive brown (2.5Y 5/4), weathered siltstone fragments; common black (N 2/0) stains of iron and manganese oxide; 20 percent siltstone fragments; strongly acid; gradual wavy boundary.

BC—48 to 60 inches; strong brown (7.5YR 5/6) channery silty clay loam; massive; many fine distinct light olive brown (2.5Y 5/4), weathered siltstone fragments; about 25 percent siltstone fragments; very strongly acid.

The thickness of the solum ranges from 40 to 65 inches. The content of coarse fragments of flint, chert, and siltstone ranges from 35 to 60 percent in individual horizons in the upper part of the solum and from 15 to 50 percent in the lower part.

The A horizon has value of 2 to 4 and chroma of 1 to 3. Some pedons do not have O and E horizons. The texture of the surface layer is cherty silt loam or very cherty silt loam. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. It is the cherty, very cherty, channery, or very channery analogs of silty clay loam.

Morristown Series

The Morristown series consists of deep, well drained soils that formed in fine earth material excavated during mining for coal and limestone. These soils contain free lime and have a high content of coarse fragments. Permeability is moderately slow. Slopes range from 1 to 70 percent.

Morristown soils are similar to Fairpoint soils and are commonly adjacent to Bethesda, Gilpin, Lowell, and Upshur soils. Fairpoint soils are in areas of noncalcareous mine spoil. Bethesda soils are in areas of acid mine spoil that have not been reclaimed. Gilpin, Lowell, and Upshur soils are on nearby ridgetops and hillsides that have not been disturbed by mining.

Typical pedon of Morristown silty clay loam, 1 to 8 percent slopes, about 1.5 miles north of High Hill, in Rich Hill Township; about 300 feet west and 1,600 feet north of the southeast corner of sec. 33, T. 13 N., R. 11 W.

Ap—0 to 8 inches; dark brown (7.5YR 4/4) silty clay loam, pinkish gray (7.5YR 6/2) dry; moderate medium angular blocky structure parting to moderate coarse granular; firm; many medium and fine roots; about 10 percent coarse fragments of shale, siltstone, and limy shale, including 2 percent that are more than 3 inches in length; slight effervescence; mildly alkaline; abrupt wavy boundary.

C1—8 to 13 inches; light gray (5Y 6/1) channery silty clay loam; weak medium angular blocky structure; very firm; continuous gray (5Y 5/1) coatings on faces of peds; 10 to 15 percent coarse fragments, including 5 percent that are more than 3 inches in length; strong effervescence; moderately alkaline; clear wavy boundary.

C2—13 to 20 inches; light gray (5Y 6/1) very channery silty clay loam; massive; extremely firm; few fine roots; about 40 percent coarse fragments, including 10 percent that are more than 3 inches in length; strong effervescence; moderately alkaline; gradual wavy boundary.

C3—20 to 60 inches; light gray (5Y 6/1) very channery silt loam; massive; very firm; about 50 percent coarse fragments, including 20 percent that are more than 3 inches in length; strong effervescence; moderately alkaline.

The depth to bedrock is more than 60 inches. The content of coarse fragments in the control section ranges from 35 to 70 percent and averages about 40 percent. The coarse fragments range in size from fine gravel to stones and boulders.

The A horizon is gravelly, channery, or shaly in unreclaimed areas. In reclaimed areas it is natural soil material that is 4 to 12 inches thick. The A or Ap horizon is silty clay loam, silt loam, or loam. It has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 8. The C horizon is the very gravelly, extremely gravelly, very cobbly, extremely cobbly, very channery, or extremely channery analogs of loam, silt loam, clay loam, or silty clay loam. It has hue of 5YR to 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 8.

Newark Series

The Newark series consists of deep, somewhat poorly drained soils on flood plains. These soils formed in recent alluvial sediments. Permeability is moderate. Slopes range from 0 to 3 percent.

Newark soils are commonly adjacent to Killbuck, Lindside, Melvin, Fitchville, and Lobdell soils. Melvin soils are poorly drained and are in the lower areas on flood plains. Killbuck soils are poorly drained and are on alluvial fans. Fitchville soils are in areas of lake sediments that are not flooded. They have an argillic horizon. The moderately well drained Lobdell and Lindside soils are in the higher areas on flood plains.

Typical pedon of Newark silt loam, frequently flooded, about 2.5 miles south of Fultonham, in Newton Township; 1,670 feet west and 1,910 feet north of the southeast corner of sec. 36, T. 11 N., R. 15 W.

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) silt

loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

Bw—11 to 19 inches; brown (10YR 4/3) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; very friable; common fine roots; few faint brown (10YR 4/3) silt coatings on faces of peds; slightly acid; clear wavy boundary.

Bg—19 to 32 inches; grayish brown (10YR 5/2) silt loam; many medium distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) mottles; weak medium and coarse subangular blocky structure; very friable; many medium prominent black (N 2/0) and reddish brown (5YR 4/3) stains of iron and manganese oxide; medium acid; gradual smooth boundary.

C1—32 to 45 inches; dark yellowish brown (10YR 4/4) silt loam; many medium distinct grayish brown (2.5Y 5/2) mottles; massive; friable; common medium prominent black (N 2/0) and reddish brown (5YR 4/3) stains of iron and manganese oxide; medium acid; diffuse boundary.

C2—45 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; medium acid.

The thickness of the solum ranges from 22 to 44 inches. The content of coarse fragments, which are mostly gravel, ranges from 0 to 5 percent within a depth of 30 inches. It is as much as 15 percent at a depth of 30 to 40 inches and 60 percent at a depth of more than 40 inches.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is mottled in some pedons. The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam or silty clay loam. The C horizon has matrix colors similar to those of the B horizon. It is silt loam or silty clay loam. In some pedons it has thin layers of loam, fine sandy loam, silty clay, or the gravelly analogs of those textures.

Nolin Series

The Nolin series consists of deep, well drained, moderately permeable soils on the flood plains along the Muskingum River and its tributaries. These soils formed in alluvial sediments. They are occasionally flooded. Slopes range from 0 to 3 percent.

The Nolin soils in Muskingum County have less color and structure development in the subsoil than is typical for the series. This difference, however, does not affect use and management of the soils.

Nolin soils are similar to Lindside soils and are commonly adjacent to Chagrin, Melvin, Tioga, and Chavies soils. Lindside soils are moderately well drained. Chagrin and Tioga soils are in landscape positions similar to those of the Nolin soils. Chagrin soils have more sand and less silt in the subsoil than the Nolin soils. Tioga soils have more sand and less clay in the subsoil than the Nolin soils. Melvin soils are poorly drained and are in low areas on the flood plains. Chavies soils are on outwash terraces and are not subject to flooding.

Typical pedon of Nolin silt loam, occasionally flooded, about 0.5 mile northeast of Dresden, in Cass Township; about 3,450 feet east of the intersection of North Dresden Road and Gene Cox Memorial Drive, and about 530 feet south; T. 3 N., R. 8 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine and medium roots; thin continuous dark grayish brown (10YR 4/2) organic coatings on vertical faces of peds; common fine dark gray (10YR 4/1) wormcasts; neutral; clear smooth boundary.

C1—7 to 14 inches; brown (10YR 4/3) silt loam; weak fine granular structure; firm; common fine roots; many faint dark grayish brown (10YR 4/2) organic coatings on faces of peds; common fine distinct dark gray (10YR 4/1) wormcasts; neutral; clear smooth boundary.

C2—14 to 26 inches; brown (10YR 4/3) silt loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure parting to moderate medium granular; friable; few fine roots; many faint dark grayish brown (10YR 4/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

C3—26 to 40 inches; brown (10YR 4/3) silt loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak medium platy structure parting to moderate medium granular; very friable; many faint dark grayish brown (10YR 4/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

C4—40 to 50 inches; brown (10YR 4/3) silt loam; few fine faint dark yellowish brown (10YR 4/4) mottles; weak medium platy structure parting to weak coarse granular; friable; few faint dark grayish brown (10YR 4/2) organic coatings on faces of peds; neutral; clear smooth boundary.

C5—50 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; few coarse prominent grayish brown (10YR 5/2) and common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse granular structure; friable; neutral.

The thickness of the alluvial deposits ranges from 40

inches to many feet. The content of coarse fragments, mostly pebbles, ranges from 0 to about 5 percent in the solum.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. It is generally silt loam, but in some pedons it is loam. The C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 3 or 4. In some pedons it has mottles with chroma of 2 or less at a depth of more than 24 inches. It is silt loam or silty clay loam. Thin strata of loam, fine sandy loam, sandy loam, or the gravelly analogs of those textures are at a depth of more than 40 inches.

Omulga Series

The Omulga series consists of deep, moderately well drained soils on terraces composed of valley fill. These soils formed in loess, colluvium, or old alluvium underlain by lacustrine sediments. They have a fragipan. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 2 to 15 percent and are mainly concave.

Omulga soils are similar to Clarksburg and Zanesville soils and are commonly adjacent to Coshocton, Glenford, and Rawson soils. Clarksburg soils have coarse fragments. Coshocton, Glenford, and Rawson soils do not have a fragipan. Zanesville soils have material weathered from sandstone and siltstone in the lower part of the solum. Glenford and Rawson soils are on landforms similar to those of the Omulga soils but are usually at the lower elevations. Zanesville and Coshocton soils are on ridgetops and hillsides above the Omulga soils.

Typical pedon of Omulga silt loam, 2 to 6 percent slopes, about 0.7 mile southwest of Norwich, in Union Township; 800 feet west and 880 feet south of the northeast corner of sec. 15, T. 1 N., R. 5 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, light gray (10YR 7/2) dry; weak fine granular structure; friable; dark brown (10YR 3/3) stains of iron and manganese oxide; strongly acid; abrupt smooth boundary.

Bt1—8 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; firm; common faint brown (10YR 5/3) silt coatings; few faint dark yellowish brown (10YR 4/4) clay films; strongly acid; clear smooth boundary.

Bt2—13 to 21 inches; yellowish brown (10YR 5/4) silt loam; few fine faint yellowish brown (10YR 5/6) and pale brown (10YR 6/3) mottles; moderate fine and medium subangular blocky structure; firm; common fine very dark grayish brown (10YR 3/2) stains of iron and manganese oxide; common faint dark yellowish brown (10YR 4/4) clay films; very strongly acid; clear wavy boundary.

Bt3—21 to 24 inches; brown (10YR 4/3) silt loam; few medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; moderate medium angular blocky structure; firm; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear wavy boundary.

Btx1—24 to 30 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct yellowish brown (10YR 5/8) and gray (10YR 5/1) mottles; moderate very coarse prismatic structure parting to weak coarse subangular blocky; brittle and very firm; black (N 2/0) stains of iron and manganese oxide; very distinct dark grayish brown (10YR 4/2) clay films; strongly acid; clear wavy boundary.

Btx2—30 to 36 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium platy; brittle and very firm; many black (N 2/0) stains and concretions of iron and manganese oxide; many faint dark yellowish brown (10YR 4/4) clay films on horizontal faces of peds; many distinct gray (10YR 5/1) clay films on vertical faces of peds; medium acid; clear wavy boundary.

Btx3—36 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint yellowish brown (10YR 5/6) and distinct gray (10YR 5/1) mottles; weak very coarse prismatic structure; firm; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; many distinct grayish brown (10YR 5/2) clay films on vertical surfaces of peds; slightly acid; gradual smooth boundary.

BC—44 to 58 inches; yellowish brown (10YR 5/4) silty clay loam; many coarse distinct dark grayish brown (10YR 4/2) and gray (10YR 5/1) mottles; weak very coarse prismatic structure; firm; neutral; abrupt wavy boundary.

2C—58 to 66 inches; brown (10YR 4/3) silty clay; massive; stratified; firm; common distinct grayish brown (10YR 5/2) clay films on faces of vertical cracks; slightly acid.

The thickness of the solum ranges from 40 to 100 inches. Depth to the fragipan ranges from 18 to 36 inches. Coarse fragments are generally water-worn gravel. The content of coarse fragments is as much as 5 percent above the fragipan. It is as much as 10 percent in the Btx and BC horizons and as much as 15 percent in the 2C horizon.

The Ap horizon has chroma of 2 or 3. Some pedons have an A, E, or BE horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 8. It

is silt loam or silty clay loam. Some pedons have a BE′ horizon above the Btx horizon. The Btx horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is generally silt loam or silty clay loam. In some pedons the Btx horizon is clay loam at a depth of more than 40 inches. The BC horizon has colors similar to those of the Btx horizon. It is silt loam or silty clay loam. The 2C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 6. It is stratified and has textures ranging from sandy loam to silty clay.

Rawson Series

The Rawson series consists of deep, moderately well drained soils on terraces in former glacial lake valleys. These soils formed in loamy deposits underlain by finer textured lacustrine deposits. Permeability is moderate in the upper part and slow or very slow in the lower part. Slopes range from 2 to 6 percent.

The Rawson soils in Muskingum County are slightly wetter than is typical for the series. This difference affects the rating of the soils for some urban uses, such as sanitary landfill.

Rawson soils commonly are adjacent to Glenford, Omulga, Markland, and Lobdell soils. Glenford, Omulga, and Markland soils are in landscape positions similar to those of the Rawson soils. Glenford soils have more silt and fewer coarse fragments in the solum than the Rawson soils. Omulga soils have a fragipan. Markland soils are more clayey in the upper part of the subsoil than the Rawson soils. Lobdell soils are on nearby flood plains or alluvial fans. They do not have an argillic horizon.

Typical pedon of Rawson silt loam, 2 to 6 percent slopes, about 2.5 miles southeast of Dresden, in Madison Township; 1,000 feet north of the intersection of Copeland Woods Road and North Branch Road, and 100 feet west; T. 3 N., R. 7 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, light gray (10YR 7/2) dry; moderate medium platy structure parting to moderate medium granular; friable; many medium roots; about 5 percent coarse fragments; slightly acid; abrupt smooth boundary.

Bt1—10 to 17 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm; many fine roots; common faint yellowish brown (10YR 5/4) clay films and brown (10YR 4/3) organic coatings on faces of peds; about 5 percent coarse fragments; slightly acid; clear wavy boundary.

Bt2—17 to 25 inches; brown (7.5YR 4/4) loam; few fine prominent grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; very firm, but brittle and platy in places; many prominent very dark grayish brown (10YR 3/2) stains of iron and manganese oxide; common fine roots along prism cracks; many faint brown (7.5YR 5/4) clay films on faces of peds; yellowish brown (10YR 5/4) silt coatings on vertical faces of peds; about 10 percent coarse fragments; medium acid; gradual boundary.

Bt3—25 to 33 inches; brown (7.5YR 5/4) loam; common medium prominent grayish brown (10YR 5/2) mottles; strong coarse prismatic structure; very firm, but brittle and platy in places; few fine prominent very dark grayish brown (10YR 3/2) stains of iron and manganese oxide; common fine roots along prism cracks; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; grayish brown (10YR 5/2) coatings on vertical faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

BC1—33 to 38 inches; brown (10YR 5/3) sandy loam; common medium yellowish brown (10YR 5/4 and 5/6) mottles; moderate coarse prismatic structure parting to moderate medium platy; friable; about 10 percent coarse fragments; medium acid; abrupt smooth boundary.

2BC2—38 to 43 inches; brown (10YR 4/3) silty clay; few medium yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure; very firm; grayish brown (10YR 5/2) and gray (10YR 5/1) coatings on faces of peds; neutral; gradual wavy boundary.

2C—43 to 65 inches; brown (10YR 5/3) silty clay; massive, weakly laminated; very firm; white (10YR 8/2) nodules of secondary calcium carbonate; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 30 to 48 inches. Depth to the underlying finer material is 20 to 40 inches. The coarse fragments are mostly fine gravel. The content of coarse fragments ranges from 0 to 15 percent in the A horizon and from 5 to 30 percent in the B horizon.

The Ap horizon has chroma of 2 or 3. It is dominantly silt loam, but in some pedons it is loam. Some pedons have a BE horizon. The Bt and BC horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. They are silt loam, loam, sandy loam, or gravelly clay loam. They are brittle in the lower part in some pedons. The 2C horizon is silty clay loam or silty clay.

Rigley Series

The Rigley series consists of deep, well drained soils on hillsides and ridgetops. These soils formed in colluvium derived from soft, argillaceous sandstone. Permeability is moderately rapid. Slopes range from 8 to 40 percent.

Rigley soils are similar to Westmoreland soils and are commonly adjacent to Berks, Coshocton, and Gilpin soils. Westmoreland soils have more clay in the subsoil than the Rigley soils. Coshocton soils are in concave landscape positions and are moderately well drained. They are more clayey than the Rigley soils. Berks and Gilpin soils are in landscape positions similar to those of the Rigley soils. They are moderately deep over bedrock.

Typical pedon of Rigley channery loam, in an area of Rigley-Coshocton complex, 25 to 40 percent slopes, about 1.5 miles southeast of Frazeysburg, in Jackson Township; 4,000 feet south of the intersection of Shannon Road and Baker Road, 1,450 feet east along the township line, and 100 feet north; in sec. 21, T. 3 N., R. 9 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) channery loam, very pale brown (10YR 7/3) dry; weak fine granular structure; friable; about 20 percent sandstone channers; very strongly acid; abrupt smooth boundary.

BE—6 to 12 inches; yellowish brown (10YR 5/4) channery loam; weak fine and medium subangular blocky structure; very friable; common faint dark yellowish brown (10YR 4/4) silt coatings on faces of peds; about 15 percent sandstone channers; strongly acid; clear smooth boundary.

Bt1—12 to 18 inches; yellowish brown (10YR 5/4) channery loam; moderate medium angular blocky structure; very friable; common faint brown (10YR 4/3) clay films on faces of peds; about 15 percent sandstone channers; strongly acid; clear smooth boundary.

Bt2—18 to 26 inches; yellowish brown (10YR 5/4) channery sandy loam; weak coarse and medium angular blocky structure; very friable; many distinct dark brown (7.5YR 4/4) clay films on faces of peds; common coarse faint pale brown (10YR 6/3) margins of channers; about 30 percent sandstone channers; strongly acid; clear wavy boundary.

Bt3—26 to 32 inches; yellowish brown (10YR 5/4) channery sandy loam; weak coarse subangular blocky structure; very friable; common faint dark brown (2.5YR 4/4) clay films on faces of peds; about 30 percent sandstone channers; very strongly acid; clear wavy boundary.

BC—32 to 48 inches; yellowish brown (10YR 5/4) channery loamy sand; weak coarse subangular blocky structure; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; common coarse faint pale brown (10YR 6/3) margins of channers; about 35 percent sandstone channers; very strongly acid; clear smooth boundary.

C—48 to 60 inches; pale brown (10YR 6/3) channery loamy sand; many coarse faint yellowish brown (10YR 5/4) mottles; massive; very friable; about 30 percent sandstone channers; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to sandstone, siltstone, or shale bedrock ranges from 60 to more than 100 inches. The content of sandstone and siltstone pebbles, cobbles, channers, and stones ranges from 5 to 35 percent in the solum and from 20 to 70 percent in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Pedons in undisturbed areas have a very dark A horizon and a light brown E horizon. The fine-earth fraction of the A and E horizons is sandy loam, fine sandy loam, loam, or the channery analogs of those textures. The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. Some pedons have low-chroma mottles at a depth of more than 36 inches. The Bt horizon is sandy loam, loam, or the gravelly or channery analogs of those textures. The C horizon has the same colors as those of the Bt horizon. It is loamy sand, sandy loam, loam, clay loam, or the channery or very channery analogs of those textures. Some pedons have a Cr horizon of soft, weathered sandstone bedrock at a depth of more than 60 inches.

Rodman Series

The Rodman series consists of deep, excessively drained soils on terrace escarpments. These soils formed in stratified glacial outwash. Permeability is moderately rapid in the subsoil and very rapid in the underlying material. Slopes range from 25 to 70 percent.

Rodman soils are commonly adjacent to Watertown and Chili soils and to the sandy-skeletal Udorthents. The well drained Watertown and Chili soils are on the less sloping parts of terraces. They have an argillic horizon and do not have a mollic epipedon. Udorthents are in areas where sand and gravel have been mined. They do not have a dark surface layer.

Typical pedon of Rodman gravelly sandy loam, 25 to 70 percent slopes, about 2 miles south of Dresden, in Jefferson Township; 200 feet northeast of the intersection of Dresden Road and McGlade School Road; T. 3 N., R. 8 W.

A—0 to 9 inches; black (10YR 2/1) gravelly sandy loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many fine and medium roots; about 25 percent gravel; slightly acid; abrupt smooth boundary.

AB—9 to 12 inches; very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; many fine and medium roots; about 25 percent gravel; slightly acid; clear smooth boundary.

Bw—12 to 20 inches; dark brown (7.5YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; many fine roots; about 30 percent gravel; slightly acid; clear irregular boundary.

C1—20 to 26 inches; dark brown (7.5YR 4/4) very gravelly loamy sand; single grained; loose; common fine roots; about 40 percent gravel; neutral; clear wavy boundary.

C2—26 to 60 inches; dark yellowish brown (10YR 4/4) very gravelly sand; single grained; loose; accumulation of secondary calcium carbonate on the lower side of coarse fragments at the upper boundary; about 40 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 12 to 30 inches. The content of coarse fragments ranges from 10 to 25 percent in the A horizon, from 20 to 30 percent in the Bw horizon, and from 35 to 70 percent in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. It is gravelly loam, loam, gravelly sandy loam, or sandy loam. The Bw horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. It is gravelly loam, gravelly sandy loam, sandy loam, loam, or very gravelly sandy loam. The C horizon has value of 3 to 5 and chroma of 1 to 4.

Sebring Series

The Sebring series consists of deep, poorly drained soils on broad flats in filled valleys. These soils formed in silty lacustrine sediments. Permeability is moderately slow. Slopes range from 0 to 2 percent.

Sebring soils are commonly adjacent to Luray, Lorain, Fitchville, and Melvin soils. The somewhat poorly drained Fitchville soils are in the slightly higher landscape positions. They have a subsoil that is not as gray as that of the Sebring soils. Melvin soils are on nearby flood plains and are frequently flooded. Luray and Lorain soils are in landscape positions similar to those of the Sebring soils. They are very poorly drained and have a darker surface layer than that of the Sebring soils.

Typical pedon of Sebring silt loam, 4.3 miles southwest of Dresden, in Muskingum Township; 3,300 feet west of the intersection of State Route 60 and Shannon Road, and 500 feet south; in sec. 4, R. 8 W., T. 2 N.

Ap—0 to 10 inches; dark gray (10YR 4/1) silt loam, light brownish gray (10YR 6/2) dry; common medium distinct very dark grayish brown (10YR 3/2) mottles; moderate medium angular blocky structure parting to weak medium granular; firm; common medium roots; slightly acid; abrupt smooth boundary.

Btg1—10 to 17 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; firm; weak medium prismatic structure parting to moderate medium subangular blocky; many distinct dark gray (10YR 4/1) organic clay films on vertical faces of peds; common coarse very dark gray (10YR 3/1) krotovinas; few fine roots; medium acid; clear wavy boundary.

Btg2—17 to 30 inches; dark grayish brown (2.5YR 4/2) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine roots; slightly acid; clear wavy boundary.

Btg3—30 to 45 inches; grayish brown (10YR 5/2) silty clay loam; few medium distinct dark gray (10YR 4/1) and common medium distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure; firm; few fine prominent very dark brown (10YR 2/2) stains of iron and manganese oxide; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear wavy boundary.

BC—45 to 55 inches; yellowish brown (10YR 5/4) silty clay loam; few medium faint yellowish brown (10YR 5/6) and common medium distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to thin laminations; firm; neutral; clear wavy boundary.

C—55 to 60 inches; grayish brown (10YR 5/2) silt loam; many medium distinct yellowish brown (10YR 5/4) mottles; massive; weak thin laminations; firm; neutral.

The thickness of the solum ranges from 30 to 55 inches. The content of coarse fragments ranges from 0 to 3 percent in the A and B horizons and from 0 to 10 percent in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 1 or 2. Some pedons have A, E, and BE horizons. The A horizon is dominantly silt loam but is silty clay loam in some pedons. The Btg horizon has hue of 10YR or 2.5YR or is neutral in hue. It has value of 4 to 6. It has chroma of 0 to 2 within a depth of 30 inches and

chroma of 0 to 6 at a depth of more than 30 inches. It has common or many mottles. It is silty clay loam or silt loam and has thin strata of loam or clay loam that are less than 3 inches thick. The C horizon has hue of 10YR or 2.5YR or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 6. It is stratified or laminated. It is commonly silt loam or silty clay loam, but in some pedons it is clay loam or sandy loam.

Stonelick Series

The Stonelick series consists of deep, well drained soils on flood plains. These soils formed in stratified, calcareous alluvium. Permeability is moderately rapid. Slopes range from 0 to 2 percent.

Stonelick soils are similar to Tioga and Chagrin soils and are commonly adjacent to Nolin and Lindside soils on the flood plains. Tioga soils are more acid than the Stonelick soils and have a cambic horizon. Chagrin, Nolin, and Lindside soils have a lower content of sand than the Stonelick soils and are noncalcareous. Lindside soils are moderately well drained.

Typical pedon of Stonelick loam, occasionally flooded, 0.75 mile southwest of Nashport, in Licking Township; 700 feet east of the north abutment of the Licking River Bridge on Pleasant Valley Road; T. 2 N., R. 9 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine roots; many very dark grayish brown (10YR 3/2) wormcasts and common brown (10YR 4/3) streaks; strong effervescence; moderately alkaline; clear smooth boundary.

C1—6 to 12 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) loam; weak medium subangular blocky structure; friable; many fine roots; many very dark grayish brown (10YR 3/2) wormcasts and coatings; strong effervescence; moderately alkaline; abrupt smooth boundary.

C2—12 to 18 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky; very friable; common very dark grayish brown (10YR 3/2) wormcasts and continuous dark grayish brown (10YR 4/2) coatings; strong effervescence; moderately alkaline; abrupt smooth boundary.

C3—18 to 39 inches; dark grayish brown (10YR 4/2) loam; weak medium prismatic structure parting to moderate medium platy; friable; common very dark grayish brown (10YR 3/2) wormcasts; slight effervescence; mildly alkaline; clear smooth boundary.

C4—39 to 51 inches; brown (10YR 4/3) loam; weak medium prismatic structure; friable; continuous dark grayish brown (10YR 4/2) coatings on vertical faces of peds; slight effervescence; mildly alkaline; clear smooth boundary.

C5—51 to 60 inches; dark grayish brown (10YR 4/2) silt loam; weak coarse subangular blocky structure; friable; slight effervescence; mildly alkaline; clear smooth boundary.

C6—60 to 71 inches; dark grayish brown (10YR 4/2) loam; friable; thin laminated strata of silt loam and fine sand; slight effervescence; mildly alkaline; clear smooth boundary.

C7—71 to 75 inches; light yellowish brown (10YR 6/4) loamy fine sand; loose; single grained; slight effervescence; mildly alkaline.

The content of coarse fragments ranges from 0 to 5 percent in the Ap horizon and from 0 to 10 percent in the C horizon. Commonly, the middle and lower parts of the C horizon are finely stratified.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. It is loam, silt loam, or fine sandy loam. The C horizon has value of 4 or 5 and chroma of 2 to 4. It is stratified loam, silt loam, fine sandy loam, and sandy loam. Some pedons have thin subhorizons of loamy fine sand.

Tioga Series

The Tioga series consists of deep, well drained soils on flood plains. These soils formed in stratified, recent loamy and sandy alluvium. Permeability is moderate or moderately rapid. Slopes range from 0 to 3 percent.

Tioga soils are similar to Chagrin and Stonelick soils and are commonly adjacent to Watertown, Nolin, and Chavies soils. Chagrin soils have a lower content of sand and a higher content of clay than the Tioga soils. Stonelick soils are mildly alkaline or moderately alkaline throughout. Watertown and Chavies soils are on terraces and are not subject to flooding. They have an argillic horizon. Nolin soils are in landscape positions similar to those of the Tioga soils. They have more silt and less sand than the Tioga soils.

Typical pedon of Tioga fine sandy loam, rarely flooded, 1.3 miles northeast of Dresden, in Cass Township; 1.3 miles east of the intersection of Dresden Road and Gene Cox Memorial Drive, and 25 feet north of the road; T. 3 N., R. 7 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; very friable; many fine and medium pores; many fine roots; slightly acid; abrupt smooth boundary.

Bw1—8 to 14 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate medium subangular

blocky structure; friable; many fine roots; many distinct dark grayish brown (10YR 4/2) coatings; slightly acid; clear smooth boundary.

Bw2—14 to 24 inches; dark brown (7.5YR 4/4) fine sandy loam; moderate coarse subangular blocky structure; friable; common fine roots; many faint brown (10YR 4/3) coatings; many medium pores; neutral; clear smooth boundary.

Bw3—24 to 34 inches; dark brown (7.5YR 4/4) sandy loam; weak coarse subangular blocky structure; very friable; few fine roots; slightly acid; clear wavy boundary.

C—34 to 60 inches; brown (10YR 5/3) loamy fine sand; single grained; loose; slightly acid.

The thickness of the solum ranges from 18 to 40 inches. The content of coarse fragments ranges from 0 to 15 percent in the A and Bw horizons and from 0 to 30 percent in the C horizon.

The A horizon has value of 3 to 5 and chroma of 2 to 4. The Bw horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It ranges from fine sandy loam to silt loam and has thin subhorizons of sandy loam or loamy sand. The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It ranges from loamy sand to fine sandy loam and the gravelly analogs of those textures.

Upshur Series

The Upshur series consists of deep, well drained, slowly permeable soils on dissected benches and hillsides. These soils formed in weathered red shale. Slopes range from 2 to 25 percent.

Upshur soils are commonly adjacent to Gilpin, Guernsey, Lowell, and Westgate soils. These adjacent soils are in landscape positions similar to those of the Upshur soils. They do not have reddish colors in the upper part of the subsoil. Guernsey and Lowell soils have dominantly yellowish brown and brown colors throughout the subsoil. Westgate soils are moderately well drained. They have strong brown, silty layers above the reddish, clayey underlying material. Gilpin soils are moderately deep. They have a lower content of clay than the Upshur soils.

Typical pedon of Upshur silty clay loam, in an area of Guernsey-Upshur silty clay loams, 6 to 15 percent slopes, eroded, about 4 miles south of Norwich, in Rich Hill Township; 1,000 feet east of the intersection of Southern Road and Clay Pike, and 100 feet north along the east section line of sec. 6, T. 13 N., R. 5 W.

Ap—0 to 4 inches; dark brown (7.5YR 3/4) silty clay loam, light brown (7.5YR 6/4) dry; moderate fine subangular blocky structure; firm; many fine and medium roots; slightly acid; abrupt smooth boundary.

Bt1—4 to 20 inches; yellowish red (5YR 4/6) silty clay; strong fine subangular blocky structure; firm; many fine and medium roots; many faint clay films; strongly acid; clear wavy boundary.

Bt2—20 to 32 inches; dark reddish brown (5YR 3/4) silty clay; moderate fine subangular blocky structure; firm; common fine and medium roots; many faint clay films; common pressure faces and slickensides; slightly acid; clear wavy boundary.

BC—32 to 40 inches; dark red (2.5YR 3/6) silty clay loam that has common fine streaks of dusky red (10YR 3/2) and strong brown (7.5YR 5/6); moderate coarse prismatic structure; firm; common fine roots; common pressure faces and slickensides; common faint clay films; mildly alkaline; gradual wavy boundary.

C1—40 to 50 inches; yellowish brown (10YR 5/6) and dark red (2.5YR 3/6) silty clay loam; massive; firm; about 10 percent coarse fragments; nodules and streaks of light gray (10YR 7/2) calcium carbonate; strong effervescence; mildly alkaline; clear smooth boundary.

C2—50 to 66 inches; dark reddish brown (2.5YR 3/4) and yellowish brown (10YR 5/8) silty clay loam; massive; firm; common fragments of light brownish gray (2.5Y 6/2) shale; strong effervescence; mildly alkaline; clear smooth boundary.

C3—66 to 74 inches; dark reddish brown (2.5YR 3/4) silty clay; strong angular blocky structure; very firm; many fine distinct light brownish gray (10YR 6/2) mottles; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 25 to 50 inches. The depth to bedrock is more than 40 inches. The content of coarse fragments ranges from 0 to 15 percent in the upper part of the solum and from 0 to 35 percent in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. It is silt loam, silty clay loam, or silty clay. The Bt horizon generally has hue of 5YR or 2.5YR, but it has hue of 10YR in the upper part in some pedons. The Bt horizon has value of 3 to 5 and chroma of 3 to 6. It is silty clay loam, silty clay, or clay. The C horizon has hue of 10YR to 10R, value of 3 to 5, and chroma of 4 to 6. Commonly, the colors are mixed. This horizon is silty clay loam, silty clay, clay, or the shaly or channery analogs of those textures.

Watertown Series

The Watertown series consists of deep, well drained soils on glacial outwash terraces. These soils formed in

sandy deposits. Permeability is moderately rapid in the upper part of the subsoil and rapid in the lower part of the subsoil and in the underlying material. Slopes range from 1 to 15 percent.

Watertown soils are similar to Chavies and Lakin soils and commonly are adjacent to Chili, Cidermill, and Tioga soils. Lakin soils formed in windblown fine sand. They have a banded argillic horizon. Chavies soils have less sand in the surface layer and the upper part of the subsoil than the Watertown soils. Chili and Cidermill soils are in landscape positions similar to those of the Watertown soils. Chili soils have more clay and gravel in the subsoil than the Watertown soils. Cidermill soils have more silt and less sand in the subsoil than the Watertown soils. Tioga soils are on nearby flood plains and are subject to flooding.

Typical pedon of Watertown sandy loam, 1 to 8 percent slopes, about 1 mile north of Dresden, in Cass Township; 1,300 feet northeast of the intersection of Gene Cox Drive and Dresden Road, and 600 feet east; T. 3 N., R. 8 W.

Ap—0 to 12 inches; dark yellowish brown (10YR 3/4) sandy loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; many fine roots; dark brown (7.5YR 3/4) coatings on faces of peds; few fine gravel fragments; strongly acid; abrupt smooth boundary.

Bt1—12 to 17 inches; yellowish brown (10YR 5/4) sandy loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct brown (7.5YR 4/4) clay film bridges between sand grains; few fine gravel fragments; medium acid; gradual wavy boundary.

Bt2—17 to 25 inches; yellowish brown (10YR 5/4) sandy loam; weak coarse subangular blocky structure; friable; common fine roots; few faint yellowish brown (10YR 5/4) clay film bridges between sand grains; about 5 percent fine gravel; strongly acid; clear smooth boundary.

BC—25 to 42 inches; brown (7.5YR 4/4) loamy sand; weak coarse subangular blocky structure; very friable; few fine roots; about 5 percent fine gravel; strongly acid; abrupt smooth boundary.

C1—42 to 72 inches; yellowish brown (10YR 5/4) gravelly coarse sand; single grained; loose; about 20 percent fine gravel; strongly acid; abrupt wavy boundary.

C2—72 to 80 inches; brown (10YR 5/3) very gravelly coarse sand; single grained; loose; about 40 percent gravel; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 25 to 60 inches. The content of gravel ranges from 0 to 20 percent in the A horizon, from 0 to 35 percent in the Bt horizon, and from 0 to 60 percent in the C horizon. The average content of gravel in the control section is less than 25 percent.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. The A horizon, if it occurs, typically is sandy loam, but in some pedons it is fine sandy loam. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is sandy loam, gravelly sandy loam, loamy sand, or gravelly loamy sand. The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. It is loamy sand, loamy coarse sand, sand, coarse sand, or the gravelly or very gravelly analogs of those textures.

Wellston Series

The Wellston series consists of deep, well drained soils on ridgetops. These soils formed in loess and in the underlying material weathered from fine grained sandstone or siltstone. Permeability is moderate. Slopes range from 2 to 15 percent.

Wellston soils are similar to Alford and Westgate soils and are commonly adjacent to Gilpin, Keene, Westmoreland, and Zanesville soils. Alford soils do not have coarse fragments in the lower part of the subsoil. Westgate soils are moderately well drained. They have more clay in the lower part of the subsoil than the Wellston soils. Westmoreland soils are on nearby hillsides. They have coarse fragments throughout. Gilpin, Keene, and Zanesville soils are in landscape positions similar to those of the Wellston soils. Gilpin soils are moderately deep over siltstone. Keene soils are moderately well drained. Zanesville soils have a fragipan.

Typical pedon of Wellston silt loam, 2 to 8 percent slopes, about 6.5 miles east of Zanesville, in Perry Township; 1,100 feet north-northeast of the intersection of Brown Drive and Airwood Drive, and 100 feet west; T. 13 N., R. 12 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 15 inches; brown (7.5YR 5/4) silt loam; moderate medium and fine subangular blocky structure; friable; common fine roots; brown (10YR 4/3) krotovinas; common faint clay films; slightly acid; gradual smooth boundary.

Bt2—15 to 24 inches; brown (7.5YR 5/4) silty clay loam; moderate medium angular blocky structure; friable; common fine roots; many faint clay films; slightly acid; gradual smooth boundary.

Bt3—24 to 32 inches; brown (7.5YR 5/6) silt loam; moderate medium angular blocky structure parting

to moderate medium platy; firm; many faint clay films; discontinuous layers and streaks of pale brown (10YR 6/3) silt loam; common black (10YR 2/1) stains of iron and manganese oxide; common fine roots; strongly acid; abrupt smooth boundary.

2Bt4—32 to 48 inches; yellowish brown (10YR 5/6) silty clay loam; few medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure; firm; many distinct brown (7.5YR 5/4) clay films; many fine mica flakes; strongly acid; gradual smooth boundary.

2Cr—48 to 50 inches; light olive brown (2.5YR 5/4), soft, weathered sandstone bedrock; massive; about 15 percent sandstone fragments.

The thickness of the solum ranges from 32 to 55 inches. The depth to bedrock ranges from 40 to 72 inches. The content of coarse fragments of siltstone, sandstone, or shale ranges from 0 to 5 percent in the A, E, and Bt horizons and from 0 to 35 percent in the 2Bt horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. Some pedons in wooded areas have A and E horizons. Some pedons in eroded areas do not have a BE horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam or silt loam. The 2Bt horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is silt loam, loam, silty clay loam, clay loam, or the channery or gravelly analogs of those textures. Some pedons have a 2BC horizon.

Westgate Series

The Westgate series consists of deep, moderately well drained soils on ridgetops or benches. These soils formed in a silty mantle and in the underlying material weathered from siltstone, shale, limestone, and sandstone. Permeability is moderate in the silty mantle and slow in the lower part of the subsoil and in the underlying material. Slopes range from 2 to 15 percent.

Westgate soils are similar to Keene and Wellston soils and are commonly adjacent to Lowell, Zanesville, and Upshur soils. Keene soils have yellower hues in the lower part of the subsoil than the Westgate soils. Wellston soils are well drained. Lowell and Upshur soils are on ridgetops or hillsides. They have more clay in the upper part of the subsoil than the Westgate soils. Zanesville soils are in landscape positions similar to those of the Westgate soils. They have a fragipan.

Typical pedon of Westgate silt loam, 2 to 6 percent slopes, about 3.5 miles southeast of Duncan Falls, in Blue Rock Township; about 1,710 feet south and 1,740 west of the northeast corner of sec. 3, T. 12 N., R. 12 W.

Oi—0.5 inch to 0; continuous mat of pine needles.

Ap—0 to 7 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; weak medium platy structure parting to weak fine granular; very friable; many fine roots; darkened by accumulation of organic matter in the upper 1 inch; extremely acid; clear smooth boundary.

BE—7 to 12 inches; strong brown (7.5YR 5/6) silt loam; weak medium platy structure parting to moderate very fine subangular blocky; friable; common medium roots; many distinct yellowish brown (10YR 5/4) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—12 to 18 inches; strong brown (7.5YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; common medium roots; common distinct yellowish brown (10YR 5/4) silt coatings and common faint brown (7.5YR 5/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—18 to 28 inches; strong brown (7.5YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; common medium roots; few distinct yellowish brown (10YR 5/4) silt coatings; many distinct reddish brown (5YR 5/4) and common faint brown (7.5YR 5/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—28 to 34 inches; strong brown (7.5YR 5/6) silty clay loam; few fine prominent grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; many distinct brown (10YR 5/3) silt coatings on faces of peds; many faint and distinct brown (7.5YR 5/4) and reddish brown (5YR 4/4 and 5/4) clay films on faces of peds; very strongly acid; abrupt smooth boundary.

2Bt4—34 to 43 inches; yellowish red (5YR 4/6) silty clay; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; common distinct brown (10YR 5/3) silt coatings in the upper part; many faint reddish brown (5YR 4/4) clay films on faces of peds; few fine nonintersecting slickensides; strongly acid; clear wavy boundary.

2Bt5—43 to 57 inches; yellowish red (5YR 4/6) clay; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots; few black (N 2/0) coatings of iron and manganese oxide on faces of peds; many black (N 2/0) stains and few fine concretions of iron and manganese oxide concentrated at the top of the horizon; many faint reddish brown (5YR 4/4) clay films on faces of peds; many coarse intersecting and nonintersecting slickensides; neutral in the

matrix, but moderately alkaline in soft accumulations that are mainly in the lower part; abrupt wavy boundary.

2BC—57 to 66 inches; yellowish red (5YR 4/6) silty clay loam; common medium prominent light red (2.5YR 6/8) and common coarse prominent dusky red (10R 3/3) mottles; moderate coarse prismatic structure parting to moderate fine angular blocky; firm; many distinct reddish brown (5YR 5/4) clay films on vertical faces of peds; few black (N 2/0) stains of iron and manganese oxide on faces of prisms; large, widely spaced slickensides; common very pale brown (10YR 7/3), soft accumulations of calcium carbonate in the matrix; slight effervescence; moderately alkaline; gradual wavy boundary.

2C—66 to 75 inches; variegated yellowish red (5YR 4/6), olive yellow (2.5Y 6/8), and dusky red (10R 3/3) silty clay loam that has pockets of light olive gray (5Y 6/2); moderate coarse prismatic structure parting to moderate fine angular blocky; firm; many very pale brown (10YR 7/3), soft accumulations of calcium carbonate in the matrix; strong effervescence; moderately alkaline; gradual wavy boundary.

2Cr—75 to 80 inches; variegated, weathered clay shale bedrock; many soft accumulations of calcium carbonate on rock surfaces; strong effervescence.

The thickness of the solum ranges from 40 to 72 inches. The depth to bedrock ranges from 60 to 80 inches. The thickness of the silty mantle ranges from 24 to 40 inches. The content of rock fragments, mainly small chips or channers of siltstone or shale, ranges from 0 to 5 percent, by volume, in the silty mantle, from 0 to 15 percent in the 2Bt and 2BC horizons, and from 0 to 30 percent in the 2C horizon.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. Some pedons in undisturbed areas have an A horizon and an E horizon. The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It has low-chroma mottles at a depth of more than 18 inches. It is silty clay loam or silt loam. The 2Bt horizon has hue of 10YR or 2.5YR, value of 4 to 6, and chroma of 3 to 6. In some pedons, it is mottled and at least one subhorizon has dominant hue of 5YR or redder. This horizon is silty clay loam, silty clay, or clay. The 2BC and 2C horizons commonly are variegated and have highly contrasting colors. They have hue of 5Y to 10R, value of 3 to 6, and chroma of 2 to 5, but hue of 2.5YR or 10R and chroma of 2 are not common in the 2C horizon. These horizons are silty clay loam, silty clay, or the shaly or channery analogs of those textures. The bedrock is soft shale or siltstone.

Westmoreland Series

The Westmoreland series consists of deep, well drained, moderately permeable soils on dissected hillsides and ridgetops. These soils formed in colluvium and material weathered from siltstone, shale, and sandstone. Slopes range from 8 to 70 percent.

Westmoreland soils are similar to Gilpin soils and are commonly adjacent to Berks, Coshocton, Guernsey, and Wellston soils. Berks and Gilpin soils are moderately deep over bedrock. Berks soils are on hillsides. Gilpin soils are on ridgetops. Coshocton and Guernsey soils are moderately well drained. Guernsey soils are on hillsides and benches. Coshocton soils are on concave hillsides. Wellston soils are on ridgetops. They have more silt and fewer coarse fragments in the upper part of the profile than the Westmoreland soils.

Typical pedon of Westmoreland silt loam, 15 to 25 percent slopes, eroded, about 6 miles west of Zanesville, in Hopewell Township; about 200 feet east and 700 feet north of the southwest corner of sec. 20, T. 1 N., R. 9 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many fine and medium roots; about 5 percent coarse fragments; medium acid; clear smooth boundary.

E—3 to 6 inches; grayish brown (10YR 5/2) silt loam; moderate fine subangular blocky structure; friable; many fine and medium roots; about 5 percent coarse fragments; strongly acid; clear smooth boundary.

BE—6 to 11 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; many fine and common medium roots; about 5 percent coarse fragments; strongly acid; gradual smooth boundary.

Bt1—11 to 20 inches; yellowish brown (10YR 5/4) channery silty clay loam; moderate medium subangular blocky structure; firm; common medium roots; common faint brown (10YR 4/3) clay films on faces of peds; about 20 percent coarse fragments; strongly acid; gradual smooth boundary.

Bt2—20 to 32 inches; dark yellowish brown (10YR 4/4) channery silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct light brown (7.5YR 6/4) clay films on faces of peds; about 25 percent light olive brown (2.5Y 5/4) siltstone fragments; strongly acid; clear smooth boundary.

BC—32 to 38 inches; brown (10YR 4/3) very channery silty clay loam; moderate coarse subangular blocky structure parting to moderate thin platy; very firm;

few distinct light brown (7.5YR 6/4) clay films on faces of peds; about 50 percent light olive brown (2.5Y 5/4), soft siltstone fragments; strongly acid; clear smooth boundary.

C—38 to 44 inches; brown (10YR 4/3) very channery silt loam; very firm; can be cut with a spade when moist; moderate medium platy rocklike structure; about 50 percent dark grayish brown (2.5Y 4/2), soft siltstone; strongly acid; gradual smooth boundary.

Cr—44 to 50 inches; dark grayish brown (2.5YR 4/2), weathered siltstone bedrock; can be cut with a spade.

R—50 to 52 inches; siltstone bedrock; cannot be cut with a spade.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock ranges from 40 to more than 72 inches. The content of coarse fragments of siltstone, shale, or sandstone ranges from 2 to 15 percent in the A horizon, from 2 to 30 percent in the Bt horizon, from 5 to 70 percent in the BC horizon, and from 45 to 90 percent in the C horizon.

The A horizon has value of 3 or 4. It is dominantly silt loam, but in some pedons it is loam or silty clay loam. Some pedons have an Ap horizon. The Bt horizon has hue of 7.5YR or 10YR and chroma of 4 to 8. It is silty clay loam, silt loam, loam, or the shaly or channery analogs of those textures. The C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 4 to 8. It is the very channery, extremely channery, very shaly, or extremely shaly analogs of silty clay loam, silt loam, or loam.

Zanesville Series

The Zanesville series consists of deep, moderately well drained and well drained soils on upland ridgetops. These soils formed in loess and in the underlying material weathered from shale, siltstone, or sandstone. They have a fragipan. Permeability is moderate above the fragipan and moderately slow or slow in the fragipan. Slopes range from 2 to 15 percent.

Zanesville soils are similar to Cincinnati and Omulga soils and are commonly adjacent to Alford, Keene, Westgate, and Wellston soils. Cincinnati soils have glacial pebbles in the lower part of the subsoil. Omulga soils are on terraces and foot slopes. Alford, Keene, Wellston, and Westgate soils are in landscape positions similar to those of the Zanesville soils. They do not have a fragipan. Wellston and Alford soils are well drained.

Typical pedon of Zanesville silt loam, 2 to 6 percent slopes, about 1.1 miles southwest of Otsego, in Monroe Township; 1,500 feet northeast of the intersection of Dent Road and State Route 93, and 350 feet north; T. 3 N., R. 5 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

BE—7 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; many faint brown (10YR 5/3) silt coatings on faces of peds; friable; many fine roots and pores; medium acid; clear smooth boundary.

Bt1—14 to 19 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots and pores; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—19 to 23 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots and few fine pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and common distinct brown (10YR 5/3) silt coatings; strongly acid; clear smooth boundary.

Bt/E—23 to 28 inches; dark yellowish brown (10YR 4/4) silt loam; few medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; pale brown (10YR 6/3) and yellowish brown (10YR 5/4), distinctly vesicular E material; strongly acid; abrupt wavy boundary.

Btx1—28 to 34 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct light brownish gray (2.5Y 6/2) mottles; weak very coarse prismatic structure; firm; few roots along faces of prisms; slightly brittle; many prominent light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) clay films on faces of prisms; common pale brown (10YR 6/3) silt coatings; common fine distinct black (N 2/0) stains of iron and manganese oxide; common faint dark yellowish brown (10YR 4/4) clay films in pores; very strongly acid; clear smooth boundary.

Btx2—34 to 38 inches; yellowish brown (10YR 5/4) silty clay loam; few medium prominent light brownish gray (2.5Y 6/2) mottles; weak very coarse prismatic structure; firm, slightly brittle; light brownish gray (2.5Y 6/2) coatings on faces of prisms; strongly acid; abrupt smooth boundary.

Btx3—38 to 45 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure; firm; common black (10YR 2/1) stains of iron and

manganese oxide; about 5 percent sandstone fragments; many distinct brown (7.5YR 5/4) and light gray (10YR 7/2) clay films; few roots; strongly acid; clear smooth boundary.

BC1—45 to 55 inches; brownish yellow (10YR 6/6) silty clay loam; few fine faint yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure; firm; few black (10YR 2/1) stains of iron and manganese oxide; many distinct brown (7.5YR 5/4) and very pale brown (10YR 7/3) clay films; about 10 percent sandstone fragments; strongly acid; gradual wavy boundary.

2BC2—55 to 62 inches; brownish yellow (10YR 6/6) channery clay loam; moderate very coarse prismatic structure; firm; few faint yellowish brown (10YR 5/6) clay films; about 15 percent sandstone fragments; strongly acid; gradual wavy boundary.

2BC3—62 to 67 inches; brownish yellow (10YR 6/6) silty clay loam; moderate very coarse prismatic structure; firm; few siltstone fragments; strongly acid; clear wavy boundary.

2C1—67 to 75 inches; yellowish brown (10YR 5/6) loam; common medium distinct pale brown (10YR 6/3) mottles; massive; friable; few siltstone fragments; strongly acid; clear wavy boundary.

2C2—75 to 80 inches; yellowish brown (10YR 5/6) channery loam; massive; firm; 20 percent siltstone fragments; strongly acid.

The thickness of the solum ranges from 35 to 70 inches. Depth to the fragipan ranges from 24 to 40 inches. The depth to soft, weathered sandstone, siltstone, or shale bedrock is more than 60 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. Some pedons in wooded areas have an A horizon and an E horizon. The BE and Bt horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. They are silt loam or silty clay loam. The Btx horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It has few to many brown or gray mottles. It is silty clay loam, silt loam, loam, or clay loam that has 0 to 15 percent coarse fragments. The 2BC and 2C horizons, if they occur, have hue of 10YR or 2.5YR, value of 4 to 6, and chroma of 3 to 6 and have few to many brown and gray mottles. They are silt loam, loam, clay loam, silty clay loam, or the channery, gravelly, or shaly analogs of those textures. They have 0 to 35 percent coarse fragments. Some pedons have a 2Cr horizon. This horizon is interbedded sandstone, siltstone, and shale bedrock.

Formation of the Soils

This section describes the major factors of soil formation and relates them to the soils in Muskingum County. It also describes some of the processes of soil formation.

Factors of Soil Formation

The major factors that influence soil formation are parent material, plants and animals, climate, relief, and time. The differences among the soils of Muskingum County are the result of differences in one or more of these factors. The factors are interrelated in most cases. Relief, for example, is responsible for differences in the microclimate, which in turn influences the plant community at a given site. The classification of the soils is based on soil morphological features that reflect the factors and processes of soil formation *(35)*.

Parent Material

Parent material is the unconsolidated material in which soil forms. It largely determines the texture of the soil, which in turn determines the permeability and water-holding capacity of the soil *(17)*. The soils of Muskingum County formed in different kinds of parent material. Many soils formed in material weathered from sandstone, siltstone, or shale bedrock. Some formed in material deposited by flowing water, glacial ice, or wind. Some soils formed in one type of parent material, and some formed in two or more types.

Residuum is material that weathered in place from rocks. Sandstone weathers into sand or sandy loam. Siltstone weathers into silt loam. Shale weathers into silty clay loam, silty clay, or clay. Gilpin soils formed in material weathered from siltstone, and Aaron soils formed in material weathered from shale. The distinctive red color of the Upshur soils is inherited from the red shale parent material in which it formed.

Colluvium is material weathered from rock that does not stay in place. It moves downslope by a combination of gravity and water action. Colluvium is very extensive in Muskingum County. Active movement in the form of soil creep and landslides occurs on many slopes *(11)*. Brookside and Guernsey soils formed in colluvium derived mainly from clay shale. Clarksburg soils formed in colluvium derived from siltstone and sandstone. Coshocton soils formed in colluvium and residuum.

Outwash deposits, lacustrine deposits, and alluvium are parent materials deposited by water. These parent materials are quite extensive in Muskingum County.

Outwash deposits were laid down by swiftly moving water from melting glaciers. The water carried the smaller silt and clay particles downstream and left the larger sand and gravel particles behind as terraces. Soils that formed in such deposits, such as Watertown and Chili soils, are porous and well drained.

Some of the valleys in the county were blocked by the glaciers and held shallow lakes for a period of time. Silt and clay settled out of the murky waters of these lakes to form lacustrine deposits. Soils that formed in these deposits, such as Markland and Glenford soils, are silty or clayey and contain little sand or gravel.

Alluvial deposits are deposited by flowing streams. When a stream floods, it deposits a new layer of sediment on the flood plain. Soils that formed in alluvium, such as Nolin and Newark soils, have weakly expressed horizons because the process of soil formation is continually being disrupted.

Glaciers covered the western edge of the county. Glacial till deposits were laid down by the ice with little water action. Glacial till deposits contain particles of various sizes and commonly are firm and compact. Homewood soils formed in glacial till.

Many areas of the county are covered by windblown silt deposits called loess. Loess deposits covered several other parent materials, including residuum, colluvium, and glacial till. Alford soils are in areas where the loess is thick *(28)*. They are silty throughout. Some areas have a thinner mantle of loess. Keene and Westgate soils are examples of soils that are silty in the upper part of the solum, which formed in loess, and clayey in the lower part of the solum, which formed in clay shale residuum *(24)*. Similarly, Wellston soils formed in loess underlain by sandstone and siltstone residuum, and Cincinnati soils formed in loess underlain by glacial till.

Mine spoil is an artificial parent material created by

surface-mining activities. It occurs in a sizable area of the county. It consists of a mixture of soil and rock. Some spoil is graded, and some is left in piles. The processes of soil formation are just beginning in soils derived from mine spoil. Morristown soils are examples.

Relief

The relief of the Allegheny Plateau region is very complex and has formed over a long period of geologic time *(21)*. Relief helps to determine the natural drainage of the soils in Muskingum County. Soils on steep slopes lose water through runoff and tend to be well drained. Soils in depressions receive water from adjacent slopes and tend to be poorly drained. Also, depressional areas are closer to the water table. Distinctly different soils can develop in the same parent material under different moisture regimes *(16)*. The moderately well drained Glenford soils and the very poorly drained Luray soils are examples. Both soils formed in silty lacustrine deposits. The Glenford soils are in convex landscape positions and have a subsoil that is well oxidized in the upper part. The Luray soils are in depressions and are saturated most of the year. Relief is not the only factor that affects the wetness of the soil. Parent material also affects drainage. For example, Watertown soils are so porous that they are well drained even where slopes are only 1 percent. The moderately slowly permeable Brookside soils on slopes of as much as 40 percent are only moderately well drained.

Erosion is most severe on the steeper slopes. Although the survey area was blanketed with windblown silt, or loess, present loess deposits are found only on the broader ridgetops, where erosion is less severe. For this reason, soils that are capped by silt, such as Wellston soils, are confined to the ridgetops. The surrounding steeper slopes are dominated by soils that are not capped by silt, such as Berks and Westmoreland soils. On slopes of more than 8 percent, the plow layer of most cultivated soils contains some subsoil material and has a higher content of clay and a lower content of organic matter because of erosion.

Time

The length of time that the parent material is exposed to the processes of soil formation affects the nature of the soil. Most of the soils on stable residual uplands, such as Gilpin and Lowell soils, are many thousands of years old. Such soils have well expressed horizons. Some recent soils that were deposited in filled valleys are underlain by older sediments in which a soil profile has developed *(6, 15)*. Homewood soils are somewhat young soils that formed in Illinoian-age glacial till. They also have well expressed horizons. The alluvial soils, such as Newark and Nolin soils, are much younger than the Homewood soils and do not show the horizon development of the older soils. The youngest soils in the county are soils that are forming in recent mine spoil, such as Morristown and Bethesda soils. The parent material in some of these soils has been altered to a depth of only 1 inch.

Climate

The climate in Muskingum County is too uniform to have significantly contributed to differences among the soils in the area. Topography and relief, however, can create differences in the microclimate *(20)*. Rain water is lost through runoff on steep slopes, for example, and surface water accumulates in depressions. In steep areas, north- and east-facing slopes are cooler and more moist than south- and west-facing slopes because of the shadow effect.

The entire county has a humid, temperate climate, which is favorable for the growth of hardwood forests. More information about climate is available under the heading "General Nature of the County."

Plants and Animals

Plants and animals have influenced the formation of soils. Most of Muskingum County was once covered by hardwood forests that were dominated by beech, oak, hickory, maple, and ash trees *(18)*. Because these trees are inefficient in returning organic matter to the soil, the soils that formed under forests of such trees are light colored and have less than 3 percent organic matter in the surface layer. Rainfall percolating through the leaf litter produces weak organic acids, which serve as leaching agents as they move downward through the soil. The dense fragipan layer in some soils, such as Homewood and Zanesville soils, may be cemented by silica leached by these acids *(25)*. Tree trunks channel rainfall, creating pockets of intense leaching.

Bacteria and fungi break down the leaf litter. Earthworms also consume large volumes of leaf litter. The burrowing of animals and the downslope slippage of trees mix the soil. Burrows and the channels of decayed roots are passages through which water can move deeper into the soil.

Human activities have had a significant impact on the soils in Muskingum County. The clearing of forests and subsequent farming activities have caused erosion of the original surface soil. As a result, the surface soil has been replaced by a mixture of surface and subsoil material. Strip mining for coal has affected a large acreage in the county. Mining activities have destroyed

soils that took centuries to form and have mixed their material with material from far below the surface. As a result, a new type of parent material was created.

Processes of Soil Formation

Soil-forming processes act on parent material over time to produce soils. The nature and rate of these processes are influenced by climate, vegetation, and relief. These processes fall into four general categories—additions, removals, transfers, and transformations.

The most obvious example of additions is the darkening of the surface layer caused by the addition of organic material. When plants die, their remains fall to the surface where they decay to form organic matter. This is one of the earliest processes in soil formation. A darkened layer can be seen on the surface of mine spoil that is only a few years old.

Most removals from the soil involve the action of water. Erosion by water removes several tons of soil per acre each year, even on well managed land *(5, 13)*. Lowell and Upshur soils were originally calcareous throughout. The leaching action of water has removed the calcium carbonate from the upper part of these soils to a depth of 3 or 4 feet. Differences in color are apparently the result of weathering of minerals inherited from the parent material *(19)*.

Transfers also are accomplished to a large extent by water. Water has moved clay from the A and E horizons of some soils, such as Homewood and Westmoreland soils, and deposited it as clay films in the B horizon. In such soils, the A and E horizons contain less clay than the parent material and the B horizon contains more.

Most transformations in the soil involve minerals and are not easily observed. One of the more evident changes involves iron minerals. The occurrence of gray mottles in some soils is the result of the transformation of iron from an oxidized to a reduced state *(3, 4)*. The transformation from rock to soil can be observed in some soils. Rigley, Gilpin, and Westmoreland soils have a Cr horizon, which resembles rock but easily crushes into soil. There are weathered or softened zones in the rock underlying Berks and Gilpin soils. Roots penetrate these zones and break the rock into fine earth *(22)*.

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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.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

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.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

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 channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural

class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay 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.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse 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 or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil 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.

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.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. The depth to bedrock. Deep soils are more than 40 inches deep over bedrock, moderately deep soils are 20 to 40 inches deep over bedrock, and shallow soils are 10 to 20 inches deep over bedrock.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the

soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically 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.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

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.

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.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

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. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

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 (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying 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, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated 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.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lamellae. A series of fibers or bands of higher clay content that occur in sands or loess.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the 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.

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).

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.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly

nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

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.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Perimeter drain. An artificial drain placed around the perimeter of a septic tank absorption field to lower the water table. Also called a curtain drain.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward 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, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

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.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

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.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	below 3.6
Extremely acid	3.6 to 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. 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.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

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 underlying material. 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.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

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 underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

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). A layer of 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.

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.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited

geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bar. A shallow trench and a mound of earth constructed at an angle across a road or trail to intercept and divert surface runoff and reduce the hazard of erosion.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-86 at Zanesville, Ohio)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	35.5	18.5	27.0	64	-10	2	2.43	1.42	3.33	6	7.6
February----	39.6	20.9	30.2	67	-8	4	2.38	1.27	3.35	5	5.4
March-------	49.9	29.4	39.6	78	5	34	3.38	1.97	4.63	7	4.5
April-------	62.6	39.3	51.0	85	20	138	3.60	2.16	4.89	8	.5
May---------	72.6	48.6	60.6	89	28	342	3.77	2.50	4.92	8	.0
June--------	80.5	57.2	68.9	94	39	566	4.16	2.39	5.73	7	.0
July--------	83.7	61.5	72.6	95	46	700	4.44	2.68	6.02	7	.0
August------	82.5	60.0	71.2	95	42	658	3.52	1.66	5.12	6	.0
September---	76.6	52.9	64.8	94	32	445	2.74	1.39	3.91	5	.0
October-----	65.2	41.6	53.4	84	21	170	2.32	1.19	3.32	5	.0
November----	51.6	32.7	42.1	75	10	39	2.98	1.58	4.20	6	1.9
December----	40.3	23.9	32.1	68	-4	9	2.75	1.52	3.84	7	4.6
Yearly:											
Average---	61.7	40.5	51.1	---	---	---	---	---	---	---	---
Extreme---	102	-19	---	97	-12	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,106	38.46	33.80	42.82	77	24.6

* 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 1951-86 at Zanesville, Ohio)

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. 21	May 3	May 19
2 years in 10 later than--	Apr. 16	Apr. 29	May 14
5 years in 10 later than--	Apr. 6	Apr. 20	May 4
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 19	Oct. 6	Sept. 24
2 years in 10 earlier than--	Oct. 24	Oct. 11	Sept. 28
5 years in 10 earlier than--	Nov. 4	Oct. 22	Oct. 8

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-86 at Zanesville, Ohio)

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	190	163	134
8 years in 10	197	171	141
5 years in 10	210	185	155
2 years in 10	223	199	169
1 year in 10	230	207	176

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaB	Aaron silt loam, 2 to 8 percent slopes	1,208	0.3
AaC2	Aaron silt loam, 8 to 15 percent slopes, eroded	9,294	2.2
AaD2	Aaron silt loam, 15 to 25 percent slopes, eroded	3,447	0.8
AcB	Aaron-Upshur complex, 2 to 6 percent slopes	522	0.1
AfB	Alford silt loam, 2 to 8 percent slopes	5,325	1.3
AfC2	Alford silt loam, 8 to 15 percent slopes, eroded	5,473	1.3
BeB	Berks channery silt loam, 2 to 8 percent slopes	129	*
BeD2	Berks channery silt loam, 15 to 25 percent slopes, eroded	1,700	0.4
BeE	Berks channery silt loam, 25 to 40 percent slopes	7,642	1.8
BkF	Berks-Westmoreland complex, 40 to 70 percent slopes	20,505	5.0
BoB	Bethesda shaly silt loam, 1 to 15 percent slopes	1,022	0.2
BoD	Bethesda shaly silt loam, 15 to 25 percent slopes	1,384	0.3
BpF	Bethesda flaggy silt loam, 25 to 70 percent slopes	7,495	1.8
BsC2	Brookside silty clay loam, 8 to 15 percent slopes, eroded	735	0.2
BsE	Brookside silty clay loam, 15 to 40 percent slopes	790	0.2
Cb	Chagrin loam, rarely flooded	2,250	0.5
CcA	Chavies loam, 0 to 2 percent slopes	535	0.1
CcB	Chavies loam, 2 to 6 percent slopes	1,018	0.2
CeA	Chili loam, 0 to 3 percent slopes	492	0.1
CeB	Chili loam, 3 to 8 percent slopes	366	0.1
ChA	Chili gravelly loam, 0 to 3 percent slopes	980	0.2
ChB	Chili gravelly loam, 3 to 8 percent slopes	562	0.1
ChC	Chili gravelly loam, 8 to 15 percent slopes	323	0.1
CkA	Cidermill silt loam, 0 to 3 percent slopes	1,196	0.3
CnB	Cincinnati silt loam, 2 to 6 percent slopes	510	0.1
CnC2	Cincinnati silt loam, 6 to 15 percent slopes, eroded	1,687	0.4
CpC2	Clarksburg silt loam, 8 to 15 percent slopes, eroded	663	0.2
CrC	Claysville-Guernsey silty clay loams, 8 to 15 percent slopes	845	0.2
CsC2	Coshocton silt loam, 8 to 15 percent slopes, eroded	10,336	2.5
CsD	Coshocton silt loam, 15 to 25 percent slopes	18,843	4.5
CtE	Coshocton-Westmoreland silt loams, 25 to 40 percent slopes	18,882	4.5
Ds	Dumps and Pits, mine	425	0.1
FaB	Fairpoint silty clay loam, 1 to 15 percent slopes	4,741	1.1
FaD	Fairpoint silty clay loam, 15 to 25 percent slopes	5,621	1.3
FaE	Fairpoint silty clay loam, 25 to 50 percent slopes	1,278	0.3
FbF	Fairpoint channery silty clay loam, 25 to 70 percent slopes	2,390	0.6
FcA	Fitchville silt loam, 0 to 2 percent slopes	3,612	0.9
FcB	Fitchville silt loam, 2 to 6 percent slopes	1,586	0.4
FkB	Frankstown Variant-Mertz complex, 3 to 8 percent slopes	313	0.1
GdB	Gilpin silt loam, 2 to 8 percent slopes	2,035	0.5
GdC2	Gilpin silt loam, 8 to 15 percent slopes, eroded	10,041	2.4
GeD2	Gilpin-Upshur complex, 15 to 25 percent slopes, eroded	458	0.1
GeE2	Gilpin-Upshur complex, 25 to 40 percent slopes, eroded	1,415	0.3
GfA	Glenford silt loam, 0 to 2 percent slopes	1,423	0.3
GfB	Glenford silt loam, 2 to 6 percent slopes	6,803	1.6
GfC2	Glenford silt loam, 6 to 15 percent slopes, eroded	4,377	1.1
GtC2	Guernsey-Upshur silty clay loams, 6 to 15 percent slopes, eroded	11,696	2.8
GtD2	Guernsey-Upshur silty clay loams, 15 to 25 percent slopes, eroded	7,290	1.7
HaC2	Homewood silt loam, 8 to 15 percent slopes, eroded	322	0.1
HaD2	Homewood silt loam, 15 to 20 percent slopes, eroded	473	0.1
JtA	Jimtown loam, 0 to 3 percent slopes	249	0.1
KeB	Keene silt loam, 2 to 6 percent slopes	5,675	1.4
KeC2	Keene silt loam, 6 to 15 percent slopes, eroded	7,196	1.7
Km	Killbuck silt loam, occasionally flooded	240	0.1
LaC	Lakin loamy fine sand, 8 to 15 percent slopes	215	0.1
LcD	Lakin-Alford complex, 15 to 25 percent slopes	535	0.1
Lk	Lindside silt loam, occasionally flooded	4,883	1.2
Lm	Lobdell loam, channery substratum, occasionally flooded	2,681	0.6
Lo	Lorain silty clay	889	0.2
LpC2	Lowell silt loam, 8 to 15 percent slopes, eroded	3,487	0.8
LpD2	Lowell silt loam, 15 to 25 percent slopes, eroded	5,612	1.3
LrE2	Lowell-Gilpin complex, 25 to 40 percent slopes, eroded	8,154	2.0
LrF	Lowell-Gilpin complex, 40 to 70 percent slopes	1,300	0.3

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
Lu	Luray silty clay loam	535	0.1
MaB	Markland silt loam, 2 to 6 percent slopes	1,300	0.3
MbC2	Markland silty clay loam, 6 to 15 percent slopes, eroded	1,490	0.4
McD2	Markland-Glenford complex, 15 to 35 percent slopes, eroded	1,894	0.5
MdA	McGary silt loam, 0 to 3 percent slopes	755	0.2
Me	Melvin silt loam, frequently flooded	4,800	1.2
MkD	Mertz very cherty silt loam, 15 to 35 percent slopes	660	0.2
MrB	Morristown shaly silty clay loam, 1 to 15 percent slopes	476	0.1
MrD	Morristown shaly silty clay loam, 15 to 25 percent slopes	340	0.1
MrF	Morristown shaly silty clay loam, 25 to 70 percent slopes	3,016	0.7
MsB	Morristown silty clay loam, 1 to 8 percent slopes	2,202	0.5
MsC	Morristown silty clay loam, 8 to 15 percent slopes	2,264	0.5
MsD	Morristown silty clay loam, 15 to 25 percent slopes	3,801	0.9
MsE	Morristown silty clay loam, 25 to 50 percent slopes	1,158	0.3
Ne	Newark silt loam, frequently flooded	9,690	2.3
No	Nolin silt loam, occasionally flooded	4,578	1.1
OmB	Omulga silt loam, 2 to 6 percent slopes	1,005	0.2
OmC	Omulga silt loam, 6 to 15 percent slopes	1,552	0.4
RaB	Rawson silt loam, 2 to 6 percent slopes	1,717	0.4
RfC	Rigley loam, 8 to 15 percent slopes	3,973	1.0
RgD	Rigley channery loam, 15 to 25 percent slopes	8,228	2.0
RhE	Rigley-Coshocton complex, 25 to 40 percent slopes	8,557	2.1
RoF	Rodman gravelly sandy loam, 25 to 70 percent slopes	631	0.2
Se	Sebring silt loam	2,622	0.6
St	Stonelick loam, occasionally flooded	339	0.1
Ta	Tioga fine sandy loam, rarely flooded	2,242	0.5
Tf	Tioga fine sandy loam, occasionally flooded	1,536	0.4
Ud	Udorthents, loamy, hilly	2,564	0.6
Ug	Udorthents, sandy, rolling	265	0.1
Uh	Udorthents, sandy-skeletal, steep	553	0.1
Uk	Udorthents-Pits complex	830	0.2
UsB	Urban land-Glenford complex, 2 to 8 percent slopes	970	0.2
UtA	Urban land-Nolin complex, rarely flooded	586	0.2
UvB	Urban land-Watertown complex, 1 to 15 percent slopes	1,465	0.4
UwC	Urban land-Wellston complex, 5 to 15 percent slopes	1,126	0.3
WaB	Watertown sandy loam, 1 to 8 percent slopes	1,974	0.5
WaC	Watertown sandy loam, 8 to 15 percent slopes	478	0.1
WhB	Wellston silt loam, 2 to 8 percent slopes	3,138	0.8
WhC2	Wellston silt loam, 8 to 15 percent slopes, eroded	10,631	2.6
WmB	Westgate silt loam, 2 to 6 percent slopes	1,365	0.3
WmC2	Westgate silt loam, 6 to 15 percent slopes, eroded	5,027	1.2
WtC2	Westmoreland silt loam, 8 to 15 percent slopes, eroded	3,408	0.8
WtD2	Westmoreland silt loam, 15 to 25 percent slopes, eroded	21,229	5.2
WtE	Westmoreland silt loam, 25 to 40 percent slopes	14,489	3.5
WuC2	Westmoreland-Guernsey silt loams, 8 to 15 percent slopes, eroded	998	0.2
WuD2	Westmoreland-Guernsey silt loams, 15 to 25 percent slopes, eroded	12,340	3.0
WuE2	Westmoreland-Guernsey silt loams, 25 to 40 percent slopes, eroded	10,403	2.5
WvD	Westmoreland-Urban land complex, 15 to 35 percent slopes	514	0.1
ZnB	Zanesville silt loam, 2 to 6 percent slopes	7,533	1.8
ZnC2	Zanesville silt loam, 6 to 15 percent slopes, eroded	6,451	1.5
	Water	3,368	0.8
	Total	416,640	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
AaB	Aaron silt loam, 2 to 8 percent slopes
AcB	Aaron-Upshur complex, 2 to 6 percent slopes
AfB	Alford silt loam, 2 to 8 percent slopes
Cb	Chagrin loam, rarely flooded
CcA	Chavies loam, 0 to 2 percent slopes
CcB	Chavies loam, 2 to 6 percent slopes
CeA	Chili loam, 0 to 3 percent slopes
CeB	Chili loam, 3 to 8 percent slopes
ChA	Chili gravelly loam, 0 to 3 percent slopes
ChB	Chili gravelly loam, 3 to 8 percent slopes
CkA	Cidermill silt loam, 0 to 3 percent slopes
CnB	Cincinnati silt loam, 2 to 6 percent slopes
FcA	Fitchville silt loam, 0 to 2 percent slopes (where drained)
FcB	Fitchville silt loam, 2 to 6 percent slopes (where drained)
GdB	Gilpin silt loam, 2 to 8 percent slopes
GfA	Glenford silt loam, 0 to 2 percent slopes
GfB	Glenford silt loam, 2 to 6 percent slopes
JtA	Jimtown loam, 0 to 3 percent slopes (where drained)
KeB	Keene silt loam, 2 to 6 percent slopes
Km	Killbuck silt loam, occasionally flooded (where drained)
Lk	Lindside silt loam, occasionally flooded
Lm	Lobdell loam, channery substratum, occasionally flooded
Lo	Lorain silty clay (where drained)
Lu	Luray silty clay loam (where drained)
MaB	Markland silt loam, 2 to 6 percent slopes
MdA	McGary silt loam, 0 to 3 percent slopes (where drained)
Me	Melvin silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
Ne	Newark silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
No	Nolin silt loam, occasionally flooded
OmB	Omulga silt loam, 2 to 6 percent slopes
RaB	Rawson silt loam, 2 to 6 percent slopes
Se	Sebring silt loam (where drained)
St	Stonelick loam, occasionally flooded
Ta	Tioga fine sandy loam, rarely flooded
Tf	Tioga fine sandy loam, occasionally flooded
WhB	Wellston silt loam, 2 to 8 percent slopes
WmB	Westgate silt loam, 2 to 6 percent slopes
ZnB	Zanesville silt loam, 2 to 6 percent slopes

TABLE 6.--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	Winter wheat	Alfalfa hay	Orchardgrass-alfalfa hay	Bluegrass-ladino	Kentucky bluegrass*
		Bu	Bu	Tons	Tons	AUM**	AUM**
AaB---------- Aaron	IIe	115	46	4.5	4.0	4.5	4.5
AaC2---------- Aaron	IIIe	100	40	4.0	3.5	3.5	4.5
AaD2---------- Aaron	IVe	85	34	3.5	3.0	3.0	4.0
AcB---------- Aaron-Upshur	IIe	110	44	4.5	4.0	4.0	4.5
AfB---------- Alford	IIe	135	54	5.8	5.3	5.5	4.5
AfC2---------- Alford	IIIe	125	50	5.0	4.5	4.5	4.5
BeB---------- Berks	IIe	95	38	3.8	3.3	3.5	3.0
BeD2---------- Berks	IVe	75	30	3.0	2.5	2.5	3.0
BeE---------- Berks	VIe	---	---	---	---	---	2.0
BkF---------- Berks-Westmoreland	VIIe	---	---	---	---	---	---
BoB, BoD-------- Bethesda	VIs	---	---	---	---	---	1.0
BpF---------- Bethesda	VIIe	---	---	---	---	---	---
BsC2---------- Brookside	IIIe	105	42	4.0	3.5	4.0	4.0
BsE---------- Brookside	VIe	---	---	---	---	---	2.0
Cb---------- Chagrin	I	140	56	6.0	5.5	5.5	5.0
CcA---------- Chavies	I	130	52	5.6	5.1	5.0	4.0
CcB---------- Chavies	IIe	125	50	5.6	5.1	5.0	4.0
CeA---------- Chili	IIs	120	48	5.2	4.7	4.5	4.0
CeB---------- Chili	IIe	115	46	5.2	4.7	4.5	4.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Winter wheat	Alfalfa hay	Orchardgrass-alfalfa hay	Bluegrass-ladino	Kentucky bluegrass*
		Bu	Bu	Tons	Tons	AUM**	AUM**
ChA--Chili	IIs	100	40	4.5	4.0	3.5	4.0
ChB--Chili	IIe	100	40	4.5	4.0	3.5	4.0
ChC--Chili	IIIe	90	36	4.0	3.5	3.0	4.0
CkA--Cidermill	I	140	56	6.0	5.5	5.5	4.0
CnB--Cincinnati	IIe	120	48	5.0	4.5	4.5	4.0
CnC2--Cincinnati	IIIe	110	44	4.5	4.0	4.0	4.0
CpC2--Clarksburg	IIIe	110	44	4.5	4.0	4.0	4.0
CrC--Claysville-Guernsey	IIIw	90	36	3.5	3.5	3.5	4.0
CsC2--Coshocton	IIIe	105	42	4.5	4.0	4.0	4.5
CsD--Coshocton	IVe	90	36	3.5	3.0	3.0	4.0
CtE--Coshocton-Westmoreland	VIe	---	---	---	---	---	2.0
Ds. Dumps and Pits							
FaB--Fairpoint	IIIs	80	32	3.5	3.0	3.0	2.0
FaD--Fairpoint	IVs	---	24	2.5	2.0	2.0	2.0
FaE--Fairpoint	VIe	---	---	---	---	---	1.0
FbF--Fairpoint	VIIe	---	---	---	---	---	---
FcA--Fitchville	IIw	120	48	4.5	4.5	4.5	4.0
FcB--Fitchville	IIe	115	46	4.5	4.5	4.5	4.0
FkB--Frankstown Variant-Mertz	IIe	100	40	4.0	3.5	3.5	3.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Winter wheat	Alfalfa hay	Orchardgrass-alfalfa hay	Bluegrass-ladino	Kentucky bluegrass*
		Bu	Bu	Tons	Tons	AUM**	AUM**
GdB---------- Gilpin	IIe	100	40	4.0	3.5	3.5	3.0
GdC2---------- Gilpin	IIIe	95	38	3.8	3.3	3.5	3.0
GeD2---------- Gilpin-Upshur	IVe	---	---	3.5	3.0	2.5	3.0
GeE2---------- Gilpin-Upshur	VIe	---	---	---	---	---	2.0
GfA---------- Glenford	I	125	50	5.0	4.5	4.5	4.5
GfB---------- Glenford	IIe	120	48	4.8	4.3	4.5	4.5
GfC2---------- Glenford	IIIe	110	44	4.5	4.0	4.0	4.5
GtC2---------- Guernsey-Upshur	IVe	95	38	4.0	3.5	3.5	4.5
GtD2---------- Guernsey-Upshur	VIe	---	---	3.0	2.5	2.5	4.0
HaC2---------- Homewood	IIIe	105	44	4.5	4.0	4.0	4.0
HaD2---------- Homewood	IVe	90	36	3.5	3.0	3.0	4.0
JtA---------- Jimtown	IIw	110	44	4.5	4.0	4.0	4.0
KeB---------- Keene	IIe	120	48	4.8	4.3	4.5	4.5
KeC2---------- Keene	IIIe	110	44	4.5	4.0	4.0	4.5
Km---------- Killbuck	IIIw	110	33	3.8	4.0	3.0	4.0
LaC---------- Lakin	IVs	80	36	4.0	3.5	3.0	3.0
LcD---------- Lakin-Alford	IVe	---	32	3.5	3.0	2.5	3.0
Lk---------- Lindside	IIw	140	42	5.0	4.5	5.5	5.0
Lm---------- Lobdell	IIw	120	40	4.8	4.3	5.5	5.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Winter wheat	Alfalfa hay	Orchardgrass-alfalfa hay	Bluegrass-ladino	Kentucky bluegrass*
		Bu	Bu	Tons	Tons	AUM**	AUM**
Lo---------- Lorain	IIIw	100	30	3.5	3.5	2.5	4.0
LpC2---------- Lowell	IIIe	110	44	4.5	4.0	4.0	4.0
LpD2---------- Lowell	IVe	90	36	3.5	3.0	3.5	4.0
LrE2---------- Lowell-Gilpin	VIe	---	---	---	---	---	2.0
LrF---------- Lowell-Gilpin	VIIe	---	---	---	---	---	---
Lu---------- Luray	IIw	140	49	4.5	4.5	3.5	4.0
MaB---------- Markland	IIIe	110	44	4.5	4.0	---	4.0
MbC2---------- Markland	IVe	95	38	4.0	3.5	3.5	4.0
McD2---------- Markland-Glenford	VIe	---	---	3.5	3.0	2.5	4.0
MdA---------- McGary	IIIw	100	40	3.5	3.5	3.5	4.0
Me---------- Melvin	IIIw	90	---	---	3.6	3.0	4.0
MkD---------- Mertz	VIe	---	---	---	---	---	2.0
MrB, MrD---------- Morristown	VIs	---	---	---	---	---	1.0
MrF---------- Morristown	VIIe	---	---	---	---	---	---
MsB---------- Morristown	IIIs	75	30	3.0	3.0	2.5	2.0
MsC---------- Morristown	IVs	65	26	3.0	3.0	2.5	2.0
MsD---------- Morristown	IVs	---	---	2.5	2.0	2.0	2.0
MsE---------- Morristown	VIe	---	---	---	---	---	1.0
Ne---------- Newark	IIw	110	33	4.5	4.5	3.5	4.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Winter wheat	Alfalfa hay	Orchardgrass-alfalfa hay	Bluegrass-ladino	Kentucky bluegrass*
		Bu	Bu	Tons	Tons	AUM**	AUM**
No---------- Nolin	IIw	140	42	5.0	4.5	5.0	5.0
OmB---------- Omulga	IIe	115	46	---	4.5	4.0	4.0
OmC---------- Omulga	IIIe	105	42	---	4.5	4.0	4.0
RaB---------- Rawson	IIe	120	49	---	4.8	4.3	4.0
RfC---------- Rigley	IIIe	90	36	3.8	3.3	3.0	4.0
RgD---------- Rigley	IVe	80	32	3.5	3.0	2.5	4.0
RhE---------- Rigley-Coshocton	VIe	---	---	---	---	---	2.0
RoF---------- Rodman	VIIs	---	---	---	---	---	---
Se---------- Sebring	IIIw	110	33	3.8	4.0	3.0	4.0
St---------- Stonelick	IIw	100	35	---	3.5	3.5	5.0
Ta---------- Tioga	IIs	120	48	5.0	4.5	4.5	5.0
Tf---------- Tioga	IIw	120	40	4.8	4.3	4.5	5.0
Ud, Ug, Uh. Udorthents							
Uk. Udorthents-Pits							
UsB. Urban land-Glenford							
UtA. Urban land-Nolin							
UvB. Urban land-Watertown							
UwC. Urban land-Wellston							

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Winter wheat	Alfalfa hay	Orchardgrass-alfalfa hay	Bluegrass-ladino	Kentucky bluegrass*
		Bu	Bu	Tons	Tons	AUM**	AUM**
WaB---------- Watertown	IIIs	100	40	4.3	3.8	3.5	3.0
WaC---------- Watertown	IIIe	90	36	3.9	3.4	3.0	3.0
WhB---------- Wellston	IIe	120	48	5.0	4.5	4.5	4.5
WhC2---------- Wellston	IIIe	110	44	4.5	4.0	4.0	4.5
WmB---------- Westgate	IIe	120	48	4.8	4.3	4.5	4.5
WmC2---------- Westgate	IIIe	110	44	4.5	4.0	4.0	4.5
WtC2---------- Westmoreland	IIIe	105	42	4.5	4.0	4.0	4.0
WtD2---------- Westmoreland	IVe	100	40	4.0	3.5	3.5	4.0
WtE---------- Westmoreland	VIe	---	---	---	---	---	2.0
WuC2---------- Westmoreland-Guernsey	IIIe	105	42	4.5	4.0	4.0	4.0
WuD2---------- Westmoreland-Guernsey	IVe	90	36	3.5	3.0	3.0	4.0
WuE2---------- Westmoreland-Guernsey	VIe	---	---	---	---	---	2.0
WvD. Westmoreland-Urban land							
ZnB---------- Zanesville	IIe	120	48	4.8	4.3	4.5	4.0
ZnC2---------- Zanesville	IIIe	105	42	4.5	4.0	4.0	4.0

* Yields of bluegrass pasture are based on management that includes mowing to control weeds and brush, applying lime, and adding manure. Improved drainage or additions of fertilizer are not included.

** 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.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	5,404	---	---	---
II	72,627	40,810	28,103	3,714
III	106,820	87,752	10,151	8,917
IV	97,952	86,051	---	11,901
V	---	---	---	---
VI	85,834	82,612	---	3,222
VII	35,337	34,706	---	631
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
AaB, AaC2--- Aaron	4C	Slight	Slight	Slight	Severe	Black oak	85	65	Northern red oak, white ash, black locust, hickory, sugar maple, northern red oak, black walnut
						White ash	76	75	
						Black locust	78	---	
						Hickory	---	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
						Black walnut	---	---	
AaD2--- Aaron (north aspect)	4R	Moderate	Slight	Slight	Severe	Black oak	85	65	Northern red oak, white ash, black locust, hickory, sugar maple, northern red oak, black walnut
						White ash	76	75	
						Black locust	78	---	
						Hickory	---	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
						Black walnut	---	---	
AaD2--- Aaron (south aspect)	4R	Moderate	Moderate	Slight	Severe	Black oak	77	59	Northern red oak, white ash, chinkapin oak, sugar maple, black locust
						White ash	68	63	
						Chinkapin oak	---	---	
						Sugar maple	---	---	
						Black locust	---	---	
AcB:									
Aaron---	4C	Slight	Slight	Slight	Severe	Black oak	85	65	Northern red oak, white ash, black locust, hickory, sugar maple, northern red oak, black walnut
						White ash	76	75	
						Black locust	78	---	
						Hickory	---	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
						Black walnut	---	---	
Upshur---	3C	Slight	Slight	Slight	Moderate	Northern red oak	65	48	Eastern white pine, shortleaf pine, yellow-poplar.
						Yellow-poplar	80	71	
						Eastern white pine	80	181	
AfB, AfC2--- Alford	5A	Slight	Slight	Slight	Moderate	White oak	90	72	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar	98	102	
BeB--- Berks	4F	Slight	Moderate	Slight	Slight	Northern red oak	70	52	Eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak	70	52	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
BeD2---------- Berks (north aspect)	4R	Moderate	Moderate	Slight	Slight	Northern red oak----	70	52	Eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	52	
BeD2---------- Berks (south aspect)	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	60	43	Eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	60	43	
BeE---------- Berks (north aspect)	4R	Moderate	Moderate	Slight	Slight	Northern red oak----	70	52	Eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	52	
BeE---------- Berks (south aspect)	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	60	43	Eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	60	43	
BkF: Berks (north aspect)-------	4R	Severe	Moderate	Slight	Slight	Northern red oak----	70	52	Eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	70	52	
Westmoreland (north aspect)	4R	Severe	Slight	Slight	Severe	Northern red oak----	81	63	Black walnut, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	90	
						Eastern white pine--	75	166	
BkF: Berks (south aspect)-------	3R	Severe	Severe	Slight	Slight	Northern red oak----	60	43	Eastern white pine, Japanese larch, Norway spruce, red pine.
						Black oak----------	60	43	
Westmoreland (south aspect)	4R	Severe	Slight	Slight	Severe	Northern red oak----	70	52	Eastern white pine, European larch.
						Yellow-poplar-------	80	71	
						Eastern white pine--	65	136	
BoB, BoD, BpF--- Bethesda	---	---	---	---	---	---	---	---	Eastern white pine, red pine, black locust.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
BsC2--Brookside	5A	Slight	Slight	Slight	Moderate	Northern red oak Yellow-poplar White oak Black walnut Black cherry Sugar maple White ash	86 96 --- --- --- --- ---	68 100 --- --- --- --- ---	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.
BsE--Brookside (north aspect)	5R	Moderate	Slight	Slight	Moderate	Northern red oak Yellow-poplar White oak Black walnut Black cherry Sugar maple White ash	86 96 --- --- --- --- ---	68 100 --- --- --- --- ---	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.
BsE--Brookside (south aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak White oak Black walnut Black cherry Sugar maple White ash Yellow-poplar	80 75 --- --- --- --- ---	62 57 --- --- --- --- ---	Eastern white pine, red pine, yellow-poplar, black walnut, white ash, northern red oak, white oak.
Cb--Chagrin	5A	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar Sugar maple White oak Black cherry White ash Black walnut	86 96 86 --- --- --- ---	68 100 53 --- --- --- ---	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.
CcA, CcB--Chavies	4A	Slight	Slight	Slight	Moderate	Northern red oak Yellow-poplar Black walnut Black cherry Sugar maple Red maple Hickory White oak American sycamore	80 93 --- --- --- --- --- --- ---	62 95 --- --- --- --- --- --- ---	Eastern white pine, yellow-poplar, black walnut, northern red oak, white oak.
CeA, CeB, ChA, ChB, ChC--Chili	4A	Slight	Slight	Slight	Moderate	White oak Northern red oak Black walnut Black cherry Sugar maple White ash Yellow-poplar	80 85 --- --- --- --- ---	62 67 --- --- --- --- ---	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, northern red oak, white oak, green ash, black cherry, black locust.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
CkA---------- Cidermill	5A	Slight	Slight	Slight	Severe	White oak----------	85	67	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, northern red oak, white oak, green ash, black cherry, black locust.
						Northern red oak----	90	72	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
						Yellow-poplar-------	---	---	
CnB, CnC2------- Cincinnati	4A	Slight	Slight	Moderate	Severe	Northern red oak----	80	62	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak.
						White oak----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
						Yellow-poplar-------	---	---	
CpC2---------- Clarksburg	4A	Slight	Slight	Slight	Moderate	Northern red oak----	75	57	Eastern white pine, yellow-poplar, Japanese larch.
						Yellow-poplar-------	85	81	
CrC: Claysville.									
Guernsey-------	4A	Slight	Slight	Slight	Severe	Northern red oak----	78	60	Eastern white pine, yellow-poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow-poplar-------	95	98	
						Sugar maple---------	---	---	
						White ash----------	---	---	
						White oak----------	---	---	
						Black cherry--------	---	---	
CsC2---------- Coshocton	4A	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow-poplar, northern red oak, white oak, red pine, white ash.
						White oak----------	75	57	
						Yellow-poplar-------	90	90	
						White ash----------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	
CsD---------- Coshocton (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow-poplar, northern red oak, white oak, red pine, white ash.
						White oak----------	75	57	
						Yellow-poplar-------	90	90	
						White ash----------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
CsD---------- Coshocton (south aspect)	3R	Moderate	Moderate	Slight	Severe	White oak----------	65	48	Eastern white pine, yellow-poplar, northern red oak, white oak, white ash, red pine.
						Northern red oak----	---	---	
						Yellow-poplar-------	---	---	
						White ash----------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	
CtE: Coshocton (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow-poplar, northern red oak, white oak, red pine, white ash.
						White oak----------	75	57	
						Yellow-poplar-------	90	90	
						White ash----------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	
Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	81	63	Black walnut, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	90	
						Eastern white pine--	75	166	
CtE: Coshocton (south aspect)	3R	Moderate	Moderate	Slight	Severe	White oak----------	65	48	Eastern white pine, yellow-poplar, northern red oak, white oak, white ash, red pine.
						Northern red oak----	---	---	
						Yellow-poplar-------	---	---	
						White ash----------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	
Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	70	52	Eastern white pine, European larch.
						Yellow-poplar-------	80	71	
						Eastern white pine--	65	136	
FaB, FaD, FaE--- Fairpoint	---	---	---	---	---	---	---	---	Eastern white pine, black locust, yellow-poplar.
FcA, FcB-------- Fitchville	5A	Slight	Slight	Slight	Severe	Pin oak----------	90	72	Eastern white pine, white ash, green ash, yellow-poplar, red pine, white oak, northern red oak, black cherry, black locust.
						Northern red oak----	80	62	
						Yellow-poplar-------	---	---	
						Sugar maple---------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
FkB:									
Frankstown Variant	4D	Slight	Slight	Moderate	Moderate	Northern red oak	80	62	Eastern white pine, yellow-poplar, red pine, white ash, black oak.
						White oak	---	---	
						White ash	---	---	
						Slippery elm	---	---	
						American beech	---	---	
						Sugar maple	---	---	
						American sycamore	---	---	
Mertz	4F	Slight	Moderate	Slight	Severe	Northern red oak	80	62	Yellow-poplar, eastern white pine, Japanese larch, Norway spruce.
						Yellow-poplar	90	90	
GdB, GdC2 Gilpin	4A	Slight	Slight	Slight	Moderate	Northern red oak	80	62	Japanese larch, Virginia pine, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	95	98	
GeD2:									
Gilpin (north aspect)	4R	Moderate	Slight	Slight	Moderate	Northern red oak	80	62	Japanese larch, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	95	98	
Upshur (north aspect)	4R	Moderate	Severe	Severe	Moderate	Northern red oak	70	52	Eastern white pine, shortleaf pine, yellow-poplar.
						Yellow-poplar	90	90	
						Eastern white pine	90	211	
GeD2:									
Gilpin (south aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak	70	52	Japanese larch, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	90	90	
Upshur (south aspect)	3R	Moderate	Severe	Severe	Moderate	Northern red oak	65	48	Eastern white pine, shortleaf pine, eastern redcedar.
						Eastern white pine	75	166	
GeE2:									
Gilpin (north aspect)	4R	Moderate	Slight	Slight	Moderate	Northern red oak	80	62	Japanese larch, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	95	98	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
GeE2: Upshur (north aspect)	4R	Moderate	Severe	Severe	Moderate	Northern red oak	70	52	Eastern white pine, shortleaf pine, yellow-poplar.
						Yellow-poplar	90	90	
						Eastern white pine	90	211	
GeE2: Gilpin (south aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak	70	52	Japanese larch, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	90	90	
Upshur (south aspect)	3R	Moderate	Severe	Severe	Moderate	Northern red oak	65	48	Eastern white pine, shortleaf pine, eastern redcedar.
						Eastern white pine	75	166	
GfA, GfB, GfC2--Glenford	5A	Slight	Slight	Slight	Severe	Northern red oak	86	68	Eastern white pine, red pine, yellow-poplar, green ash, white ash, white oak, northern red oak, black cherry, black locust.
						Yellow-poplar	96	100	
						White oak	---	---	
						White ash	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
GtC2: Guernsey	4A	Slight	Slight	Slight	Severe	Northern red oak	78	60	Eastern white pine, yellow-poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow-poplar	95	48	
						Sugar maple	---	---	
						White ash	---	---	
						White oak	---	---	
						Black cherry	---	---	
Upshur	3C	Slight	Severe	Severe	Moderate	Northern red oak	65	48	Eastern white pine, yellow-poplar.
						Yellow-poplar	80	71	
						Eastern white pine	80	181	
GtD2: Guernsey (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	78	60	Eastern white pine, yellow-poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow-poplar	95	98	
						Sugar maple	---	---	
						White ash	---	---	
						White oak	---	---	
						Black cherry	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
GtD2: Upshur (north aspect)	4R	Moderate	Severe	Severe	Moderate	Northern red oak	70	52	Eastern white pine, yellow-poplar.
						Yellow-poplar	90	90	
						Eastern white pine	90	211	
GtD2: Guernsey (south aspect)	4R	Moderate	Moderate	Slight	Severe	Northern red oak	70	52	White oak, yellow-poplar, white ash, northern red oak, eastern white pine, red pine.
						White oak	65	48	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow-poplar	---	---	
Upshur (south aspect)	3R	Moderate	Severe	Severe	Moderate	Northern red oak	65	48	Eastern white pine, eastern redcedar.
						Eastern white pine	75	166	
HaC2: Homewood	5D	Slight	Slight	Moderate	Moderate	Northern red oak	93	75	Black oak, yellow-poplar, red pine, white ash, eastern white pine.
						White oak	---	---	
						Slippery elm	---	---	
						American beech	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						American sycamore	---	---	
HaD2: Homewood (north aspect)	5R	Moderate	Slight	Moderate	Moderate	Northern red oak	93	75	Black oak, yellow-poplar, red pine, white ash, eastern white pine.
						White oak	---	---	
						Slippery elm	---	---	
						American beech	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						American sycamore	---	---	
HaD2: Homewood (south aspect)	5R	Moderate	Moderate	Moderate	Moderate	Northern red oak	84	66	Black oak, yellow-poplar, red pine, white ash, eastern white pine.
						White oak	---	---	
						Slippery elm	---	---	
						American beech	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						American sycamore	---	---	
JtA: Jimtown	5A	Slight	Slight	Slight	Moderate	Northern red oak	85	67	Eastern white pine, yellow-poplar, black cherry, white ash, red pine, white oak, northern red oak, black locust, American sycamore, eastern cottonwood.
						Yellow-poplar	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						White oak	---	---	
						Black cherry	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
KeB, KeC2----- Keene	4A	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow-poplar, black walnut, white ash, red pine, white oak, northern red oak.
						White oak----------	75	57	
						Yellow-poplar-------	95	98	
						White ash----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
Km----------- Killbuck	5W	Slight	Moderate	Moderate	Severe	Pin oak------------	86	68	Red maple, silver maple, green ash, American sycamore, eastern cottonwood, pin oak, swamp white oak, sweetgum, baldcypress.
						Green ash----------	---	---	
						Black cherry--------	---	---	
						Eastern cottonwood--	---	---	
						Red maple----------	---	---	
						Swamp white oak-----	---	---	
LaC----------- Lakin	3S	Slight	Moderate	Slight	Slight	Northern red oak----	60	43	Eastern white pine, Japanese larch.
						Chestnut oak--------	60	43	
						Black oak----------	60	43	
LcD:									
Lakin----------	3S	Slight	Moderate	Slight	Slight	Northern red oak----	60	43	Eastern white pine, Japanese larch.
						Chestnut oak--------	60	43	
						Black oak----------	60	43	
Alford---------	5R	Slight	Slight	Slight	Moderate	White oak----------	90	72	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	104	
						Sweetgum-----------	76	70	
Lk----------- Lindside	5A	Slight	Slight	Slight	Severe	Northern red oak----	86	68	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch, black walnut, black oak, northern red oak, white ash, white oak.
						Yellow-poplar-------	95	98	
						Black walnut--------	---	---	
						White ash----------	85	88	
						White oak----------	85	67	
						Red maple----------	---	---	
Lm----------- Lobdell	5A	Slight	Slight	Slight	Severe	Northern red oak----	87	69	Eastern white pine, white oak, yellow-poplar, white ash, red pine, northern red oak.
						Yellow-poplar-------	96	100	
						Sugar maple---------	---	---	
						White ash----------	---	---	
						White oak----------	---	---	
						Black cherry--------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
Lo Lorain	5W	Slight	Severe	Severe	Severe	Pin oak Swamp white oak Green ash Black cherry Eastern cottonwood Red maple	88 --- --- --- --- ---	70 --- --- --- --- ---	Silver maple, red maple, sweetgum, green ash, American sycamore, eastern cottonwood.
LpC2 Lowell	4C	Slight	Slight	Slight	Severe	Northern red oak Yellow-poplar	70 ---	52 ---	Eastern white pine, yellow-poplar.
LpD2 Lowell (north aspect)	4C	Moderate	Slight	Slight	Severe	Northern red oak Black walnut	70 ---	52 ---	Eastern white pine, black walnut.
LpD2 Lowell (south aspect)	3C	Moderate	Moderate	Slight	Severe	Northern red oak	60	43	Eastern white pine.
LrE2: Lowell (north aspect)	5R	Moderate	Slight	Slight	Severe	Black oak White ash Hickory Black locust Sugar maple Northern red oak	88 75 --- 77 --- ---	70 73 --- --- --- ---	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
Gilpin (north aspect)	4R	Severe	Slight	Slight	Moderate	Northern red oak Yellow-poplar	80 95	62 98	Japanese larch, eastern white pine, black cherry, yellow-poplar.
LrE2: Lowell (south aspect)	5R	Moderate	Slight	Slight	Severe	Black oak White ash Hickory Black locust Sugar maple Northern red oak	88 75 --- 77 --- ---	70 73 --- --- --- ---	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
Gilpin (south aspect)	4R	Severe	Moderate	Slight	Moderate	Northern red oak Yellow-poplar	70 90	52 90	Japanese larch, eastern white pine, black cherry, yellow-poplar.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
LrF:									
Lowell (north aspect)	5R	Severe	Slight	Slight	Severe	Black oak	88	70	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
						White ash	75	73	
						Hickory	---	---	
						Black locust	77	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
Gilpin (north aspect)	4R	Severe	Slight	Slight	Moderate	Northern red oak	80	62	Japanese larch, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	95	98	
LrF:									
Lowell (south aspect)	5R	Severe	Slight	Slight	Severe	Black oak	88	70	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
						White ash	75	73	
						Hickory	---	---	
						Black locust	77	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
Gilpin (south aspect)	4R	Severe	Moderate	Slight	Moderate	Northern red oak	70	52	Japanese larch, eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	90	90	
Lu, Luray	5W	Slight	Severe	Severe	Severe	Pin oak	86	68	Red maple, silver maple, green ash, American sycamore, eastern cottonwood, pin oak, swamp white oak, sweetgum, baldcypress.
						Swamp white oak	---	---	
						Green ash	---	---	
						Red maple	---	---	
						Eastern cottonwood	---	---	
						Black cherry	---	---	
MaB, MbC2, Markland	4C	Slight	Severe	Severe	Moderate	White oak	75	57	Eastern white pine, red pine, yellow-poplar, white ash.
						Northern red oak	78	60	
McD2:									
Markland	4R	Moderate	Severe	Severe	Moderate	White oak	75	57	Eastern white pine, red pine, yellow-poplar, white ash.
						Northern red oak	78	60	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
McD2:									
Glenford	5R	Moderate	Slight	Slight	Severe	Northern red oak	86	68	Eastern white pine, red pine, yellow-poplar, green ash, white ash, white oak, northern red oak, black cherry, black locust.
						Yellow-poplar	96	100	
						White oak	---	---	
						White ash	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
MdA	4W	Slight	Severe	Severe	Moderate	White oak	70	52	Eastern white pine, baldcypress, white ash, red maple, yellow-poplar, American sycamore, eastern cottonwood, green ash.
McGary						Pin oak	85	67	
						Yellow-poplar	85	81	
						Sweetgum	80	79	
Me	4W	Slight	Severe	Severe	Severe	Pin oak	99	81	Pin oak, American sycamore, sweetgum, loblolly pine, eastern cottonwood.
Melvin						Eastern cottonwood	95	116	
						Sweetgum	92	112	
						Green ash	---	---	
						Hackberry	---	---	
						Hickory	---	---	
						Red maple	---	---	
						American elm	---	---	
MkD	4F	Slight	Moderate	Slight	Severe	Northern red oak	80	62	Yellow-poplar, eastern white pine, Japanese larch, Norway spruce.
Mertz						Yellow-poplar	90	90	
MrB, MrD, MrF	---	---	---	---	---	---	---	---	Eastern white pine, black locust, red pine, American sycamore, eastern cottonwood, white ash, black ash.
Morristown									

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
MsB, MsC, MsD, MsE---------- Morristown	---	---	---	---	---	---	---	---	Eastern white pine, black locust, yellow-poplar, American sycamore, eastern cottonwood, white ash, black ash.
Ne---------- Newark	5W	Slight	Slight	Moderate	Severe	Pin oak----------	96	78	Eastern cottonwood, sweetgum, American sycamore.
						Eastern cottonwood--	89	100	
						Green ash----------	---	---	
No---------- Nolin	5A	Slight	Slight	Slight	Severe	Northern red oak----	90	72	Yellow-poplar, eastern white pine, eastern cottonwood, white ash, sweetgum, black walnut.
						Yellow-poplar-------	107	119	
						Eastern cottonwood--	---	---	
						Black walnut--------	---	---	
						American sycamore---	---	---	
						River birch---------	---	---	
OmB, OmC-------- Omulga	4D	Slight	Slight	Moderate	Severe	Northern red oak----	80	62	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, white oak, northern red oak, green ash, black cherry, black locust, American, sycamore, eastern cottonwood.
						White oak----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
						Yellow-poplar-------	---	---	
RaB---------- Rawson	4A	Slight	Slight	Slight	Moderate	White oak----------	75	57	Eastern white pine, yellow-poplar, black cherry, white ash, red pine, white oak, northern red oak, green ash, black locust, American sycamore, eastern cottonwood.
						Northern red oak----	80	62	
						Yellow-poplar-------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
RfC---------- Rigley	4A	Slight	Slight	Slight	Moderate	White oak----------	75	57	White oak,
						Black oak----------	78	60	northern red
						Northern red oak----	---	---	oak, yellow-
						Yellow-poplar-------	94	97	poplar,
						American beech------	---	---	eastern white
						Hickory----------	---	---	pine.
RgD---------- Rigley (north aspect)	4R	Moderate	Slight	Slight	Moderate	White oak----------	75	57	White oak,
						Black oak----------	78	60	northern red
						Northern red oak----	---	---	oak, yellow-
						Yellow-poplar-------	94	97	poplar,
						American beech------	---	---	eastern white
						Hickory----------	---	---	pine.
RgD---------- Rigley (south aspect)	3R	Moderate	Moderate	Slight	Moderate	White oak----------	65	48	Eastern white
						Black oak----------	---	---	pine, white
						Hickory----------	---	---	oak.
						Scarlet oak--------	---	---	
						American beech------	---	---	
						Shortleaf pine------	---	---	
RhE: Rigley (north aspect)-------	4R	Moderate	Slight	Slight	Moderate	White oak----------	75	57	White oak,
						Black oak----------	78	60	northern red
						Northern red oak----	---	---	oak, yellow-
						Yellow-poplar-------	94	97	poplar,
						American beech------	---	---	eastern white
						Hickory----------	---	---	pine.
Coshocton (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white
						White oak----------	75	57	pine, yellow-
						Yellow-poplar-------	90	90	poplar,
						White ash----------	---	---	northern red
						Sugar maple--------	---	---	oak, white
						Black cherry-------	---	---	oak, red pine,
									white ash.
RhE: Rigley (south aspect)-------	3R	Moderate	Moderate	Slight	Moderate	White oak----------	65	48	Eastern white
						Black oak----------	---	---	pine, white
						Hickory----------	---	---	oak.
						Scarlet oak--------	---	---	
						American beech------	---	---	
Coshocton (south aspect)	3R	Moderate	Moderate	Slight	Severe	White oak----------	65	48	Eastern white
						Northern red oak----	---	---	pine, yellow-
						Yellow-poplar-------	---	---	poplar,
						White ash----------	---	---	northern red
						Sugar maple--------	---	---	oak, white
						Black cherry-------	---	---	oak, white
									ash, red pine.
RoF---------- Rodman	4R	Severe	Severe	Slight	Slight	Northern red oak----	70	52	Eastern white
						White oak----------	70	52	pine, red
						Red pine----------	75	142	pine, jack
						Eastern white pine--	85	196	pine.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
Se---------- Sebring	5W	Slight	Severe	Severe	Severe	Pin oak----------	90	72	Red maple, green ash, pin oak, swamp white oak, American sycamore, eastern cottonwood, sweetgum, eastern white pine, silver maple.
						Swamp white oak-----	---	---	
						Red maple----------	---	---	
						Green ash----------	---	---	
						Black cherry--------	---	---	
						Eastern cottonwood--	---	---	
St---------- Stonelick	4A	Slight	Slight	Slight	Moderate	Northern red oak----	80	62	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, white oak.
						Yellow-poplar-------	95	98	
						White oak----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
Ta, Tf---------- Tioga	4A	Slight	Slight	Slight	Moderate	Northern red oak----	75	57	Eastern white pine, yellow-poplar, Norway spruce, black walnut, European larch.
						Yellow-poplar-------	85	81	
						Sugar maple---------	67	41	
WaB, WaC-------- Watertown	4A	Slight	Slight	Slight	Moderate	Black oak----------	80	62	Yellow-poplar, black walnut, white ash, black oak, northern red oak, red pine.
						Yellow-poplar-------	90	90	
						Northern red oak----	---	---	
						Red maple----------	---	---	
						Bur oak------------	---	---	
						Quaking aspen-------	---	---	
						Green ash----------	---	---	
						Slippery elm--------	---	---	
WhB, WhC2------- Wellston	4A	Slight	Slight	Slight	Severe	Northern red oak----	81	63	Eastern white pine, black walnut, yellow-poplar, white ash, white oak, northern red oak, red pine, green ash.
						Yellow-poplar-------	90	90	
						White oak----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
WmB, WmC2------- Westgate	4A	Slight	Slight	Slight	Severe	Northern red oak----	68	50	Eastern white pine, red pine, yellow-poplar, black walnut, white oak, northern red oak, white ash.
						Yellow-poplar-------	91	92	
						White ash----------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
WtC2---------- Westmoreland	4A	Slight	Slight	Slight	Severe	Northern red oak----	75	57	Eastern white pine, yellow-poplar, Virginia pine.
						Yellow-poplar-------	85	81	
						Eastern white pine--	70	151	
WtD2---------- Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	81	63	Black walnut, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	90	
						Eastern white pine--	75	166	
WtD2---------- Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	70	52	Eastern white pine, European larch.
						Yellow-poplar-------	80	71	
						Eastern white pine--	65	136	
WtE---------- Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	81	65	Black walnut, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	90	
						Eastern white pine--	75	166	
WtE---------- Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	70	52	Eastern white pine, European larch.
						Yellow-poplar-------	80	71	
						Eastern white pine--	65	136	
WuC2: Westmoreland---	4A	Slight	Slight	Slight	Severe	Northern red oak----	75	57	Eastern white pine, yellow-poplar.
						Yellow-poplar-------	85	81	
						Eastern white pine--	70	157	
Guernsey-------	4A	Slight	Slight	Slight	Severe	Northern red oak----	78	60	Eastern white pine, yellow-poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow-poplar-------	95	98	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
						White oak-----------	---	---	
						Black cherry--------	---	---	
WuD2: Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	81	63	Black walnut, yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	90	
						Eastern white pine--	75	166	
Guernsey (north aspect)-------	4R	Moderate	Slight	Slight	Severe	Northern red oak----	78	60	Eastern white pine, yellow-poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow-poplar-------	95	98	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
						White oak-----------	---	---	
						Black cherry--------	---	---	
WuD2: Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak----	70	52	Eastern white pine, European larch.
						Yellow-poplar-------	80	71	
						Eastern white pine--	65	136	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
WuD2: Guernsey (south aspect)	4R	Moderate	Moderate	Slight	Severe	Northern red oak	70	52	White oak, yellow-poplar, white ash, northern red oak, eastern white pine, red pine.
						White oak	65	48	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow-poplar	---	---	
WuE2: Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	81	63	Black walnut, yellow-poplar, eastern white pine.
						Yellow-poplar	90	90	
						Eastern white pine	75	166	
Guernsey (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	78	60	Eastern white pine, yellow-poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow-poplar	95	98	
						Sugar maple	---	---	
						White ash	---	---	
						White oak	---	---	
						Black cherry	---	---	
WuE2: Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	70	52	Eastern white pine, European larch.
						Yellow-poplar	80	71	
						Eastern white pine	65	136	
Guernsey (south aspect)	4R	Moderate	Moderate	Slight	Severe	Northern red oak	70	52	White oak, yellow-poplar, white ash, northern red oak, eastern white pine, red pine.
						White oak	65	48	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow-poplar	---	---	
ZnB, ZnC2--- Zanesville	4A	Slight	Slight	Slight	Moderate	Northern red oak	68	50	Eastern white pine.

* 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.

TABLE 9.--WOODLAND HARVESTING AND REGENERATION ACTIVITIES

(Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
AaB Aaron	Severe: low strength.	Severe: low strength.	Slight	Slight.
AaC2 Aaron	Severe: low strength, slippage.	Severe: slippage, low strength.	Slight	Slight.
AaD2 Aaron	Severe: low strength, slippage.	Severe: slope, slippage, low strength.	Moderate: slope.	Moderate: slope.
AcB: Aaron	Severe: low strength, slippage.	Severe: low strength.	Slight	Slight.
Upshur	Severe: low strength.	Severe: slippage.	Slight	Slight.
AfB, AfC2 Alford	Severe: low strength.	Severe: low strength.	Slight	Slight.
BeB Berks	Slight	Moderate: slope.	Slight	Slight.
BeD2, BeE Berks	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
BkF: Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BoB Bethesda	Slight	Slight	Slight	Slight.
BoD Bethesda	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
BpF Bethesda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BsC2 Brookside	Severe: low strength.	Severe: low strength.	Slight	Moderate: slope, too clayey.
BsE Brookside	Severe: low strength.	Severe: slope, low strength.	Moderate: slope.	Moderate: slope, too clayey.
Cb Chagrin	Slight	Slight	Slight	Slight.
CcA, CcB Chavies	Slight	Slight	Slight	Slight.

TABLE 9.--WOODLAND HARVESTING AND REGENERATION ACTIVITIES--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
CeA, CeB, ChA, ChB---- Chili	Slight----------	Slight----------	Slight----------	Slight.
ChC---------- Chili	Slight----------	Moderate: slope.	Slight----------	Slight.
CkA---------- Cidermill	Slight----------	Slight----------	Slight----------	Slight.
CnB, CnC2---------- Cincinnati	Severe: low strength.	Severe: low strength.	Slight----------	Slight.
CpC2---------- Clarksburg	Severe: low strength.	Severe: low strength.	Slight----------	Slight.
CrC:				
Claysville----------	Severe: slippage.	Severe: slope, low strength.	Severe: slippage.	Slight.
Guernsey----------	Severe: slippage.	Severe: slippage.	Slight----------	Slight.
CsC2---------- Coshocton	Severe: low strength.	Severe: slope.	Slight----------	Slight.
CsD---------- Coshocton	Severe: low strength.	Severe: slope.	Moderate: slope.	Moderate: slope.
CtE:				
Coshocton----------	Severe: low strength.	Severe: slope.	Moderate: slope.	Moderate: slope.
Westmoreland---------	Moderate: low strength, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
FaB---------- Fairpoint	Slight----------	Moderate: slope.	Slight----------	Slight.
FaD---------- Fairpoint	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
FaE---------- Fairpoint	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
FbF---------- Fairpoint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
FcA, FcB---------- Fitchville	Severe: low strength, wetness.	Severe: low strength, wetness.	Severe: wetness.	Severe: wetness.
FkB:				
Frankstown Variant---	Moderate: depth to rock.	Moderate: depth to rock.	Slight----------	Slight.
Mertz----------	Slight----------	Slight----------	Slight----------	Slight.
GdB---------- Gilpin	Slight----------	Slight----------	Slight----------	Slight.

TABLE 9.--WOODLAND HARVESTING AND REGENERATION ACTIVITIES--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
GdC2 Gilpin	Slight	Moderate: slope.	Slight	Slight.
GeD2: Gilpin	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Upshur	Severe: slippage.	Severe: slope.	Moderate: slope.	Moderate: slope.
GeE2: Gilpin	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Moderate: slope.
Upshur	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
GfA, GfB, GfC2 Glenford	Severe: low strength.	Severe: low strength.	Slight	Slight.
GtC2: Guernsey	Severe: slippage.	Severe: slippage.	Slight	Slight.
Upshur	Severe: slippage.	Severe: slippage.	Moderate: slope.	Moderate: slope.
GtD2: Guernsey	Severe: slippage.	Severe: slippage, slope.	Moderate: slope.	Moderate: slope.
Upshur	Severe: slippage.	Severe: slippage, slope.	Moderate: slope.	Moderate: slope.
HaC2 Homewood	Moderate: low strength.	Moderate: slope.	Slight	Slight.
HaD2 Homewood	Moderate: slope, low strength.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.
JtA Jimtown	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
KeB, KeC2 Keene	Severe: low strength.	Severe: slope.	Slight	Slight.
Km Killbuck	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
LaC Lakin	Slight	Moderate: slope.	Slight	Slight.
LcD: Lakin	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.

TABLE 9.--WOODLAND HARVESTING AND REGENERATION ACTIVITIES--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
LcD:				
Alford	Severe: low strength, slope.	Severe: slope, low strength.	Moderate: slope.	Moderate: slope.
Lk Lindside	Severe: flooding.	Severe: flooding.	Slight	Slight.
Lm Lobdell	Moderate: low strength.	Moderate: low strength.	Slight	Slight.
Lo Lorain	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
LpC2 Lowell	Severe: low strength.	Moderate: slope.	Slight	Slight.
LpD2 Lowell	Severe: slippage, low strength.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.
LrE2:				
Lowell	Severe: low strength.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.
Gilpin	Moderate: slope, depth to rock.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.
LrF:				
Lowell	Severe: low strength, slope, slippage.	Severe: low strength, slope.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope.	Severe: low strength, slope.	Severe: slope.	Severe: slope.
Lu Luray	Severe: wetness.	Severe: low strength.	Severe: wetness.	Severe: wetness.
MaB, MbC2 Markland	Severe: low strength.	Severe: low strength.	Slight	Slight.
McD2:				
Markland	Severe: low strength.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.
Glenford	Moderate: slope.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.
MdA McGary	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness.
Me Melvin	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.

TABLE 9.--WOODLAND HARVESTING AND REGENERATION ACTIVITIES--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
MkD Mertz	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
MrB Morristown	Slight	Slight	Slight	Slight.
MrD Morristown	Severe: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
MrF Morristown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MsB, MsC Morristown	Slight	Slight	Slight	Slight.
MsD Morristown	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
MsE Morristown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Ne Newark	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.
No Nolin	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.
OmB, OmC Omulga	Severe: low strength.	Severe: low strength.	Slight	Slight.
RaB Rawson	Slight	Slight	Slight	Slight.
RfC Rigley	Slight	Moderate: slope.	Slight	Slight.
RgD Rigley	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
RhE: Rigley	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Coshocton	Severe: low strength.	Severe: slope.	Moderate: slope.	Moderate: slope.
RoF Rodman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Se Sebring	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
St Stonelick	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ta Tioga	Slight	Slight	Slight	Slight.
Tf Tioga	Moderate: flooding.	Moderate: flooding.	Moderate: flooding.	Moderate: flooding.
WaB Watertown	Slight	Slight	Slight	Slight.

TABLE 9.--WOODLAND HARVESTING AND REGENERATION ACTIVITIES--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
WaC Watertown	Slight	Moderate: slope.	Slight	Slight.
WhB Wellston	Moderate: low strength.	Moderate: low strength.	Slight	Slight.
WhC2 Wellston	Moderate: low strength.	Moderate: low strength, slope.	Slight	Slight.
WmB, WmC2 Westgate	Severe: low strength.	Severe: low strength.	Slight	Slight.
WtC2 Westmoreland	Moderate: low strength.	Moderate: slope.	Slight	Slight.
WtD2, WtE Westmoreland	Moderate: low strength, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
WuC2: Westmoreland	Moderate: low strength.	Moderate: slope.	Slight	Slight.
Guernsey	Severe: low strength.	Severe: slippage.	Slight	Slight.
WuD2: Westmoreland	Moderate: low strength, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Guernsey	Severe: slippage.	Severe: slope, slippage.	Moderate: slope.	Moderate: slope.
WuE2: Westmoreland	Moderate: slope.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.
Guernsey	Severe: slippage.	Severe: slope, slippage.	Moderate: slope.	Moderate: slope.
ZnB, ZnC2 Zanesville	Severe: low strength.	Severe: low strength.	Slight	Slight.

TABLE 10.--CHRISTMAS TREE SUITABILITY RATINGS*

Soil name and map symbol	White pine	Scotch pine	Austrian pine	White spruce	Norway spruce	Blue spruce	Douglas-fir	Fraser fir	Balsam fir
AaB, AaC2, AaD2---- Aaron	S-7	S-7	S-7	S-7	S-7	L-7	L-3	L-3	L-3
AcB---- Aaron-Upshur	S-7	S-7	S-7	S-7	S-7	L-7	L-3	L-3	L-3
AfB, AfC2---- Alford	S	S	S	S	S	S	S	S	S
BeB, BeD2, BeE---- Berks	S-5	S-5	S-5	L-2	L-2	L-2	L-2	L-2	L-2
BkF---- Berks-Westmoreland	S-5	S-5	S-5	L-2	L-2	L-2	L-2	L-2	L-2
BoB, BoD, BpF---- Bethesda	L-5	L-5	L-5	N-5	N-5	N-5	N-5	N-5	N-5
BsC2, BsE---- Brookside	S-7	S-7	S-7	S-7	S-7	L-1,7	L-3	L-3	S-1,7
Cb---- Chagrin	S	S	S	S-1	S-1	S-1	S-1	S-1	S-1
CcA, CcB---- Chavies	S	S	S	S	S	S	S	S	S
CeA, CeB---- Chili	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5
ChA, ChB, ChC---- Chili	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5
CkA---- Cidermill	S	S	S	S	S	S	S	S	S
CnB, CnC2---- Cincinnati	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4
CpC2---- Clarksburg	S	S	S	S-1	S-1	L-1	L-3	L-3	S-1
CrC---- Claysville-Guernsey	L-3	L-3	L-3	L-3	L-3	L-3	L-1,3	L-1,3	L-1,3
CsC2, CsD---- Coshocton	S	S	S	S-1	S-1	L-1	L-3	L-3	S-1
CtE---- Coshocton-Westmoreland	S	S	S	S	S	L	L-3	L-3	S
Ds---- Dumps and Pits	NR	NR	NR	NR	NR	NR	NR	NR	NR
FaB, FaD, FaE, FbF---- Fairpoint	L-2	L-2	L-2	N-2	N-2	N-2	N-2	N-2	N-2
FcA, FcB---- Fitchville	L-3	L-3	L-3	L-3	L-3	L-3	N-3	N-3	N-3

* See ratings guide at end of table.

TABLE 10.--CHRISTMAS TREE SUITABILITY RATINGS*--Continued

Soil name and map symbol	White pine	Scotch pine	Austrian pine	White spruce	Norway spruce	Blue spruce	Douglas-fir	Fraser fir	Balsam fir
FkB---- Frankstown Variant-Mertz	S	S	S	L-2	L-2	L-2	L-2	L-2	L-2
GdB, GdC2---- Gilpin	S	S	S	L-2	L-2	L-2	L-2	L-2	L-2
GeD2, GeE2---- Gilpin-Upshur	S-7	S-7	S-7	L-7	L-7	L-7	L-7	L-7	L-7
GfA, GfB, GfC2---- Glenford	S	S	S	S	S	L-3	L-3	L-3	S
GtC2, GtD2---- Guernsey-Upshur	S-6,7	S-6,7	S-6,7	S-6,7	S-6,7	L-6,7	L	L	L-6,7
HaC2, HaD2---- Homewood	S	S	S	S	S	L-3	L-3	L-3	S
JtA---- Jimtown	L-3	L-3	L-3	L-3	L-3	L-3	L-3	L-3	L-3
KeB, KeC2---- Keene	S-4	S-4	S-4	S-4	S-4	L-3	L-3	L-3	S-4
Km---- Killbuck	L-3	L-3	L-3	L-3	L-3	L-3	L-1,3	L-1,3	L-1,3
LaC---- Lakin	L-2	L-2	L-2	L-2	L-2	L-2	L-2	L-2	L-2
LcD---- Lakin-Alford	S	S	S	L-5	L-5	L-5	L-5	L-5	L-5
Lk---- Lindside	S	S	S	S	S	L-3	L-3	L-3	S
Lm---- Lobdell	S	S	S	S	S	L-3	L-3	L-3	S
Lo---- Lorain	L-3	L-3	L-3	L-3	L-3	L-3	N	N	L-1,3
LpC2, LpD2---- Lowell	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7
LrE2, LrF---- Lowell-Gilpin	S-5,7	S-5,7	S-5,7	S-5,7	S-5,7	S-5,7	S-5,7	S-5,7	S-5,7
Lu---- Luray	L-3	L-3	L-3	L-3	L-3	L-3	L-1,3	L-1,3	L-1,3
MaB, MbC2---- Markland	S-7	S-7	S-7	S-1,7	S-1,7	S-1,3,7	L-3	L-3	S-1,7
McD2---- Markland-Glenford	S-7	S-7	S-7	S-7	S-7	L-3,7	L-3,7	L-3,7	S-7
MdA---- McGary	L-3	L-3	L-3	L-3	L-3	L-3	N-3	N-3	L-1,3
Me---- Melvin	L-3	L-3	L-3	L-3	L-3	L-3	N-3	N-3	L-1,3

* See ratings guide at end of table.

TABLE 10.--CHRISTMAS TREE SUITABILITY RATINGS*--Continued

Soil name and map symbol	White pine	Scotch pine	Austrian pine	White spruce	Norway spruce	Blue spruce	Douglas-fir	Fraser fir	Balsam fir
MkD---------- Mertz	S-5	S-5	S-5	L-2	L-2	L-2	L-2	L-2	L-2
MrB, MrD, MrF, MsB, MsC, MsD, MsE------- Morristown	L-2	L-2	L-2	N-2	N-2	N-2	N-2	N-2	N-2
Ne---------- Newark	L-3	L-3	L-3	L-3	L-3	L-3	N-3	N-3	L-1,3
No---------- Nolin	S	S	S	S-1	S-1	S-1	S-1	S-1	S-1
OmB, OmC---------- Omulga	S-4	S-4	S-4	S-1,4	S-1,4	L-1,4	L-3,4	L-3,4	S-1,4
RaB---------- Rawson	S-4	S-4	S-4	S-1,4	S-1,4	L-1,3,5	L-3,4	L-3,4	S-1,4
RfC, RgD---------- Rigley	S-5	S-5	S-5	L-5	L-5	L-5	L-5	L-5	L-5
RhE---------- Rigley-Coshocton	S-6	S-6	S-6	L-6	L-6	L-6	N-3	N-3	L-6
RoF---------- Rodman	L-2	L-2	L-2	N-2	N-2	N-2	N-2	N-2	N-2
Se---------- Sebring	L-3	L-3	L-3	L-3	L-3	L-3	N-3	N-3	L-3
St---------- Stonelick	S-5	S-5	S-5	S-1,5	S-1,5	S-1,5	S-1,5	S-1,5	S-1,5
Ta, Tf---------- Tioga	S	S	S	S-1	S-1	S-1	S-1	S-1	S-1
Ud, Ug, Uh, Uk------- Udorthents	L-5	L-5	L-5	N-2	N-2	N-2	N-2	N-2	N-2
UsB---------- Urban land-Glenford	NR	NR	NR	NR	NR	NR	NR	NR	NR
UtA---------- Urban land-Nolin	NR	NR	NR	NR	NR	NR	NR	NR	NR
UvB---------- Urban land-Watertown	NR	NR	NR	NR	NR	NR	NR	NR	NR
UwC---------- Urban land-Wellston	NR	NR	NR	NR	NR	NR	NR	NR	NR
WaB, WaC---------- Watertown	S-5	S-5	S-5	L-2	L-2	L-2	L-2	L-2	L-2
WhB, WhC2---------- Wellston	S	S	S	S	S	S	S	S	S
WmB, WmC2---------- Westgate	S-4	S-4	S-4	S-1,4	S-1,4	L-1,3,4	L-3,4	L-3,4	S-1,4
WtC2, WtD2, WtE------ Westmoreland	S	S	S	S	S	S	S	S	S

* See ratings guide at end of table.

TABLE 10.--CHRISTMAS TREE SUITABILITY RATINGS*--Continued

Soil name and map symbol	White pine	Scotch pine	Austrian pine	White spruce	Norway spruce	Blue spruce	Douglas-fir	Fraser fir	Balsam fir
WuC2, WuD2, WuE2----- Westmoreland-Guernsey	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6
WvD----- Westmoreland-Urban land	NR	NR	NR	NR	NR	NR	NR	NR	NR
ZnB, ZnC2----- Zanesville	S-4	S-4	S-4	S-4	S-4	L-3,4	L-3,4	L-3,4	S-4

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S = Suitable: Growth and/or foliage quality should be good to excellent with proper management.
L = Limited suitability: The species will probably grow, but there may be reductions in growth and/or foliage quality, even with good management.
N = Not suitable: Survival, growth, and/or foliage quality will probably be so impaired that the species should not be planted.
NR = Not rated for Christmas tree production.

1--Hazard of frost
2--Hazard of drought
3--Seasonal wetness
4--Potential root damage from frost heave
5--Moisture shortages
6--Seep spots
7--Cracking

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
AaB, AaC2, AaD2---Aaron	---	Washington hawthorn, Amur honeysuckle, Amur privet, American cranberrybush, eastern redcedar, arrowwood.	Green ash, Osage-orange, Austrian pine.	Eastern white pine, pin oak.	---
AcB:					
Aaron----------	---	Washington hawthorn, Amur honeysuckle, Amur privet, American cranberrybush, eastern redcedar, arrowwood.	Green ash, Osage-orange, Austrian pine.	Eastern white pine, pin oak.	---
Upshur----------	---	American cranberrybush, Amur honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osage-orange, Austrian pine.	Pin oak, eastern white pine.	---
AfB, AfC2--------- Alford	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
BeB, BeD2, BeE---- Berks	Siberian peashrub	Amur honeysuckle, lilac, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
BkF:					
Berks----------	Siberian peashrub	Amur honeysuckle, lilac, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Westmoreland-----	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
BoB, BoD, BpF. Bethesda					
BsC2---------- Brookside	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
BsE. Brookside					
Cb---------- Chagrin	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
CcA, CcB---------- Chavies	---	Amur honeysuckle, Amur privet, American cranberrybush, Washington hawthorn.	Northern whitecedar, Osage-orange, Austrian pine, eastern redcedar.	Red pine, eastern white pine, Norway spruce.	---
CeA, CeB, ChA, ChB, ChC--------- Chili	Siberian peashrub	Lilac, Amur honeysuckle, Washington hawthorn, radiant crabapple, eastern redcedar.	Eastern white pine, jack pine, red pine, Austrian pine.	---	---
CkA---------- Cidermill	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Blue spruce, Washington hawthorn, white fir, northern whitecedar.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
CnB, CnC2--------- Cincinnati	---	Eastern redcedar, Washington hawthorn, Amur privet, Amur honeysuckle, arrowwood, American cranberrybush.	Green ash, Austrian pine, Osage-orange.	Pin oak, eastern white pine.	---
CpC2---------- Clarksburg	---	American cranberrybush, Amur honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osage-orange, Austrian pine.	Pin oak, eastern white pine.	---

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
CrC:					
Claysville	---	Amur privet, American cranberrybush, eastern redcedar, arrowwood, Washington hawthorn, Amur honeysuckle.	Osage-orange, Austrian pine, green ash.	Pin oak	---
Guernsey	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Eastern white pine, pin oak.	---
CsC2, CsD Coshocton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce	Pin oak, eastern white pine.
CtE:					
Coshocton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce	Pin oak, eastern white pine.
Westmoreland	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
Ds. Dumps and Pits					
FaB, FaD, FaE, FbF. Fairpoint					
FcA, FcB Fitchville	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
FkB: Frankstown Variant	Siberian peashrub	Lilac, Amur honeysuckle, Washington hawthorn, radiant crabapple, eastern redcedar.	Eastern white pine, jack pine, red pine, Austrian pine.	---	---
Mertz.					
GdB, GdC2 Gilpin	Siberian peashrub	Amur honeysuckle, lilac, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
GeD2, GeE2: Gilpin	Siberian peashrub	Amur honeysuckle, lilac, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Upshur	---	American cranberrybush, Amur honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osage-orange, Austrian pine.	Pin oak, eastern white pine.	---
GfA, GfB, GfC2 Glenford	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak
GtC2, GtD2: Guernsey	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Eastern white pine, pin oak.	---
Upshur	---	American cranberrybush, Amur honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osage-orange, Austrian pine.	Pin oak, eastern white pine.	---

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
HaC2, HaD2-------- Homewood	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Eastern white pine, pin oak.	---
JtA--------------- Jimtown	---	Amur honeysuckle, silky dogwood, American cranberrybush, Amur privet.	Northern whitecedar, blue spruce, Austrian pine, white fir, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
KeB, KeC2--------- Keene	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern whitecedar, Austrian pine, Washington hawthorn, white fir, blue spruce.	Norway spruce-----	Eastern white pine, pin oak.
Km---------------- Killbuck	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
LaC--------------- Lakin	Siberian peashrub	Amur honeysuckle, lilac, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine.	Eastern white pine	---
LcD: Lakin------------	Siberian peashrub	Amur honeysuckle, lilac, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine.	Eastern white pine	---
Alford----------- 	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Lk---------------- Lindside	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
Lm---------- Lobdell	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
Lo---------- Lorain	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
LpC2, LpD2-------- Lowell	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Norway spruce-----	Austrian pine, pin oak, eastern white pine.
LrE2, LrF: Lowell----------	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Norway spruce-----	Austrian pine, pin oak, eastern white pine.
Gilpin----------	Siberian peashrub	Amur honeysuckle, lilac, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Lu---------- Luray	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
MaB, MbC2--------- Markland	---	Arrowwood, Washington hawthorn, eastern redcedar, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
McD2: Markland---------	---	Arrowwood, Washington hawthorn, eastern redcedar, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
McD2: Glenford	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
MdA McGary	---	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
Me. Melvin					
MkD. Mertz					
MrB, MrD, MrF, MsB, MsC, MsD, MsE Morristown	Siberian peashrub	Washington hawthorn, eastern redcedar, jack pine, Russian-olive, Osage-orange.	Honeylocust, northern catalpa.	---	---
Ne Newark	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
No Nolin	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
OmB, OmC Omulga	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Eastern white pine, pin oak.	---

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
RaB---------- Rawson	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
RfC, RgD---------- Rigley	---	American cranberrybush, Amur honeysuckle, Amur privet, Washington hawthorn.	Eastern redcedar, Osage-orange, northern whitecedar, Austrian pine.	Red pine, Norway spruce, eastern white pine.	---
RhE: Rigley----------	---	American cranberrybush, Amur honeysuckle, Amur privet, Washington hawthorn.	Eastern redcedar, Osage-orange, northern whitecedar, Austrian pine.	Red pine, Norway spruce, eastern white pine.	---
Coshocton--------	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce-----	Pin oak, eastern white pine.
RoF---------- Rodman	Siberian peashrub	Silky dogwood, gray dogwood, Amur honeysuckle, Washington hawthorn, radiant crabapple, eastern redcedar.	Black locust, jack pine, Virginia pine.	---	---
Se---------- Sebring	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern whitecedar, Austrian pine, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
St---------- Stonelick	---	Siberian peashrub	Green ash, eastern redcedar, Osage-orange, northern whitecedar, nannyberry viburnum, white spruce, Washington hawthorn.	Black willow------	---
Ta, Tf---------- Tioga	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
Ud, Ug, Uh. Udorthents					
Uk: Udorthents.					
Pits.					
UsB: Urban land.					
Glenford---------	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
UtA: Urban land.					
Nolin----------	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
UvB: Urban land.					
Watertown--------	---	American cranberrybush, Amur privet, Amur honeysuckle, Washington hawthorn.	Northern whitecedar, eastern redcedar, Osage-orange, Austrian pine.	Eastern white pine, Norway spruce, red pine.	---
UwC: Urban land.					
Wellston---------	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
WaB, WaC---------- Watertown	---	American cranberrybush, Amur privet, Amur honeysuckle, Washington hawthorn.	Northern whitecedar, eastern redcedar, Osage-orange, Austrian pine.	Eastern white pine, Norway spruce, red pine.	---
WhB, WhC2--------- Wellston	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 11.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
WmB, WmC2--------- Westgate	---	Washington hawthorn, Amur honeysuckle, Amur privet, American cranberrybush, eastern redcedar, arrowwood.	Green ash, Osage-orange, Austrian pine.	Eastern white pine, pin oak.	---
WtC2, WtD2, WtE--- Westmoreland	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
WuC2, WuD2, WuE2: Westmoreland-----	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
Guernsey---------	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Eastern white pine, pin oak.	---
WvD: Westmoreland-----	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
Urban land.					
ZnB, ZnC2--------- Zanesville	---	American cranberrybush, Amur honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osage-orange, Austrian pine.	Pin oak, eastern white pine.	---

TABLE 12.--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
AaB Aaron	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
AaC2 Aaron	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
AaD2 Aaron	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
AcB: Aaron	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
Upshur	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.	Slight.
AfB Alford	Slight	Slight	Moderate: slope.	Slight	Slight.
AfC2 Alford	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
BeB Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Severe: small stones.
BeD2 Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope, small stones.
BeE Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
BkF: Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
BoB Bethesda	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Slight	Severe: droughty.
BoD Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BpF Bethesda	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, droughty, slope.
BsC2 Brookside	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
BsE Brookside	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Cb Chagrin	Severe: flooding.	Slight	Moderate: small stones.	Slight	Slight.
CcA Chavies	Slight	Slight	Moderate: small stones.	Slight	Slight.
CcB Chavies	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
CeA Chili	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
CeB Chili	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
ChA, ChB Chili	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
ChC Chili	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty, slope.
CkA Cidermill	Slight	Slight	Slight	Slight	Slight.
CnB Cincinnati	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
CnC2 Cincinnati	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
CpC2 Clarksburg	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
CrC: Claysville	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CrC: Guernsey	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
CsC2: Coshocton	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
CsD: Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
CtE: Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Ds. Dumps and Pits					
FaB: Fairpoint	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Severe: droughty.
FaD: Fairpoint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: droughty, slope.
FaE: Fairpoint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: droughty, slope.
FbF: Fairpoint	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, droughty, slope.
FcA, FcB: Fitchville	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
FkB: Frankstown Variant	Slight	Slight	Moderate: slope, small stones, thin layer.	Slight	Moderate: large stones, thin layer, area reclaim.
Mertz	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Moderate: small stones.
GdB: Gilpin	Slight	Slight	Moderate: small stones, slope.	Slight	Moderate: thin layer.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GdC2 Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
GeD2: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Upshur	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
GeE2: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Upshur	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
GfA Glenford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Slight.
GfB Glenford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Slight.
GfC2 Glenford	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
GtC2: Guernsey	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
Upshur	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
GtD2: Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Upshur	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
HaC2 Homewood	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
HaD2 Homewood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
JtA Jimtown	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
KeB Keene	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness.
KeC2 Keene	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Km Killbuck	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
LaC Lakin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, droughty.
LcD: Lakin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Lk Lindside	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: flooding.
Lm Lobdell	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
Lo Lorain	Severe: ponding, too clayey.	Severe: ponding, too clayey.	Severe: too clayey, ponding.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
LpC2 Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
LpD2 Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
LrE2, LrF: Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
Lu Luray	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
MaB Markland	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MbC2 Markland	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
McD2: Markland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Glenford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
MdA McGary	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Me Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
MkD Mertz	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
MrB Morristown	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Slight	Severe: droughty.
MrD Morristown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
MrF Morristown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
MsB Morristown	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: erodes easily.	Moderate: droughty.
MsC Morristown	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: droughty, slope.
MsD Morristown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
MsE Morristown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Ne Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, erodes easily.	Severe: wetness, flooding.
No Nolin	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OmB Omulga	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
OmC Omulga	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
RaB Rawson	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
RfC Rigley	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
RgD Rigley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
RhE: Rigley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
RoF Rodman	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
Se Sebring	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
St Stonelick	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Ta Tioga	Severe: flooding.	Slight	Slight	Severe: erodes easily.	Moderate: droughty.
Tf Tioga	Severe: flooding.	Slight	Moderate: flooding.	Severe: erodes easily.	Moderate: flooding.
Ud, Ug, Uh. Udorthents					
Uk: Udorthents.					
Pits.					
UsB: Urban land.					

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
UsB:					
Glenford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Slight.
UtA:					
Urban land.					
Nolin	Severe: flooding.	Slight	Slight	Slight	Slight.
UvB:					
Urban land.					
Watertown	Slight	Slight	Severe: slope.	Slight	Moderate: droughty.
UwC:					
Urban land.					
Wellston	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WaB Watertown	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
WaC Watertown	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
WhB Wellston	Slight	Slight	Moderate: slope.	Slight	Slight.
WhC2 Wellston	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WmB Westgate	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
WmC2 Westgate	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WtC2 Westmoreland	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WtD2 Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
WtE Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
WuC2:					
Westmoreland	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WuC2:					
Guernsey	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
WuD2:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
WuE2:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
WvD:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Urban land.					
ZnB Zanesville	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Slight.
ZnC2 Zanesville	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

TABLE 13.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaB---- Aaron	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AaC2---- Aaron	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AaD2---- Aaron	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AcB:										
Aaron----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Upshur----	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
AfB---- Alford	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AfC2---- Alford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BeB---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BeD2---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BeE---- Berks	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
BkF:										
Berks----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Westmoreland----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
BoB, BoD, BpF---- Bethesda	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
BsC2---- Brookside	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BsE---- Brookside	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Cb---- Chagrin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CcA, CcB---- Chavies	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
CeA---- Chili	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 13.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CeB---- Chili	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ChA---- Chili	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChB, ChC---- Chili	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CkA---- Cidermill	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CnB---- Cincinnati	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CnC2---- Cincinnati	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CpC2---- Clarksburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CrC:										
Claysville----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Guernsey----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CsC2---- Coshocton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CsD---- Coshocton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CtE:										
Coshocton----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Westmoreland----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ds. Dumps and Pits										
FaB---- Fairpoint	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
FaD---- Fairpoint	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
FaE---- Fairpoint	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
FbF---- Fairpoint	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
FcA---- Fitchville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 13.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
FcB---------- Fitchville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FkB:										
Frankstown Variant	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Mertz----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GdB---------- Gilpin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
GdC2---------- Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
GeD2:										
Gilpin----------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Upshur----------	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GeE2:										
Gilpin----------	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Upshur----------	Very poor.	Fair	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
GfA---------- Glenford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
GfB---------- Glenford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GfC2---------- Glenford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GtC2:										
Guernsey----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Upshur----------	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GtD2:										
Guernsey----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Upshur----------	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HaC2---------- Homewood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HaD2---------- Homewood	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 13.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
JtA---- Jimtown	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
KeB---- Keene	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KeC2---- Keene	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Km---- Killbuck	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
LaC---- Lakin	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
LcD:										
Lakin----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Alford----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lk---- Lindside	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Lm---- Lobdell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Lo---- Lorain	Fair	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
LpC2---- Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LpD2---- Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LrE2:										
Lowell----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Gilpin----	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LrF:										
Lowell----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Gilpin----	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Lu---- Luray	Fair	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
MaB---- Markland	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MbC2---- Markland	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 13.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
McD2:										
Markland	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Glenford	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MdA McGary	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Me Melvin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MkD Mertz	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MrB, MrD, MrF Morristown	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
MsB Morristown	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
MsC Morristown	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MsD Morristown	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MsE Morristown	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
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.
OmB Omulga	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OmC Omulga	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RaB Rawson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RfC Rigley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RgD Rigley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RhE:										
Rigley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Coshocton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

TABLE 13.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
RoF---------- Rodman	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Se---------- Sebring	Fair	Fair	Good	Good	Good	Good	Good	Fair	Good	Good.
St---------- Stonelick	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ta, Tf---------- Tioga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ud, Ug, Uh. Udorthents										
Uk: Udorthents.										
Pits.										
UsB: Urban land.										
Glenford----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UtA: Urban land.										
Nolin----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UvB: Urban land.										
Watertown---------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
UwC: Urban land.										
Wellston----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaB---------- Watertown	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
WaC---------- Watertown	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
WhB---------- Wellston	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WhC2---------- Wellston	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WmB---------- Westgate	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 13.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WmC2---------- Westgate	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WtC2---------- Westmoreland	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WtD2---------- Westmoreland	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WtE---------- Westmoreland	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WuC2: Westmoreland------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Guernsey----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WuD2: Westmoreland------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Guernsey----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WuE2: Westmoreland------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Guernsey----------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WvD: Westmoreland------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Urban land.										
ZnB---------- Zanesville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ZnC2---------- Zanesville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 14.--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
AaB---------- Aaron	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
AaC2---------- Aaron	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, slope.
AaD2---------- Aaron	Severe: wetness, slope.	Severe: shrink-swell, slope, slippage.	Severe: wetness, slope, shrink-swell, slippage.	Severe: shrink-swell, slope, slippage.	Severe: shrink-swell, low strength, slope, slippage.	Severe: slope.
AcB:						
Aaron----------	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Upshur----------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
AfB---------- Alford	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
AfC2---------- Alford	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
BeB---------- Berks	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Slight---------	Severe: small stones.
BeD2, BeE--------- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
BkF:						
Berks----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Westmoreland-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BoB---------- Bethesda	Moderate: dense layer, large stones, slope.	Severe: unstable fill.	Severe: unstable fill.	Severe: slope, unstable fill.	Severe: unstable fill.	Severe: droughty.
BoD---------- Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.

TABLE 14.--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
BpF---------- Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: large stones, droughty, slope.
BsC2---------- Brookside	Moderate: too clayey, wetness, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell, slippage.	Severe: low strength, shrink-swell.	Moderate: slope.
BsE---------- Brookside	Severe: slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, slippage, shrink-swell.	Severe: slope.
Cb---------- Chagrin	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Slight.
CcA---------- Chavies	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
CcB---------- Chavies	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
CeA---------- Chili	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: droughty.
CeB---------- Chili	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
ChA---------- Chili	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: small stones, droughty.
ChB---------- Chili	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones, droughty.
ChC---------- Chili	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
CkA---------- Cidermill	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: low strength, frost action.	Slight.
CnB---------- Cincinnati	Moderate: dense layer, wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Severe: low strength, frost action.	Slight.
CnC2---------- Cincinnati	Moderate: dense layer, wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
CpC2---------- Clarksburg	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness, slope.	Moderate: wetness, slope.

TABLE 14.--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
CrC:						
Claysville	Severe: wetness, slope, slippage.	Severe: wetness, shrink-swell, slippage.	Severe: wetness, shrink-swell, slippage.	Severe: wetness, shrink-swell, slippage.	Severe: shrink-swell, low strength, slippage.	Moderate: wetness, slope.
Guernsey	Severe: wetness, slippage.	Severe: shrink-swell, slippage.	Severe: wetness, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, low strength, slippage.	Moderate: slope, wetness.
CsC2--- Coshocton	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
CsD--- Coshocton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
CtE:						
Coshocton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ds. Dumps and Pits						
FaB--- Fairpoint	Slight	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: droughty.
FaD, FaE--- Fairpoint	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
FbF--- Fairpoint	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: small stones, droughty, slope.
FcA, FcB--- Fitchville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
FkB:						
Frankstown Variant	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, low strength, frost action.	Moderate: large stones, thin layer, area reclaim.
Mertz	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.	Moderate: small stones.

TABLE 14.--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
GdB Gilpin	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: thin layer.
GdC2 Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
GeD2, GeE2: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Upshur	Severe: slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, low strength.	Severe: slope.
GfA Glenford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
GfB Glenford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
GfC2 Glenford	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
GtC2: Guernsey	Severe: wetness, slippage.	Severe: shrink-swell, slippage.	Severe: wetness, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, low strength.	Moderate: slope, wetness.
Upshur	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, low strength.	Moderate: slope.
GtD2: Guernsey	Severe: wetness, slope, slippage.	Severe: slope, slippage, shrink-swell.	Severe: wetness, slope, shrink-swell.	Severe: slope, slippage, shrink-swell.	Severe: shrink-swell, low strength, slope.	Severe: slope.
Upshur	Severe: slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, low strength.	Severe: slope.
HaC2 Homewood	Moderate: dense layer, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
HaD2 Homewood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 14.--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
JtA---------- Jimtown	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
KeB---------- Keene	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
KeC2---------- Keene	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
Km---------- Killbuck	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness.
LaC---------- Lakin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
LcD:						
Lakin----------	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Alford----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Lk---------- Lindside	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Lm---------- Lobdell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
Lo---------- Lorain	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, too clayey.
LpC2---------- Lowell	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, depth to rock, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
LpD2---------- Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

TABLE 14.--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
LrE2, LrF: Lowell	Severe: slope.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: low strength, slope, slippage.	Severe: slope.
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lu Luray	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
MaB Markland	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
MbC2 Markland	Moderate: too clayey, wetness, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
McD2: Markland	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
Glenford	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
MdA McGary	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Me Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
MkD Mertz	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MrB Morristown	Moderate: dense layer, slope.	Severe: unstable fill.	Severe: unstable fill.	Severe: slope, unstable fill.	Severe: unstable fill.	Severe: droughty.
MrD, MrF Morristown	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
MsB Morristown	Moderate: dense layer.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Moderate: droughty.
MsC Morristown	Moderate: dense layer, slope.	Severe: unstable fill.	Severe: unstable fill.	Severe: slope, unstable fill.	Severe: unstable fill.	Moderate: droughty, slope.

TABLE 14.--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
MsD, MsE---------- Morristown	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope.
Ne---------- Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
No---------- Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
OmB---------- Omulga	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
OmC---------- Omulga	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
RaB---------- Rawson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Slight.
RfC---------- Rigley	Moderate: slope, cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
RgD---------- Rigley	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RhE:						
Rigley----------	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Coshocton--------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
RoF---------- Rodman	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Se---------- Sebring	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
St---------- Stonelick	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Ta---------- Tioga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Moderate: droughty.

TABLE 14.--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
Tf---------- Tioga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Ud, Ug, Uh. Udorthents						
Uk: Udorthents.						
Pits.						
UsB: Urban land.						
Glenford---------	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
UtA: Urban land.						
Nolin----------	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
UvB: Urban land.						
Watertown--------	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
UwC: Urban land.						
Wellston---------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
WaB---------- Watertown	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
WaC---------- Watertown	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope.
WhB---------- Wellston	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
WhC2---------- Wellston	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
WmB---------- Westgate	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
WmC2---------- Westgate	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.

TABLE 14.--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
WtC2---------- Westmoreland	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
WtD2, WtE---------- Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WuC2: Westmoreland-----	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
Guernsey---------	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: slope, wetness.
WuD2, WuE2: Westmoreland-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Guernsey---------	Severe: wetness, slope, slippage.	Severe: slope, slippage, shrink-swell.	Severe: wetness, slope, shrink-swell.	Severe: slope, slippage, shrink-swell.	Severe: shrink-swell, low strength, slope.	Severe: slope.
WvD: Westmoreland-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Urban land.						
ZnB---------- Zanesville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength, frost action.	Slight.
ZnC2---------- Zanesville	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.

TABLE 15.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaB Aaron	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
AaC2 Aaron	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
AaD2 Aaron	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: depth to rock, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
AcB: Aaron	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
Upshur	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
AfB Alford	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
AfC2 Alford	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
BeB Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BeD2, BeE Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
BkF: Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
BoB Bethesda	Severe: percs slowly, unstable fill.	Severe: slope, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.

TABLE 15.--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
BoD, BpF---------- Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
BsC2---------- Brookside	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: too clayey.	Moderate: slope, wetness.	Poor: too clayey, hard to pack.
BsE---------- Brookside	Severe: slope, percs slowly, wetness.	Severe: slope, wetness, slippage.	Severe: slope, too clayey, slippage.	Severe: slope, slippage.	Poor: slope, too clayey, hard to pack.
Cb---------- Chagrin	Moderate: flooding, wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: flooding, wetness.	Fair: thin layer.
CcA, CcB---------- Chavies	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
CeA, CeB, ChA, ChB-- Chili	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones.
ChC---------- Chili	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones, slope.
CkA---------- Cidermill	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, thin layer.
CnB---------- Cincinnati	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
CnC2---------- Cincinnati	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
CpC2---------- Clarksburg	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: slope, small stones.
CrC: Claysville---------	Severe: wetness, percs slowly, slippage.	Severe: slope, slippage.	Severe: wetness, too clayey.	Severe: wetness, slippage.	Poor: too clayey, hard to pack.
Guernsey----------	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
CsC2---------- Coshocton	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, wetness.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.

TABLE 15.--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
CsD---------- Coshocton	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
CtE: Coshocton----------	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Westmoreland-------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Ds. Dumps and Pits					
FaB---------- Fairpoint	Severe: percs slowly, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
FaD, FaE, FbF------- Fairpoint	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
FcA, FcB---------- Fitchville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
FkB: Frankstown Variant-	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
Mertz----------	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey, large stones.	Slight----------	Poor: small stones.
GdB---------- Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GdC2---------- Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GeD2, GeE2: Gilpin----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Upshur----------	Severe: slope, percs slowly, slippage.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope, slippage.	Poor: slope, too clayey, hard to pack.

TABLE 15.--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
GfA, GfB---------- Glenford	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
GfC2---------- Glenford	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
GtC2: Guernsey----------	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
Upshur----------	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
GtD2: Guernsey----------	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Upshur----------	Severe: slope, percs slowly, slippage.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope, slippage.	Poor: slope, too clayey, hard to pack.
HaC2---------- Homewood	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
HaD2---------- Homewood	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
JtA---------- Jimtown	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, small stones, wetness.
KeB---------- Keene	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, wetness.	Moderate: wetness.	Poor: too clayey, hard to pack.
KeC2---------- Keene	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, wetness.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
Km---------- Killbuck	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
LaC---------- Lakin	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.

TABLE 15.--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
LcD:					
Lakin	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, seepage.
Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Lk Lindside	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Lm Lobdell	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: small stones.
Lo Lorain	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
LpC2 Lowell	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock, too clayey.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
LpD2 Lowell	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
LrE2, LrF:					
Lowell	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Lu Luray	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
MaB Markland	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
MbC2 Markland	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
McD2:					
Markland	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

TABLE 15.--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
McD2: Glenford	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: slope.
MdA McGary	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Me Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MkD Mertz	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
MrB Morristown	Severe: percs slowly, unstable fill.	Severe: slope, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
MrD, MrF Morristown	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
MsB Morristown	Severe: percs slowly, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
MsC Morristown	Severe: percs slowly, unstable fill.	Severe: slope, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
MsD, MsE Morristown	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
Ne Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
No Nolin	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey.
OmB Omulga	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
OmC Omulga	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
RaB Rawson	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.

TABLE 15.--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
RfC---------- Rigley	Moderate: slope, poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
RgD---------- Rigley	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
RhE:					
Rigley----------	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Coshocton----------	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
RoF---------- Rodman	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Se---------- Sebring	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
St---------- Stonelick	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage.
Ta---------- Tioga	Severe: poor filter, wetness.	Severe: flooding, seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: thin layer.
Tf---------- Tioga	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: thin layer.
Ud, Ug, Uh. Udorthents					
Uk: Udorthents.					
Pits.					
UsB: Urban land.					
Glenford----------	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
UtA: Urban land.					

TABLE 15.--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
UtA:					
Nolin	Moderate: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
UvB:					
Urban land.					
Watertown	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
UwC:					
Urban land.					
Wellston	Moderate: thin layer, seepage, slope.	Severe: slope.	Severe: seepage.	Moderate: slope.	Fair: area reclaim, too clayey, slope.
WaB	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
WaC	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
WhB	Moderate: thin layer, seepage.	Moderate: seepage, slope.	Severe: seepage.	Slight	Fair: area reclaim, too clayey.
WhC2	Moderate: thin layer, seepage, slope.	Severe: slope.	Severe: seepage.	Moderate: slope.	Fair: area reclaim, too clayey, slope.
WmB	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: depth to rock.	Moderate: wetness.	Poor: thin layer.
WmC2	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: wetness, slope.	Poor: thin layer.
WtC2	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Poor: small stones.
WtD2, WtE	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.

TABLE 15.--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
WuC2:					
Westmoreland	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Poor: small stones.
Guernsey	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
WuD2, WuE2:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Guernsey	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
WvD:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Urban land.					
ZnB	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Poor: small stones.
Zanesville					
ZnC2	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness, slope.	Poor: small stones.
Zanesville					

TABLE 16.--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
AaB, AaC2 Aaron	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AaD2 Aaron	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
AcB: Aaron	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Upshur	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AfB Alford	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
AfC2 Alford	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
BeB Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BeD2 Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BeE Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BkF: Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
BoB Bethesda	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
BoD Bethesda	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BpF Bethesda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BsC2 Brookside	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BsE Brookside	Poor: slope, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
Cb Chagrin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
CcA, CcB Chavies	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
CeA, CeB, ChA, ChB, ChC Chili	Good	Probable	Probable	Poor: small stones, area reclaim.
CkA Cidermill	Good	Probable	Probable	Poor: area reclaim.
CnB Cincinnati	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
CnC2 Cincinnati	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, slope.
CpC2 Clarksburg	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CrC: Claysville	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
Guernsey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
CsC2 Coshocton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CsD Coshocton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CtE:				
Coshocton	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ds. Dumps and Pits				
FaB	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
FaD	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
FaE, FbF	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
FcA, FcB	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
FkB:				
Frankstown Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Mertz	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
GdB, GdC2	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GeD2:				
Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Upshur	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
GeE2:				
Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Upshur	Poor: slope, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GfA, GfB---------- Glenford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
GfC2---------- Glenford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
GtC2:				
Guernsey----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
Upshur----------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GtD2:				
Guernsey----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
Upshur----------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
HaC2---------- Homewood	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, slope.
HaD2---------- Homewood	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
JtA---------- Jimtown	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
KeB, KeC2---------- Keene	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim.
Km---------- Killbuck	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
LaC---------- Lakin	Good----------	Probable----------	Improbable: excess fines.	Fair: too sandy, slope.
LcD:				
Lakin----------	Severe: slope, seepage.	Probable----------	Improbable: excess fines.	Poor: slope.
Alford----------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Lk---------- Lindside	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Lm---------- Lobdell	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Lo---------- Lorain	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
LpC2---------- Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
LpD2---------- Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
LrE2, LrF: Lowell----------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Gilpin----------	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Lu---------- Luray	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MaB, MbC2---------- Markland	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
McD2: Markland----------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Glenford----------	Fair: low strength, wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
MdA---------- McGary	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Me---------- Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MkD---------- Mertz	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MrB---- Morristown	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
MrD---- Morristown	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
MrF---- Morristown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
MsB, MsC---- Morristown	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
MsD---- Morristown	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
MsE---- Morristown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Ne---- Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
No---- Nolin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
OmB---- Omulga	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
OmC---- Omulga	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
RaB---- Rawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
RfC---- Rigley	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
RgD---- Rigley	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
RhE: Rigley----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Coshocton----	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RoF---------- Rodman	Poor: slope.	Probable----------	Probable----------	Poor: too sandy, small stones, area reclaim.
Se---------- Sebring	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
St---------- Stonelick	Good----------	Probable----------	Improbable: too sandy.	Fair: small stones.
Ta, Tf---------- Tioga	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
Ud, Ug, Uh. Udorthents				
Uk: Udorthents.				
Pits.				
UsB: Urban land.				
Glenford----------	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
UtA: Urban land.				
Nolin----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
UvB: Urban land.				
Watertown----------	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
UwC: Urban land.				
Wellston----------	Fair: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WaB, WaC---------- Watertown	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
WhB, WhC2---------- Wellston	Fair: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WmB---------- Westgate	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
WmC2 Westgate	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
WtC2 Westmoreland	Fair: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WtD2 Westmoreland	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WtE Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WuC2: Westmoreland	Fair: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Guernsey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
WuD2: Westmoreland	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Guernsey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
WuE2: Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Guernsey	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
WvD: Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Urban land.				
ZnB, ZnC2 Zanesville	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.

TABLE 17.--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	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AaB---------- Aaron	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
AaC2, AaD2-------- Aaron	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
AcB:						
Aaron----------	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
Upshur----------	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily, percs slowly.	Erodes easily, percs slowly.
AfB---------- Alford	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
AfC2---------- Alford	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
BeB---------- Berks	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, large stones.	Droughty, depth to rock, large stones.
BeD2, BeE--------- Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
BkF:						
Berks----------	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
Westmoreland-----	Severe: slope.	Severe: piping.	No water-------	Deep to water	Slope----------	Slope.
BoB---------- Bethesda	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
BoD, BpF---------- Bethesda	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, slippage.	Large stones, slope, droughty.
BsC2---------- Brookside	Severe: slope.	Moderate: hard to pack, wetness, thin layer.	Severe: no water.	Slope----------	Slope, erodes easily.	Slope, erodes easily.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
BsE---------- Brookside	Severe: slope, slippage.	Moderate: hard to pack, wetness, thin layer.	Severe: no water.	Slope----------	Slope, erodes easily, slippage.	Slope, erodes easily.
Cb---------- Chagrin	Moderate: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Favorable------	Favorable.
CcA, CcB---------- Chavies	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Soil blowing---	Favorable.
CeA, CeB, ChA, ChB---------- Chili	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Droughty.
ChC---------- Chili	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, droughty.
CkA---------- Cidermill	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
CnB---------- Cincinnati	Moderate: seepage, slope.	Severe: thin layer.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
CnC2---------- Cincinnati	Severe: slope.	Severe: thin layer.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
CpC2---------- Clarksburg	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, erodes easily.	Slope, erodes easily, rooting depth.
CrC:						
Claysville-------	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, frost action, slippage.	Slope, erodes easily, slippage.	Wetness, slope, erodes easily.
Guernsey---------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
CsC2, CsD--------- Coshocton	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
CtE:						
Coshocton--------	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
Westmoreland-----	Severe: slope.	Severe: piping.	No water-------	Deep to water	Slope----------	Slope.
Ds. Dumps and Pits						

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
FaB---------- Fairpoint	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones, erodes easily.	Large stones, erodes easily.
FaD, FaE---------- Fairpoint	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
FbF---------- Fairpoint	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, slippage.	Large stones, slope, droughty.
FcA---------- Fitchville	Moderate: seepage.	Severe: piping.	Severe: no water.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
FcB---------- Fitchville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
FkB: Frankstown Variant---------	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock, erodes easily, area reclaim.	Erodes easily, depth to rock, area reclaim.
Mertz----------	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
GdB---------- Gilpin	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Depth to rock, large stones.	Depth to rock, large stones.
GdC2---------- Gilpin	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
GeD2, GeE2: Gilpin----------	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Upshur----------	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
GfA---------- Glenford	Moderate: seepage.	Severe: piping.	Severe: no water.	Frost action---	Erodes easily, wetness.	Erodes easily.
GfB---------- Glenford	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
GfC2---------- Glenford	Severe: slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily.
GtC2: Guernsey---------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
GtC2:						
Upshur	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
GtD2:						
Guernsey	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, slippage.	Slope, erodes easily, percs slowly.
Upshur	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
HaC2, HaD2 Homewood	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
JtA Jimtown	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, too sandy.	Wetness.
KeB Keene	Moderate: seepage, slope.	Moderate: thin layer, piping, hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
KeC2 Keene	Severe: slope.	Moderate: thin layer, piping, hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
Km Killbuck	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
LaC Lakin	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
LcD:						
Lakin	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
Alford	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Lk Lindside	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily.
Lm Lobdell	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding, frost action.	Erodes easily, wetness.	Erodes easily.
Lo Lorain	Slight	Severe: hard to pack, ponding.	Severe: no water.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Wetness, percs slowly.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
LpC2, LpD2-------- Lowell	Severe: slope.	Severe: hard to pack.	Severe: no water.	Slope----------	Slope, erodes easily, wetness.	Slope, erodes easily.
LrE2, LrF: Lowell-----------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Gilpin-----------	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Lu---------------- Luray	Moderate: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Ponding--------	Wetness.
MaB--------------- Markland	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily, percs slowly.	Erodes easily, percs slowly.
MbC2-------------- Markland	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
McD2: Markland---------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Glenford---------	Severe: slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily.
MdA--------------- McGary	Slight---------	Severe: wetness.	Severe: slow refill.	Percs slowly---	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Me---------------- Melvin	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding-------	Erodes easily, wetness.	Wetness, erodes easily.
MkD--------------- Mertz	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
MrB, MrD, MrF----- Morristown	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
MsB--------------- Morristown	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones, erodes easily.	Large stones, erodes easily.
MsC, MsD, MsE----- Morristown	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
Ne---------------- Newark	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
No---------------- Nolin	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
OmB---------- Omulga	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
OmC---------- Omulga	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
RaB---------- Rawson	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly, slope.	Wetness--------	Percs slowly, rooting depth.
RfC, RgD---------- Rigley	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
RhE:						
Rigley----------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
Coshocton--------	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
RoF---------- Rodman	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
Se---------- Sebring	Moderate: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.
St---------- Stonelick	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy------	Favorable.
Ta, Tf---------- Tioga	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Erodes easily	Erodes easily, droughty.
Ud, Ug, Uh. Udorthents						
Uk:						
Udorthents.						
Pits.						
UsB:						
Urban land.						
Glenford---------	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
UtA:						
Urban land.						
Nolin----------	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
UvB: Urban land.						
Watertown	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
UwC: Urban land.						
Wellston	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
WaB---- Watertown	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
WaC---- Watertown	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
WhB---- Wellston	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
WhC2---- Wellston	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
WmB---- Westgate	Moderate: seepage, slope.	Moderate: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
WmC2---- Westgate	Severe: slope.	Moderate: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
WtC2, WtD2, WtE--- Westmoreland	Severe: slope.	Severe: piping.	No water----	Deep to water	Slope----	Slope.
WuC2: Westmoreland----	Severe: slope.	Severe: piping.	No water----	Deep to water	Slope----	Slope.
Guernsey----	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
WuD2, WuE2: Westmoreland----	Severe: slope.	Severe: piping.	No water----	Deep to water	Slope----	Slope.
Guernsey----	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, slippage.	Slope, erodes easily, percs slowly.
WvD: Westmoreland----	Severe: slope.	Severe: piping.	No water----	Deep to water	Slope----	Slope.
Urban land.						

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
ZnB---------- Zanesville	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
ZnC2---------- Zanesville	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.

TABLE 18.--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		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
AaB, AaC2, AaD2---	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	70-90	20-35	5-15
Aaron	7-46	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	90-100	90-100	85-100	80-100	45-70	22-43
	46-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
AcB:											
Aaron----------	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	70-90	20-35	5-15
	7-44	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	90-100	90-100	85-100	80-100	45-70	22-43
	44-46	Weathered bedrock	---	---	---	---	---	---	---	---	---
Upshur----------	0-7	Silty clay loam	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-50	11-25
	7-50	Silty clay, clay	MH, CH, CL	A-7	0	95-100	95-100	90-100	85-100	45-70	20-40
	50-72	Silty clay loam, shaly silty clay, clay.	CL, ML, MH, CH	A-6, A-7	0	80-100	65-100	60-100	55-95	35-55	11-25
AfB, AfC2--------	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	20-30	5-15
Alford	10-50	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	80-100	30-40	10-20
	50-80	Silt loam, silt	ML, CL-ML, CL	A-4	0	100	100	90-100	70-100	<25	NP-10
BeB, BeD2, BeE---	0-8	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
Berks	8-28	Channery loam, very channery silt loam, channery silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	28-35	Channery loam, very channery silt loam, channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	35-49	Weathered bedrock	---	---	---	---	---	---	---	---	---
BkF:											
Berks----------	0-10	Channery loam----	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	10-22	Channery loam, very channery loam, channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	22-24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Westmoreland----	0-4	Silt loam--------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	4-44	Silty clay loam, channery loam, shaly silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	44-46	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
BoB, BoD--------- Bethesda	0-1	Shaly silt loam	ML, GM, GM-GC, CL-ML	A-4, A-6	0-15	65-90	55-80	50-80	35-75	25-40	4-14
	1-60	Very shaly silty clay loam, very shaly silt loam.	GM, GC, ML, CL	A-4, A-6, A-7, A-2	10-30	40-80	25-65	20-65	18-60	24-50	3-23
BpF-------------- Bethesda	0-10	Flaggy silt loam	CL, GC, GM, GM-GC	A-6, A-4	15-35	65-90	55-80	50-80	35-75	25-40	4-14
	10-60	Very channery silty clay loam, channery silty clay loam.	GM, GC, ML, CL	A-4, A-6, A-7, A-2	10-30	40-80	25-65	20-65	18-60	24-50	3-23
BsC2, BsE-------- Brookside	0-10	Silty clay loam	CL	A-6, A-7	0-5	90-100	80-100	75-100	70-95	30-50	10-28
	10-63	Silty clay, gravelly silty clay loam, channery silty clay loam.	CH, CL	A-7, A-6	0-15	80-95	65-90	60-85	55-85	35-70	15-40
	63-70	Channery silty clay loam, clay, silty clay.	CH, CL	A-6, A-7	5-25	70-90	60-75	55-75	50-70	35-65	22-44
Cb--------------- Chagrin	0-12	Loam----------	ML, CL, CL-ML	A-4	0	95-100	85-100	80-100	70-90	20-35	2-10
	12-43	Silt loam, loam, sandy loam.	ML, SM	A-4, A-2, A-6	0	90-100	75-100	55-90	30-80	20-40	NP-14
	43-83	Stratified silt loam to gravelly fine sand.	ML, SM, SP-SM	A-4, A-2	0	75-100	65-100	40-85	10-80	20-40	NP-10
CcA, CcB--------- Chavies	0-12	Loam----------	SM, ML, CL-ML, SM-SC	A-4	0	85-100	75-100	40-90	40-75	<25	NP-5
	12-42	Fine sandy loam, silt loam, loam.	SM, ML	A-4	0	85-100	75-100	65-100	45-85	<35	NP-8
	42-80	Fine sandy loam, gravelly fine sandy loam, loam, gravelly loamy sand.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1-b	0-5	70-100	60-95	40-85	20-75	<25	NP-5
CeA, CeB--------- Chili	0-12	Loam----------	ML, CL-ML	A-4	0	85-100	75-100	65-85	55-75	25-35	4-10
	12-48	Loam, gravelly clay loam, gravelly sandy loam.	ML, SM, GM, CL	A-4, A-2, A-6, A-1-b	0	65-100	50-80	35-70	20-65	<30	NP-12
	48-70	Stratified gravelly loamy sand to very gravelly sand.	GW, GM, SP, SM	A-1	5-10	30-70	25-65	10-45	2-20	---	NP

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
ChA, ChB, ChC---- Chili	0-9	Gravelly loam----	SM, ML, GM	A-4, A-2, A-1-b	0	65-90	55-75	35-70	15-55	<30	NP-7
	9-43	Gravelly loam, gravelly clay loam, gravelly sandy loam.	ML, SM, GM, CL	A-4, A-2, A-6, A-1-b	0	65-100	50-80	35-70	20-65	<30	NP-12
	43-60	Stratified gravelly loamy sand to very gravelly sand.	GW, GM, SP, SM	A-1	5-10	30-70	25-65	10-45	2-20	---	NP
CkA---------- Cidermill	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	20-35	5-15
	8-36	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	90-100	70-90	20-35	5-15
	36-56	Loam, gravelly clay loam, fine sandy loam.	ML, SM, GM, CL	A-4, A-2, A-6	0-5	65-100	40-85	35-75	30-70	<30	NP-15
	56-80	Stratified sandy loam to very gravelly coarse sand.	SM, GM, GW, SP	A-1	0-15	30-70	25-65	10-45	2-25	---	NP
CnB---------- Cincinnati	0-8	Silt loam--------	ML, CL	A-4, A-6	0	100	95-100	90-100	80-100	25-40	3-16
	8-28	Silty clay loam, loam, silt loam.	CL	A-6, A-4	0	95-100	90-100	85-100	70-100	25-40	8-15
	28-50	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	50-69	Clay loam, loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	69-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
CnC2---------- Cincinnati	0-8	Silt loam--------	ML, CL	A-4, A-6	0	100	95-100	90-100	80-100	25-40	3-16
	8-24	Silty clay loam, loam, silt loam.	CL	A-6, A-4	0	95-100	90-100	85-100	70-100	25-40	8-15
	24-50	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	50-69	Clay loam, loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	69-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
CpC2---------- Clarksburg	0-9	Silt loam--------	CL	A-4, A-6	0-5	90-100	85-100	80-95	75-90	25-35	2-11
	9-25	Silty clay loam, channery clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-10	80-100	65-100	60-95	55-85	25-45	6-20
	25-44	Clay loam, channery clay loam, gravelly silt loam.	CL-ML, CL, SM-SC, SC	A-4, A-6, A-7	0-15	75-100	55-100	50-95	45-90	20-45	4-20
	44-80	Clay loam, channery clay loam, silty clay loam.	CL, CH, SM-SC, GC	A-4, A-6, A-7, A-2	0-20	50-100	20-100	15-95	15-90	20-52	4-25
CrC: Claysville------	0-8	Silty clay loam	CL	A-6, A-7	0	90-100	80-100	75-100	70-95	25-50	15-30
	8-54	Silty clay loam, silty clay, shaly silty clay.	CH, CL, MH, ML	A-7	0-5	75-100	70-100	65-100	60-95	45-70	20-35
	54-84	Silty clay, shaly silty clay loam, silty clay loam.	CL, CH	A-6, A-7	0-5	70-100	60-95	55-95	50-90	35-55	15-30

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
CrC:											
Guernsey	0-7	Silty clay loam	CL	A-4, A-6, A-7	0-2	90-100	80-100	75-100	70-95	25-45	8-22
	7-39	Silty clay, clay, silty clay loam.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-100	45-65	15-35
	39-60	Clay, silty clay, shaly silty clay loam.	CH, MH, ML, CL	A-7	0-20	70-100	60-90	55-90	55-90	40-70	15-40
CsC2, CsD	0-8	Silt loam	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
Coshocton	8-20	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	85-100	80-100	70-95	60-90	25-40	6-18
	20-40	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	40-65	Shaly silty clay loam, silty clay, silty clay loam.	CL, CH, GC, SC	A-7, A-6, A-2	0-20	40-100	30-95	30-85	30-80	30-55	16-35
	65-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
CtE:											
Coshocton	0-8	Silt loam	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
	8-20	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	85-100	80-100	70-95	60-90	25-40	6-18
	20-40	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	40-60	Shaly silty clay loam, silty clay, very channery loam.	CL, CH, GC, SC	A-7, A-6, A-2	0-20	40-100	30-95	30-85	30-80	30-55	16-35
	60-75	Weathered bedrock	---	---	---	---	---	---	---	---	---
Westmoreland	0-5	Silt loam	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	5-37	Silty clay loam, shaly silty clay loam, shaly silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	37-65	Very channery loam, very channery silt loam, very shaly silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	65-70	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ds.											
Dumps and Pits											
FaB, FaD, FaE	0-7	Silty clay loam	CL	A-6, A-7	0-5	90-100	80-100	70-95	60-95	35-50	12-24
Fairpoint	7-60	Gravelly clay loam, very shaly silty clay loam, shaly silty clay loam.	GC, CL, CL-ML, SC	A-4, A-6, A-7, A-2	15-30	55-75	25-65	20-65	15-60	25-50	4-24

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
FbF--------- Fairpoint	0-4	Channery silty clay loam.	CL, SC, GC	A-6, A-7	5-20	55-90	45-80	40-80	35-80	35-50	12-24
	4-60	Shaly clay loam, very channery silty clay loam, extremely channery silty clay loam.	GC, CL, CL-ML, SC	A-4, A-6, A-7, A-2	15-30	55-75	25-65	20-65	15-60	25-50	4-24
FcA--------- Fitchville	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-95	24-40	4-16
	10-58	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7	0	100	100	90-100	80-100	28-50	5-23
	58-70	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-100	20-40	3-18
FcB--------- Fitchville	0-14	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-95	24-40	4-16
	14-58	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7	0	100	100	90-100	80-100	28-50	5-23
	58-70	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-100	20-40	3-18
FkB:											
Frankstown Variant--------	0-9	Silt loam--------	ML, CL-ML, CL	A-4	0-10	90-100	80-95	75-95	60-80	20-30	3-10
	9-16	Cherty silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0-10	90-100	80-95	75-95	60-90	20-35	5-15
	16-22	Cherty silt loam, very cherty silty clay loam.	CL, GM-GC, GC, CL-ML	A-2, A-4, A-6	5-20	50-90	35-70	35-70	25-60	25-40	5-15
	22-25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mertz---------	0-6	Very cherty silt loam.	ML, GM	A-4	5-10	70-95	55-85	45-85	40-75	---	NP
	6-48	Cherty clay loam, very cherty silty clay loam, cherty silt loam.	ML, CL, GM, GC	A-6, A-7, A-4	5-20	55-95	45-85	45-85	40-75	30-45	7-20
	48-60	Cherty clay loam, very cherty loam, very channery silty clay loam.	CL, GC, SC	A-6, A-7, A-2	5-50	55-80	30-75	30-70	25-55	30-45	10-20
GdB, GdC2-------- Gilpin	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	9-30	Channery clay loam, silt loam, clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	30-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GeD2, GeE2:											
Gilpin----------	0-4	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	4-28	Channery silt loam, silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GeD2, GeE2:											
Upshur	0-5	Silty clay loam	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-50	11-25
	5-45	Silty clay, shaly silty clay, channery silty clay.	MH, CH, CL	A-7	0	95-100	95-100	90-100	85-100	45-70	20-40
	45-62	Shaly silty clay loam, silty clay, very channery silty clay.	CL, ML, MH, CH	A-6, A-7	0	80-100	65-100	60-100	55-95	35-55	11-25
	62-64	Weathered bedrock	---	---	---	---	---	---	---	---	---
GfA, GfB	0-10	Silt loam	CL-ML, CL, ML	A-4, A-6	0	100	100	95-100	80-100	25-40	4-14
Glenford	10-34	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	100	100	95-100	80-100	25-45	5-18
	34-50	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	95-100	90-100	75-100	20-40	3-18
	50-60	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-100	20-40	3-15
GfC2	0-6	Silt loam	CL-ML, CL, ML	A-4, A-6	0	100	100	95-100	80-100	25-40	4-14
Glenford	6-26	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	100	100	95-100	80-100	25-45	5-18
	26-40	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	95-100	90-100	75-100	20-40	3-18
	40-60	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-100	20-40	3-15
GtC2, GtD2:											
Guernsey	0-7	Silty clay loam	CL	A-4, A-6, A-7	0-2	90-100	80-100	75-100	70-95	25-45	8-22
	7-39	Silty clay, clay, channery silty clay.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-100	45-65	15-35
	39-62	Channery silty clay, silty clay, shaly silty clay loam.	CH, MH, ML, CL	A-7	0-20	70-100	60-90	55-90	55-90	40-70	15-40
	62-64	Weathered bedrock	---	---	---	---	---	---	---	---	---
Upshur	0-4	Silty clay loam	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-50	11-25
	4-40	Silty clay, clay, silty clay loam.	MH, CH, CL	A-7	0	95-100	95-100	90-100	85-100	45-70	20-40
	40-74	Silty clay loam, silty clay, clay.	CL, ML, MH, CH	A-6, A-7	0	80-100	65-100	60-100	55-95	35-55	11-25
HaC2, HaD2	0-7	Silt loam	ML	A-4	0	95-100	90-100	85-100	75-100	25-35	NP-10
Homewood	7-28	Loam, silty clay loam, clay loam.	ML, CL	A-4, A-6	0-2	90-100	85-100	75-100	55-80	30-40	5-15
	28-46	Loam, clay loam, gravelly clay loam.	CL-ML, CL, ML, SM-SC	A-4, A-6	0-5	70-100	60-95	55-90	45-80	25-40	5-15
	46-80	Loam, clay loam, gravelly silt loam.	SC, CL, CL-ML, SM-SC	A-4, A-6	0-10	70-100	55-95	50-90	40-80	20-35	5-15

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
JtA---------- Jimtown	0-8	Loam----------	ML, CL-ML, CL	A-4	0	95-100	75-100	60-95	50-80	20-30	NP-8
	8-40	Loam, gravelly loam, gravelly clay loam.	CL-ML, CL, SM-SC, SC	A-4, A-6, A-2	0-2	75-100	55-100	45-95	30-75	25-40	4-15
	40-48	Sandy loam, gravelly loam, very gravelly loamy sand.	SM, SC, GM, GC	A-1, A-4, A-2	0-5	50-90	40-75	30-70	20-55	<30	NP-8
	48-80	Stratified gravelly loam to very gravelly sand.	SM, GM	A-1, A-4, A-2	0-5	45-90	30-80	20-75	15-50	<30	NP-7
KeB, KeC2-------- Keene	0-8	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	95-100	90-100	85-100	70-95	25-36	4-12
	8-30	Silt loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4	0	95-100	90-100	85-100	75-100	25-40	6-18
	30-38	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0-5	95-100	75-100	70-95	65-90	30-55	10-28
	38-74	Channery silty clay loam, shaly silty clay, clay.	CL, CH	A-6, A-7	5-20	65-100	55-100	55-90	50-85	30-55	10-28
	74-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
Km---------- Killbuck	0-10	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	90-100	65-90	25-35	4-10
	10-28	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-95	25-40	4-15
	28-35	Silty clay loam, silty clay, shaly silty clay loam.	CL	A-6, A-7	0	90-100	85-100	80-100	70-95	30-50	12-30
	35-80	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7	0	90-100	85-100	80-100	70-95	25-45	11-28
LaC---------- Lakin	0-9	Loamy fine sand	SM, SM-SC	A-2	0	95-100	95-100	95-100	10-35	<30	NP-7
	9-55	Loamy sand, fine sandy loam, loamy fine sand.	SM, SM-SC, SP-SM	A-2, A-3	0	95-100	95-100	90-100	5-35	<30	NP-7
	55-87	Fine sand, sandy loam, loamy fine sand.	SM, SM-SC, GM, SP-SM	A-1, A-2, A-3	0	40-100	35-100	20-80	5-25	<30	NP-7
LcD:											
Lakin----------	0-10	Loamy fine sand	SM, SM-SC	A-2	0	95-100	95-100	95-100	10-35	<30	NP-7
	10-47	Loamy sand, fine sand, loamy fine sand.	SM, SM-SC, SP-SM	A-2, A-3	0	95-100	95-100	90-100	5-35	<30	NP-7
	47-77	Sand, sandy loam, gravelly sand.	SM, SM-SC, GM, SP-SM	A-1, A-2, A-3	0	40-100	35-100	20-80	5-25	<30	NP-7
Alford----------	0-4	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	20-30	5-15
	4-45	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	80-100	30-40	10-20
	45-60	Silt loam, silt	ML, CL-ML, CL	A-4	0	100	100	90-100	70-100	<25	NP-10

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
Lk 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
	9-40	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
	40-60	Stratified silty clay loam to gravelly sandy loam.	CL, ML, SM, SC	A-2, A-4, A-6	0	60-100	55-100	45-100	30-95	20-40	4-18
Lm Lobdell	0-6	Loam	ML, CL-ML, CL	A-4	0	95-100	90-100	80-100	65-90	20-30	NP-8
	6-14	Loam, silt loam	ML	A-4	0	90-100	80-100	70-95	55-85	20-35	NP-10
	14-28	Loam, silt loam, channery silt loam.	ML, SM, CL-ML, CL	A-4	0-5	75-100	65-95	60-90	45-80	15-35	NP-10
	28-63	Stratified silt loam to channery sandy loam.	SM, SC, SM-SC, ML	A-2, A-4, A-1	5-15	65-90	55-85	40-70	20-65	<30	NP-8
Lo Lorain	0-7	Silty clay	MH	A-7	0	100	100	90-100	80-100	60-80	15-30
	7-48	Silty clay, silty clay loam, clay.	CH, CL, MH, ML	A-6, A-7	0	100	100	90-100	80-100	35-65	15-45
	48-60	Clay, silty clay, silty clay loam.	CH, CL, MH	A-7	0	100	100	90-100	80-100	40-75	20-45
LpC2, LpD2 Lowell	0-8	Silt loam	CL, CL-ML	A-4	0	100	95-100	85-100	70-90	22-32	4-10
	8-18	Silty clay loam	CL	A-6, A-7	0-2	95-100	95-100	90-100	80-95	34-42	15-22
	18-57	Silty clay, silty clay loam, clay.	CH, CL	A-7, A-6	0-5	95-100	90-100	80-100	75-95	35-65	15-45
	57-70	Channery silty clay loam, shaly silty clay, silty clay loam.	GC, CL, SC	A-6, A-7	5-20	65-90	55-80	50-80	45-75	30-45	15-30
	70-72	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LrE2, LrF: Lowell	0-7	Silt loam	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	7-48	Silty clay, channery silty clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	48-60	Clay, channery silty clay loam.	CH, MH, CL	A-7	0-20	95-100	90-100	85-100	75-100	45-75	20-40
Gilpin	0-2	Channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	2-12	Channery silt loam, shaly silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	12-22	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	22-24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
Lu Luray	0-16	Silty clay loam	CL, CH, MH, ML	A-6, A-7	0	100	100	95-100	85-95	35-55	10-25
	16-55	Silty clay loam, silt loam.	CL, CH, MH, ML	A-6, A-7	0	100	100	95-100	80-95	35-60	15-30
	55-60	Stratified fine sandy loam to silty clay loam.	CL, ML, CL-ML	A-6, A-4, A-7	0	100	95-100	80-100	55-100	25-50	5-20
MaB Markland	0-7	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	7-28	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-95	45-60	19-32
	28-80	Stratified clay to silty clay loam.	CL, CH, ML, MH	A-7	0	100	100	90-100	75-95	40-55	15-25
MbC2 Markland	0-6	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-95	30-45	10-20
	6-30	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-95	45-60	19-32
	30-80	Stratified clay to silty clay loam.	CL, CH, ML, MH	A-7	0	100	100	90-100	75-95	40-55	15-25
McD2: Markland	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-95	30-45	10-20
	7-31	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-95	45-60	19-32
	31-80	Stratified clay to silty clay loam.	CL, CH, ML, MH	A-7	0	100	100	90-100	75-95	40-55	15-25
McD2: Glenford	0-8	Silt loam	CL-ML, CL, ML	A-4, A-6	0	100	100	95-100	80-100	25-40	4-14
	8-30	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	100	100	95-100	80-100	25-45	5-18
	30-60	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-100	20-40	3-15
MdA McGary	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-15
	6-40	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-100	45-60	25-35
	40-60	Stratified silty clay loam to clay.	CL, CH	A-6, A-7	0	95-100	95-100	95-100	85-100	35-55	20-35
Me Melvin	0-3	Silt loam	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	3-44	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
	44-60	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

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
MkD--------- Mertz	0-7	Very cherty silt loam.	ML, GM	A-4	5-15	55-70	35-55	30-55	20-50	---	NP
	7-30	Cherty clay loam, very cherty silty clay loam, cherty silt loam.	ML, CL, GM, GC	A-6, A-7, A-4	5-20	55-95	45-85	45-85	40-75	30-45	7-20
	30-60	Channery clay loam, very channery loam, very channery silty clay loam.	CL, GC, SC	A-6, A-7, A-2	5-50	55-80	30-75	30-70	25-55	30-45	10-20
MrB, MrD, MrF---- Morristown	0-5	Shaly silty clay loam.	CL, GC, SC	A-7, A-6	5-15	70-95	50-80	50-75	40-70	35-50	12-24
	5-60	Very channery silty clay loam, very cobbly clay loam.	GC, CL, CL-ML, GM-GC	A-7, A-6, A-4, A-2	10-25	35-75	25-65	20-65	15-60	25-50	4-24
MsB, MsC, MsD, MsE---------- Morristown	0-8	Silty clay loam	CL	A-7, A-6	0-5	90-100	80-100	70-95	60-95	35-50	12-24
	8-60	Very channery silty clay loam, very channery clay loam.	GM-GC, GC, CL, CL-ML	A-7, A-6, A-4, A-2	10-25	35-75	25-65	20-65	15-60	25-50	4-24
Ne---------- Newark	0-11	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	11-32	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
	32-60	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	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	7-60	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
OmB, OmC--------- Omulga	0-8	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	95-100	90-100	85-100	65-90	25-35	5-15
	8-24	Silty clay loam, silt loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	95-100	90-100	85-100	65-100	25-45	5-20
	24-44	Silty clay loam, silt loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	85-100	80-100	75-95	60-90	20-40	5-20
	44-58	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	85-100	80-100	75-95	70-90	20-45	5-20
	58-66	Stratified sandy loam to clay.	CL	A-6, A-7	0	80-100	75-100	65-95	50-90	30-50	15-30
RaB---------- Rawson	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	90-100	80-100	65-100	50-100	25-40	4-16
	10-38	Loam, sandy loam, silt loam.	SC, CL, GC	A-4, A-6, A-2-4, A-2-6	0	65-100	55-95	45-90	25-75	20-40	7-20
	38-65	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0	90-100	85-100	85-100	75-95	35-65	15-40

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RfC--- Rigley	0-10	Loam---	SM, ML, SM-SC, CL-ML	A-2, A-4	0-10	80-95	75-90	55-80	25-65	<30	NP-7
	10-40	Gravelly sandy loam, loam, sandy loam.	SM, ML, GM, GM-GC	A-2, A-4, A-1	0-10	65-95	60-90	40-75	20-60	<30	NP-7
	40-80	Sandy loam, gravelly loam, loamy sand.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	55-80	45-70	30-60	15-50	<35	NP-15
RgD--- Rigley	0-6	Channery loam---	SM, GM, ML, SM-SC	A-2, A-4	0-10	60-85	60-80	50-70	25-65	<30	NP-7
	6-32	Channery sandy loam, channery loam, sandy loam.	SM, ML, GM, GM-GC	A-2, A-4, A-1	0-10	65-95	60-90	40-75	20-60	<30	NP-7
	32-60	Gravelly sandy loam, gravelly loam, channery loamy sand.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	55-80	45-70	30-60	15-50	<35	NP-15
RhE: Rigley---	0-6	Channery loam---	SM, GM, ML, SM-SC	A-2, A-4	0-10	60-85	60-80	50-70	25-65	<30	NP-7
	6-32	Channery sandy loam, channery loam, sandy loam.	SM, ML, GM, GM-GC	A-2, A-4, A-1	0-10	65-95	60-90	40-75	20-60	<30	NP-7
	32-60	Gravelly sandy loam, gravelly loam, channery loamy sand.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	55-80	45-70	30-60	15-50	<35	NP-15
RhE: Coshocton---	0-6	Silt loam---	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
	6-43	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	43-48	Shaly silty clay loam, silty clay, very channery loam.	CL, CH, GC, SC	A-7, A-6, A-2	0-20	40-100	30-95	30-85	30-80	30-55	16-35
	48-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
RoF--- Rodman	0-12	Gravelly sandy loam.	SM-SC, SM, SP-SM	A-1, A-2	0-2	70-85	65-75	35-60	10-30	<25	NP-5
	12-20	Gravelly sandy loam, gravelly loamy sand.	ML, CL, SC, SM	A-4, A-2, A-1	0-2	70-85	60-85	40-75	20-55	<30	NP-10
	20-60	Stratified sand to very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	22-50	7-20	2-10	---	NP
Se--- Sebring	0-10	Silt loam---	ML, CL-ML, CL	A-4	0	100	100	95-100	85-95	20-35	3-10
	10-55	Silty clay loam, silt loam.	ML, CL	A-4, A-6, A-7	0	100	95-100	90-100	80-100	30-50	7-22
	55-60	Stratified sandy loam to silty clay loam.	ML, CL, CL-ML, SC	A-2, A-4, A-6, A-7	0	90-100	85-100	55-100	30-95	20-45	3-20

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
St	0-6	Loam	ML, CL, SM, CL-ML	A-4	0	85-100	75-100	60-95	45-90	20-32	2-10
Stonelick	6-75	Stratified silt loam to loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1-b	0	85-100	75-100	40-60	5-40	<15	NP
Ta	0-8	Fine sandy loam	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
Tioga	8-34	Silt loam, sandy loam, fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-90	20-80	<15	NP-2
	34-60	Silt loam, gravelly loam, loamy fine sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-90	5-80	<15	NP-2
Tf	0-20	Fine sandy loam	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
Tioga	20-38	Silt loam, loam, gravelly fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-90	20-80	<15	NP-2
	38-60	Silt loam, gravelly loam, very gravelly loamy sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-90	5-80	<15	NP-2
Ud, Ug, Uh.											
Udorthents											
Uk:											
Udorthents.											
Pits.											
UsB:											
Urban land.											
Glenford	0-9	Silt loam	CL-ML, CL, ML	A-4, A-6	0	100	100	95-100	80-100	25-40	4-14
	9-40	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	95-100	90-100	75-100	20-40	3-18
	40-60	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-100	20-40	3-15
UtA:											
Urban land.											
Nolin	0-7	Silt loam	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	7-60	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
UvB:											
Urban land.											

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
UvB:											
Watertown	0-10	Sandy loam	SM	A-2, A-1-b, A-4	0	90-100	80-100	45-70	20-45	---	NP
	10-26	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM	A-1, A-2, A-4	0	70-100	50-100	30-65	15-45	---	NP
	26-60	Very gravelly loamy coarse sand, gravelly loamy sand, loamy sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0	40-100	30-100	15-70	5-30	---	NP
UwC:											
Urban land.											
Wellston	0-7	Silt loam	ML	A-4	0	95-100	90-100	85-100	70-95	25-35	3-10
	7-30	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-5	75-100	70-100	60-95	60-90	25-40	5-20
	30-54	Silt loam, loam, gravelly loam.	CL-ML, CL, SC, SM-SC	A-4, A-6	0-10	65-90	65-90	60-90	40-65	20-35	5-15
	54-60	Very channery loam, gravelly sandy loam, channery clay loam.	SM-SC, SC, GM-GC, CL	A-1-b, A-2, A-4, A-6	0-15	60-80	45-75	30-70	15-55	20-35	5-15
WaB, WaC	0-12	Sandy loam	SM	A-2, A-1-b, A-4	0	90-100	80-100	45-70	20-45	---	NP
Watertown											
	12-25	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM	A-1, A-2, A-4	0	70-100	50-100	30-65	15-45	---	NP
	25-42	Very gravelly loamy coarse sand, gravelly loamy sand, loamy sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0	40-100	30-100	15-70	5-30	---	NP
	42-80	Sand, very gravelly coarse sand, gravelly coarse sand.	SM, GM, GP-GM, SP-SM	A-1	0	40-100	20-100	10-50	5-25	---	NP
WhB, WhC2	0-7	Silt loam	ML	A-4	0	95-100	90-100	85-100	70-95	25-35	3-10
Wellston	7-48	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-5	75-100	70-100	60-95	60-90	25-40	5-20
	48-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
WmB, WmC2	0-7	Silt loam	ML, CL-ML, CL	A-4	0	95-100	90-100	80-100	70-100	22-35	3-10
Westgate	7-34	Silt loam, silty clay loam.	CL, ML	A-6, A-7	0	95-100	90-100	85-100	80-100	30-50	10-20
	34-57	Silty clay loam, silty clay, clay.	CH, CL	A-7, A-6	0-5	90-100	80-100	70-100	60-100	35-60	20-35
	57-75	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0-10	80-100	65-100	60-100	55-95	35-55	15-35
	75-80	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
WtC2, WtD2------- Westmoreland	0-6	Silt loam---------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	6-32	Channery silty clay loam, channery loam, silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	32-44	Very channery silty clay loam, very channery silt loam, shaly silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	44-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WtE-------------- Westmoreland	0-9	Silt loam---------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	9-45	Silty clay loam, channery silt loam, silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	45-60	Very channery loam, very channery silt loam, silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	60-70	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WuC2, WuD2, WuE2: Westmoreland----	0-9	Silt loam---------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	9-40	Silty clay loam, channery loam, shaly silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	40-60	Very channery loam, very channery silt loam, shaly silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	60-62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Guernsey---------	0-8	Silt loam---------	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	70-90	25-40	4-14
	8-52	Silty clay, clay, silty clay loam.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-100	45-65	15-35
	52-55	Clay, silty clay, shaly silty clay loam.	CH, MH, ML, CL	A-7	0-20	70-100	60-90	55-90	55-90	40-70	15-40
	55-57	Weathered bedrock	---	---	---	---	---	---	---	---	---
WvD: Westmoreland----	0-9	Silt loam---------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	9-40	Silty clay loam, channery silty clay loam, channery silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	40-60	Very channery clay loam, very channery silt loam, shaly silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	60-65	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
ZnB, ZnC2-------- Zanesville	0-7	Silt loam--------	CL-ML, CL, ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	4-15
	7-28	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	5-20
	28-45	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	80-100	60-100	20-40	2-20
	45-80	Sandy clay loam, clay loam, channery loam.	SC, CL, SM, GM	A-6, A-4, A-2, A-1-b	0-10	65-100	50-100	40-100	20-85	20-40	2-20

TABLE 19.--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 "Wind erodibility group" and "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		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AaB, AaC2, AaD2-- Aaron	0-7 7-46 46-48	10-27 35-60 ---	1.20-1.40 1.30-1.60 ---	0.6-2.0 0.06-0.2 ---	0.19-0.23 0.14-0.18 ---	4.5-7.8 5.1-7.8 ---	Low High ---	0.37 0.28 ---	3	6	1-3
AcB: Aaron	0-7 7-44 44-46	10-27 35-60 ---	1.20-1.40 1.30-1.60 ---	0.6-2.0 0.06-0.2 ---	0.19-0.23 0.14-0.18 ---	4.5-7.8 5.1-7.8 ---	Low High ---	0.37 0.28 ---	3	6	1-3
Upshur	0-7 7-50 50-72	27-35 40-55 27-45	1.20-1.50 1.30-1.60 1.30-1.60	0.2-0.6 0.06-0.2 0.06-0.2	0.12-0.16 0.10-0.14 0.08-0.12	4.5-6.5 4.5-8.4 5.1-8.4	Moderate High Moderate	0.37 0.32 0.32	3	7	.5-3
AfB, AfC2 Alford	0-10 10-50 50-80	12-26 22-32 8-20	1.25-1.40 1.35-1.50 1.30-1.45	0.6-2.0 0.6-2.0 0.6-2.0	0.22-0.24 0.18-0.20 0.20-0.22	4.5-7.3 4.5-6.0 5.1-7.8	Low Moderate Low	0.37 0.37 0.37	5-4	5	.5-2
BeB, BeD2, BeE--- Berks	0-8 8-28 28-35 35-49	5-23 5-32 5-20 ---	1.20-1.50 1.20-1.60 1.20-1.60 ---	0.6-6.0 0.6-6.0 2.0-6.0 ---	0.08-0.12 0.04-0.10 0.04-0.10 ---	3.6-6.5 3.6-6.5 3.6-6.5 ---	Low Low Low ---	0.17 0.17 0.17 ---	3	---	.5-3
BkF: Berks	0-10 10-22 22-24	5-23 5-20 ---	1.20-1.50 1.20-1.60 ---	0.6-6.0 2.0-6.0 ---	0.08-0.12 0.04-0.10 ---	3.6-6.5 3.6-6.5 ---	Low Low ---	0.17 0.17 ---	3	---	.5-3
Westmoreland----	0-4 4-44 44-46	15-30 20-35 ---	1.20-1.40 1.20-1.50 ---	0.6-2.0 0.6-2.0 ---	0.16-0.20 0.12-0.18 ---	4.5-6.0 4.5-6.0 ---	Low Low ---	0.37 0.28 ---	3	5	1-4
BoB, BoD Bethesda	0-1 1-60	18-27 18-35	1.40-1.55 1.60-1.90	0.6-2.0 0.2-0.6	0.10-0.16 0.04-0.10	3.6-5.5 3.6-5.5	Low Low	0.28 0.32	5	8	<.5
BpF Bethesda	0-10 10-60	18-27 18-35	1.40-1.55 1.60-1.90	0.6-2.0 0.2-0.6	0.05-0.10 0.04-0.10	3.6-5.5 3.6-5.5	Low Low	0.28 0.32	5	8	<.5
BsC2, BsE Brookside	0-10 10-63 63-70	27-40 35-55 30-60	1.20-1.50 1.45-1.70 1.45-1.75	0.6-2.0 0.2-0.6 0.2-0.6	0.18-0.23 0.07-0.14 0.05-0.12	4.5-7.8 5.1-7.8 5.6-8.4	Moderate High High	0.37 0.37 0.37	5	7	1-3
Cb Chagrin	0-12 12-43 43-83	10-27 18-30 5-25	1.20-1.40 1.20-1.50 1.20-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.20-0.24 0.14-0.20 0.08-0.20	5.6-7.3 5.6-7.3 5.6-7.3	Low Low Low	0.32 0.32 0.32	5	5	2-4
CcA, CcB Chavies	0-12 12-42 42-80	7-18 7-18 7-18	1.20-1.40 1.20-1.40 1.30-1.50	2.0-6.0 2.0-6.0 2.0-6.0	0.11-0.18 0.11-0.20 0.08-0.18	4.5-7.3 4.5-7.3 4.5-6.0	Low Low Low	0.24 0.24 0.24	4	3	.5-4
CeA, CeB Chili	0-12 12-48 48-70	5-18 18-27 1-10	1.30-1.50 1.30-1.55 1.25-1.50	0.6-2.0 2.0-6.0 6.0-20	0.14-0.18 0.09-0.16 0.02-0.08	4.5-7.3 4.5-6.5 5.1-7.8	Low Low Low	0.32 0.32 0.10	4	5	1-3
ChA, ChB, ChC---- Chili	0-9 9-43 43-60	5-15 18-27 1-10	1.30-1.50 1.30-1.55 1.25-1.50	0.6-2.0 2.0-6.0 6.0-20	0.10-0.14 0.09-0.16 0.02-0.08	4.5-7.3 4.5-6.5 5.1-7.8	Low Low Low	0.24 0.32 0.10	4	8	1-3

TABLE 19.--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		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
CkA----------	0-8	15-25	1.30-1.45	0.6-2.0	0.18-0.22	4.5-7.3	Low----------	0.37	4	5	1-3
Cidermill	8-36	18-30	1.40-1.60	0.6-2.0	0.16-0.20	4.5-6.5	Low----------	0.37			
	36-56	15-30	1.30-1.60	2.0-6.0	0.12-0.18	4.5-6.0	Low----------	0.24			
	56-80	1-10	1.20-1.50	6.0-20	0.02-0.08	4.5-6.0	Low----------	0.10			
CnB----------	0-8	15-25	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	4	6	1-3
Cincinnati	8-28	22-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Low----------	0.37			
	28-50	25-35	1.60-1.85	0.06-0.6	0.08-0.12	4.5-6.5	Moderate-----	0.37			
	50-69	25-40	1.55-1.75	0.06-0.6	0.08-0.12	4.5-6.5	Moderate-----	0.37			
	69-80	---	---	---	---	---	----------	----			
CnC2----------	0-8	18-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	4	6	.5-2
Cincinnati	8-24	22-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Low----------	0.37			
	24-50	25-35	1.60-1.85	0.06-0.6	0.08-0.12	4.5-6.5	Moderate-----	0.37			
	50-69	25-40	1.55-1.75	0.06-0.6	0.08-0.12	4.5-6.5	Moderate-----	0.37			
	69-80	---	---	---	---	---	----------	----			
CpC2----------	0-9	10-27	1.20-1.40	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.37	3	---	1-3
Clarksburg	9-25	22-35	1.30-1.50	0.6-2.0	0.12-0.18	5.1-6.5	Moderate-----	0.28			
	25-44	22-35	1.40-1.70	0.06-0.6	0.06-0.12	5.1-6.5	Moderate-----	0.28			
	44-80	22-40	1.20-1.60	0.06-0.6	0.06-0.16	4.5-6.5	Moderate-----	0.28			
CrC:											
Claysville------	0-8	32-40	1.25-1.50	0.2-0.6	0.18-0.23	6.1-7.3	Moderate-----	0.28	5	4	3-7
	8-54	35-50	1.40-1.65	0.06-0.2	0.11-0.18	6.1-7.8	High---------	0.32			
	54-84	32-50	1.40-1.65	0.06-0.2	0.08-0.14	6.6-8.4	High---------	0.32			
Guernsey--------	0-7	27-35	1.35-1.55	0.2-0.6	0.17-0.22	4.5-7.3	Moderate-----	0.43	3-2	7	.5-2
	7-39	35-60	1.40-1.60	0.06-0.6	0.10-0.15	4.5-7.8	High---------	0.32			
	39-60	35-60	1.40-1.60	0.06-0.6	0.06-0.10	5.1-8.4	High---------	0.32			
CsC2, CsD--------	0-8	15-23	1.30-1.50	0.6-2.0	0.18-0.23	3.6-7.3	Low----------	0.37	5-4	5	1-3
Coshocton	8-20	18-30	1.35-1.55	0.2-2.0	0.14-0.20	3.6-5.5	Moderate-----	0.37			
	20-40	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate-----	0.37			
	40-65	24-36	1.45-1.70	0.06-0.6	0.08-0.12	4.5-6.0	Moderate-----	0.28			
	65-80	---	---	---	---	---	----------	----			
CtE:											
Coshocton-------	0-8	15-23	1.30-1.50	0.6-2.0	0.18-0.23	3.6-7.3	Low----------	0.37	5-4	5	1-3
	8-20	18-30	1.35-1.55	0.2-2.0	0.14-0.20	3.6-5.5	Moderate-----	0.37			
	20-40	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate-----	0.37			
	40-60	24-36	1.45-1.70	0.06-0.6	0.08-0.12	4.5-6.0	Moderate-----	0.28			
	60-75	---	---	---	---	---	----------	----			
Westmoreland----	0-5	15-30	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.37	3	5	1-4
	5-37	20-35	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.28			
	37-65	18-35	1.20-1.50	0.6-2.0	0.06-0.10	5.1-6.0	Low----------	0.17			
	65-70	---	---	---	---	---	----------	----			
Ds.											
Dumps and Pits											
FaB, FaD, FaE----	0-7	27-40	1.40-1.65	0.2-0.6	0.12-0.18	5.6-7.3	Moderate-----	0.43	2	7	.5-2
Fairpoint	7-60	18-35	1.60-1.80	0.2-0.6	0.03-0.10	5.6-7.3	Moderate-----	0.32			
FbF----------	0-4	27-35	1.45-1.65	0.2-0.6	0.06-0.15	5.6-7.3	Moderate-----	0.28	5	8	<.5
Fairpoint	4-60	18-35	1.60-1.80	0.2-0.6	0.03-0.10	5.6-7.3	Moderate-----	0.28			
FcA----------	0-10	16-27	1.30-1.45	0.6-2.0	0.17-0.21	4.5-7.3	Low----------	0.37	5	6	2-3
Fitchville	10-58	20-35	1.45-1.70	0.2-0.6	0.15-0.19	4.5-7.3	Moderate-----	0.37			
	58-70	16-30	1.40-1.65	0.2-2.0	0.14-0.18	5.6-7.8	Low----------	0.37			

TABLE 19.--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		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
FcB	0-14	16-27	1.30-1.45	0.6-2.0	0.17-0.21	4.5-7.3	Low	0.37	5	6	2-3
Fitchville	14-58	20-35	1.45-1.70	0.2-0.6	0.15-0.19	4.5-7.3	Moderate	0.37			
	58-70	16-30	1.40-1.65	0.2-2.0	0.14-0.18	5.6-7.8	Low	0.37			
FkB:											
Frankstown Variant	0-9	10-20	1.30-1.45	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.37	4	5	1-3
	9-16	20-30	1.30-1.45	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37			
	16-22	25-35	1.30-1.45	0.6-2.0	0.09-0.18	4.5-6.0	Moderate	0.28			
	22-25	---	---	---	---	---	---	---			
Mertz	0-6	10-27	1.20-1.40	0.6-2.0	0.14-0.18	5.1-7.3	Low	0.28	4	---	1-3
	6-48	15-35	1.40-1.60	0.2-0.6	0.08-0.18	5.1-7.3	Low	0.17			
	48-60	15-35	1.40-1.60	0.2-0.6	0.08-0.18	4.5-5.5	Low	0.17			
GdB, GdC2	0-9	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	---	.5-4
Gilpin	9-30	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24			
	30-40	---	---	---	---	---	---	---			
GeD2, GeE2:											
Gilpin	0-4	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	---	.5-4
	4-28	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24			
	28-30	---	---	---	---	---	---	---			
Upshur	0-5	27-35	1.20-1.50	0.2-0.6	0.12-0.16	4.5-6.5	Moderate	0.37	3	7	.5-3
	5-45	40-55	1.30-1.60	0.06-0.2	0.10-0.14	4.5-8.4	High	0.32			
	45-62	27-45	1.30-1.60	0.06-0.2	0.08-0.12	5.1-8.4	Moderate	0.32			
	62-64	---	---	---	---	---	---	---			
GfA, GfB	0-10	15-27	1.30-1.45	0.6-2.0	0.16-0.20	4.5-7.3	Low	0.37	5-4	6	1-3
Glenford	10-34	18-35	1.45-1.65	0.2-2.0	0.14-0.18	4.5-6.0	Moderate	0.43			
	34-50	18-35	1.45-1.65	0.2-0.6	0.13-0.17	5.6-7.3	Low	0.43			
	50-60	15-38	1.40-1.60	0.2-2.0	0.12-0.17	5.6-7.8	Low	0.37			
GfC2	0-6	15-27	1.30-1.45	0.6-2.0	0.16-0.20	4.5-7.3	Low	0.37	5-4	6	1-3
Glenford	6-26	18-35	1.45-1.65	0.2-2.0	0.14-0.18	4.5-6.0	Moderate	0.43			
	26-40	18-35	1.45-1.65	0.2-0.6	0.13-0.17	5.6-7.3	Low	0.43			
	40-60	15-38	1.40-1.60	0.2-2.0	0.12-0.17	5.6-7.8	Low	0.37			
GtC2, GtD2:											
Guernsey	0-7	27-35	1.35-1.55	0.2-0.6	0.17-0.22	4.5-7.3	Moderate	0.43	3-2	7	.5-2
	7-39	35-60	1.40-1.60	0.06-0.6	0.10-0.15	4.5-7.8	High	0.32			
	39-62	35-60	1.40-1.60	0.06-0.6	0.06-0.10	5.1-8.4	High	0.32			
	62-64	---	---	---	---	---	---	---			
Upshur	0-4	27-35	1.20-1.50	0.2-0.6	0.12-0.16	4.5-6.5	Moderate	0.37	3	7	.5-3
	4-40	40-55	1.30-1.60	0.06-0.2	0.10-0.14	4.5-8.4	High	0.32			
	40-74	27-45	1.30-1.60	0.06-0.2	0.08-0.12	5.1-8.4	Moderate	0.32			
HaC2, HaD2	0-7	13-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-7.3	Low	0.37	4	5	1-3
Homewood	7-28	24-32	1.40-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Moderate	0.37			
	28-46	24-32	1.60-1.90	0.06-0.2	0.06-0.10	4.5-5.5	Moderate	0.37			
	46-80	16-30	1.55-1.85	0.06-0.2	0.06-0.10	4.5-7.8	Low	0.37			
JtA	0-8	10-24	1.30-1.50	0.6-2.0	0.18-0.22	4.5-7.3	Low	0.32	4	5	2-3
Jimtown	8-40	18-27	1.25-1.60	0.6-2.0	0.10-0.18	4.5-6.5	Low	0.32			
	40-48	8-20	1.25-1.60	0.6-6.0	0.07-0.11	5.1-6.5	Low	0.24			
	48-80	4-16	1.25-1.65	2.0-6.0	0.04-0.10	5.1-8.4	Low	0.10			

TABLE 19.--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		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
KeB, KeC2	0-8	12-25	1.30-1.45	0.6-2.0	0.21-0.24	4.5-7.3	Low	0.43	4	5	1-3
Keene	8-30	18-33	1.30-1.55	0.2-2.0	0.18-0.22	4.5-6.0	Moderate	0.37			
	30-38	30-45	1.40-1.60	0.06-0.6	0.10-0.15	4.5-5.5	Moderate	0.37			
	38-74	27-53	1.40-1.60	0.06-0.6	0.08-0.13	4.5-6.5	Moderate	0.37			
	74-80	---	---	---	---	---	---	---			
Km	0-10	15-25	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.3	Low	0.37	5	6	2-4
Killbuck	10-28	18-32	1.25-1.55	0.2-2.0	0.17-0.22	5.6-7.3	Low	0.37			
	28-35	25-45	1.30-1.60	0.2-0.6	0.16-0.22	5.6-7.8	Moderate	0.37			
	35-80	22-40	1.35-1.60	0.2-2.0	0.15-0.20	5.6-7.8	Moderate	0.37			
LaC	0-9	2-6	1.20-1.40	6.0-20	0.06-0.10	4.5-6.0	Low	0.17	5	---	1-2
Lakin	9-55	3-8	1.30-1.50	6.0-20	0.04-0.08	4.5-6.0	Low	0.17			
	55-87	1-3	1.30-1.50	6.0-20	0.04-0.08	4.5-6.0	Low	0.17			
LcD:											
Lakin	0-10	2-6	1.20-1.40	6.0-20	0.06-0.10	4.5-6.0	Low	0.17	5	---	1-2
	10-47	3-8	1.30-1.50	6.0-20	0.04-0.08	4.5-6.0	Low	0.17			
	47-77	1-3	1.30-1.50	6.0-20	0.04-0.08	4.5-6.0	Low	0.17			
Alford	0-4	12-26	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.37	5-4	5	.5-2
	4-45	22-32	1.35-1.50	0.6-2.0	0.18-0.20	4.5-6.0	Moderate	0.37			
	45-60	8-20	1.30-1.45	0.6-2.0	0.20-0.22	5.1-6.5	Low	0.37			
Lk	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
Lindside	9-40	18-35	1.20-1.40	0.2-2.0	0.17-0.22	5.1-7.8	Low	0.37			
	40-60	18-35	1.20-1.40	0.2-6.0	0.12-0.18	5.6-7.8	Low	0.32			
Lm	0-6	15-27	1.20-1.40	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.37	5	5	1-3
Lobdell	6-14	18-30	1.25-1.60	0.6-2.0	0.17-0.22	5.1-7.3	Low	0.37			
	14-28	18-25	1.25-1.60	0.6-2.0	0.15-0.20	5.1-7.3	Low	0.37			
	28-63	15-25	1.20-1.60	0.6-6.0	0.07-0.16	5.6-7.3	Low	0.32			
Lo	0-7	40-60	1.30-1.50	0.06-0.2	0.11-0.13	5.1-7.3	High	0.32	5	4	4-8
Lorain	7-48	40-55	1.35-1.70	0.06-0.2	0.09-0.13	5.1-7.3	High	0.32			
	48-60	30-55	1.45-1.75	0.06-0.2	0.10-0.14	6.6-7.8	High	0.32			
LpC2, LpD2	0-8	18-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low	0.37	3	6	1-4
Lowell	8-18	27-33	1.20-1.40	0.2-2.0	0.16-0.20	4.5-6.5	High	0.32			
	18-57	40-55	1.30-1.60	0.2-0.6	0.09-0.13	5.1-7.8	High	0.28			
	57-70	27-35	1.50-1.70	0.2-2.0	0.05-0.14	5.6-7.8	Moderate	0.28			
	70-72	---	---	---	---	---	---	---			
LrE2, LrF:											
Lowell	0-7	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low	0.37	3	---	1-4
	7-48	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	High	0.28			
	48-60	40-60	1.50-1.70	0.2-0.6	0.12-0.17	5.1-7.8	High	0.28			
Gilpin	0-2	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	---	.5-4
	2-12	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24			
	12-22	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24			
	22-24	---	---	---	---	---	---	---			
Lu	0-16	27-40	1.30-1.55	0.2-0.6	0.21-0.23	5.6-7.3	Moderate	0.32	5	7	4-8
Luray	16-55	25-35	1.45-1.65	0.2-0.6	0.18-0.22	5.6-7.3	Moderate	0.32			
	55-60	15-30	1.45-1.60	0.2-2.0	0.14-0.18	6.1-8.4	Low	0.32			
MaB	0-7	20-27	1.30-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.43	3	6	1-3
Markland	7-28	40-55	1.55-1.65	0.06-0.2	0.11-0.13	5.1-7.3	High	0.32			
	28-80	35-50	1.55-1.70	0.06-0.2	0.09-0.11	7.4-8.4	High	0.32			

TABLE 19.--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		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
MbC2----------	0-6	28-40	1.35-1.50	0.2-0.6	0.18-0.20	5.1-7.3	Moderate-----	0.43	2	7	1-3
Markland	6-30	40-55	1.55-1.65	0.06-0.2	0.11-0.13	5.1-7.3	High---------	0.32			
	30-80	35-50	1.55-1.70	0.06-0.2	0.09-0.11	7.4-8.4	High---------	0.32			
McD2:											
Markland--------	0-7	28-40	1.35-1.50	0.2-0.6	0.18-0.20	5.1-7.3	Moderate-----	0.43	2	7	1-3
	7-31	40-55	1.55-1.65	0.06-0.2	0.11-0.13	5.1-7.3	High---------	0.32			
	31-80	35-50	1.55-1.70	0.06-0.2	0.09-0.11	7.4-8.4	High---------	0.32			
Glenford--------	0-8	15-27	1.30-1.45	0.6-2.0	0.16-0.20	4.5-7.3	Low----------	0.37	5-4	6	1-3
	8-30	18-35	1.45-1.65	0.2-2.0	0.14-0.18	4.5-6.0	Moderate-----	0.43			
	30-60	15-30	1.40-1.60	0.2-2.0	0.12-0.17	5.6-7.8	Low----------	0.37			
MdA----------	0-6	22-27	1.35-1.50	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.43	3	6	1-4
McGary	6-40	35-50	1.60-1.70	0.06-0.2	0.11-0.13	5.6-7.8	High---------	0.32			
	40-60	35-50	1.55-1.65	<0.2	0.14-0.16	7.4-8.4	High---------	0.32			
Me----------	0-3	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	---	.5-3
Melvin	3-44	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43			
	44-60	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low----------	0.43			
MkD----------	0-7	10-24	1.20-1.40	0.6-2.0	0.07-0.12	5.1-7.3	Low----------	0.28	4	8	1-3
Mertz	7-30	15-35	1.40-1.60	0.2-0.6	0.08-0.18	4.5-7.3	Low----------	0.17			
	30-60	15-35	1.40-1.60	0.2-0.6	0.08-0.18	4.5-5.5	Low----------	0.17			
MrB, MrD, MrF----	0-5	27-40	1.50-1.75	0.2-0.6	0.07-0.14	6.1-8.4	Moderate-----	0.32	5	8	<.5
Morristown	5-60	20-35	1.65-1.90	0.2-0.6	0.03-0.11	7.4-8.4	Moderate-----	0.32			
MsB, MsC, MsD, MsE----------	0-8	27-40	1.40-1.65	0.2-0.6	0.13-0.18	6.1-8.4	Moderate-----	0.43	2	4L	.5-2
Morristown	8-60	20-35	1.65-1.90	0.2-0.6	0.03-0.11	7.4-8.4	Moderate-----	0.32			
Ne----------	0-11	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low----------	0.43	5	5	1-4
Newark	11-32	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43			
	32-60	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low----------	0.43			
No----------	0-7	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	---	2-4
Nolin	7-60	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43			
OmB, OmC---------	0-8	12-18	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	4	5	.5-2
Omulga	8-24	20-35	1.30-1.45	0.6-2.0	0.18-0.22	3.6-5.5	Moderate-----	0.43			
	24-44	18-30	1.60-1.80	0.06-0.2	0.06-0.08	3.6-6.5	Moderate-----	0.43			
	44-58	20-35	1.50-1.60	0.2-0.6	0.18-0.21	4.5-7.3	Moderate-----	0.43			
	58-66	22-45	1.50-1.60	0.2-0.6	0.10-0.18	4.5-7.3	Moderate-----	0.32			
RaB----------	0-10	12-20	1.35-1.50	0.6-2.0	0.18-0.22	4.5-7.3	Low----------	0.32	4-3	5	1-3
Rawson	10-38	18-35	1.50-1.70	0.6-2.0	0.12-0.16	5.1-7.8	Low----------	0.32			
	38-65	35-55	1.60-1.85	<0.2	0.08-0.12	6.6-8.4	Moderate-----	0.32			
RfC----------	0-10	7-18	1.20-1.40	2.0-6.0	0.09-0.15	4.5-7.3	Low----------	0.24	4	---	.5-3
Rigley	10-40	7-18	1.30-1.60	2.0-6.0	0.09-0.15	3.6-5.5	Low----------	0.17			
	40-80	7-40	1.30-1.60	2.0-6.0	0.07-0.15	3.6-5.5	Low----------	0.17			
RgD----------	0-6	7-18	1.20-1.40	2.0-6.0	0.09-0.15	4.5-7.3	Low----------	0.17	4	8	.5-3
Rigley	6-32	7-18	1.30-1.60	2.0-6.0	0.09-0.15	3.6-5.5	Low----------	0.17			
	32-60	7-40	1.30-1.60	2.0-6.0	0.07-0.15	3.6-5.5	Low----------	0.17			
RhE:											
Rigley----------	0-6	7-18	1.20-1.40	2.0-6.0	0.09-0.15	4.5-7.3	Low----------	0.17	4	8	.5-3
	6-32	7-18	1.30-1.60	2.0-6.0	0.09-0.15	3.6-5.5	Low----------	0.17			
	32-60	7-40	1.30-1.60	2.0-6.0	0.07-0.15	3.6-5.5	Low----------	0.17			

TABLE 19.--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		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
RhE:											
Coshocton	0-6	15-23	1.30-1.50	0.6-2.0	0.18-0.23	3.6-7.3	Low	0.37	5-4	5	1-3
	6-43	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate	0.37			
	43-48	24-36	1.45-1.70	0.06-0.6	0.08-0.12	4.5-6.0	Moderate	0.28			
	48-50	---	---	---	---	---	---	---			
RoF	0-12	5-20	1.10-1.40	2.0-6.0	0.09-0.12	6.1-7.8	Low	0.15	3	8	2-4
Rodman	12-20	5-25	1.10-1.50	2.0-6.0	0.09-0.12	6.1-7.8	Low	0.20			
	20-60	0-10	1.60-1.70	>20	0.02-0.04	6.6-8.4	Low	0.10			
Se	0-10	18-27	1.30-1.45	0.6-2.0	0.18-0.22	4.5-7.3	Low	0.37	5	6	3-5
Sebring	10-55	22-35	1.45-1.65	0.2-0.6	0.14-0.18	5.1-7.3	Moderate	0.37			
	55-60	15-30	1.40-1.60	0.2-2.0	0.12-0.16	6.1-8.4	Moderate	0.37			
St	0-6	10-22	1.20-1.45	0.6-2.0	0.15-0.20	7.4-8.4	Low	0.32	5	5	1-3
Stonelick	6-75	5-18	1.30-1.55	2.0-6.0	0.08-0.14	7.4-8.4	Low	0.24			
Ta	0-8	5-18	1.15-1.40	0.6-6.0	0.15-0.21	5.1-7.3	Low	0.37	5	---	2-6
Tioga	8-34	5-18	1.15-1.45	0.6-6.0	0.07-0.20	5.1-7.3	Low	0.28			
	34-60	3-15	1.25-1.55	0.6-20	0.02-0.20	5.6-7.8	Low	0.28			
Tf	0-20	5-18	1.15-1.40	0.6-6.0	0.15-0.21	5.1-7.3	Low	0.37	5	---	2-6
Tioga	20-38	5-18	1.15-1.45	0.6-6.0	0.07-0.20	5.1-7.3	Low	0.28			
	38-60	3-15	1.25-1.55	0.6-20	0.02-0.20	5.6-7.8	Low	0.28			
Ud, Ug, Uh.											
Udorthents											
Uk:											
Udorthents.											
Pits.											
UsB:											
Urban land.											
Glenford	0-9	15-27	1.30-1.45	0.6-2.0	0.16-0.20	4.5-7.3	Low	0.37	5-4	6	1-3
	9-40	18-35	1.45-1.65	0.2-0.6	0.13-0.17	5.6-7.3	Low	0.43			
	40-60	15-30	1.40-1.60	0.2-2.0	0.12-0.17	5.6-7.8	Low	0.37			
UtA:											
Urban land.											
Nolin	0-7	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43	5	---	2-4
	7-60	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43			
UvB:											
Urban land.											
Watertown	0-10	5-15	1.20-1.60	2.0-6.0	0.10-0.14	4.5-7.3	Low	0.17	4	3	.5-2
	10-26	6-18	1.30-1.60	2.0-6.0	0.05-0.11	4.5-6.5	Low	0.10			
	26-60	2-10	1.30-1.60	6.0-20	0.04-0.06	4.5-6.5	Low	0.10			
UwC:											
Urban land.											
Wellston	0-7	13-27	1.30-1.50	0.6-2.0	0.18-0.22	5.1-6.5	Low	0.37	4-3	6	1-3
	7-30	18-35	1.30-1.65	0.6-2.0	0.17-0.21	4.5-6.0	Low	0.37			
	30-54	15-30	1.30-1.60	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.37			
	54-60	15-30	1.30-1.60	0.6-2.0	0.06-0.16	4.5-6.0	Low	0.20			

TABLE 19.--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		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
WaB, WaC--------- Watertown	0-12 12-25 25-42 42-80	5-15 6-18 2-10 0-5	1.20-1.60 1.30-1.60 1.30-1.60 1.40-1.70	2.0-6.0 2.0-6.0 6.0-20 6.0-20	0.10-0.14 0.05-0.11 0.04-0.06 0.03-0.06	4.5-7.3 4.5-6.5 4.5-6.5 5.1-7.8	Low---------- Low---------- Low---------- Low----------	0.17 0.10 0.10 0.10	4	3	.5-2
WhB, WhC2-------- Wellston	0-7 7-48 48-50	13-27 18-35 ---	1.30-1.50 1.30-1.65 ---	0.6-2.0 0.6-2.0 ---	0.18-0.22 0.17-0.21 ---	5.1-6.5 4.5-6.5 ---	Low---------- Low---------- ----------	0.37 0.37 ----	4-3	6	1-3
WmB, WmC2-------- Westgate	0-7 7-34 34-57 57-75 75-80	14-27 25-35 35-60 32-55 ---	1.30-1.50 1.30-1.50 1.40-1.60 1.40-1.60 ---	0.6-2.0 0.6-2.0 0.06-0.2 0.06-0.2 ---	0.20-0.24 0.17-0.22 0.15-0.18 0.10-0.15 ---	3.6-7.3 4.5-6.0 5.1-7.3 6.6-8.4 ---	Low---------- Moderate----- High--------- High--------- ----------	0.43 0.43 0.32 0.32 ----	4	6	1-3
WtC2, WtD2------- Westmoreland	0-6 6-32 32-44 44-50	15-30 20-35 18-35 ---	1.20-1.40 1.20-1.50 1.20-1.50 ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.20 0.12-0.18 0.06-0.10 ---	4.5-6.0 4.5-6.0 5.1-6.0 ---	Low---------- Low---------- Low---------- ----------	0.37 0.28 0.17 ----	3	5	1-4
WtE-------------- Westmoreland	0-9 9-45 45-60 60-70	15-30 20-35 18-35 ---	1.20-1.40 1.20-1.50 1.20-1.50 ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.20 0.12-0.18 0.06-0.10 ---	4.5-6.0 4.5-6.0 5.1-6.0 ---	Low---------- Low---------- Low---------- ----------	0.37 0.28 0.17 ----	3	5	1-4
WuC2, WuD2, WuE2: Westmoreland---- Guernsey-------- WvD: Westmoreland---- Urban land.	0-9 9-40 40-60 60-62 0-8 8-52 52-55 55-57 0-9 9-40 40-60 60-65	15-30 20-35 18-35 --- 13-27 35-60 35-60 --- 15-30 20-35 18-35 ---	1.20-1.40 1.20-1.50 1.20-1.50 --- 1.30-1.50 1.40-1.60 1.40-1.60 --- 1.20-1.40 1.20-1.50 1.20-1.50 ---	0.6-2.0 0.6-2.0 0.6-2.0 --- 0.6-2.0 0.06-0.6 0.06-0.6 --- 0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.20 0.12-0.18 0.06-0.10 --- 0.19-0.24 0.10-0.15 0.06-0.10 --- 0.16-0.20 0.12-0.18 0.06-0.10 ---	4.5-6.0 4.5-6.0 5.1-6.0 --- 4.5-7.3 4.5-7.8 5.1-8.4 --- 4.5-6.0 4.5-6.0 5.1-6.0 ---	Low---------- Low---------- Low---------- ---------- Low---------- High--------- High--------- ---------- Low---------- Low---------- Low---------- ----------	0.37 0.28 0.17 ---- 0.43 0.32 0.32 ---- 0.37 0.28 0.17 ----	3 3-2 3 	5 6 5 	1-4 1-3 1-4
ZnB, ZnC2-------- Zanesville	0-7 7-28 28-45 45-80	12-27 18-35 18-33 20-40	1.35-1.40 1.35-1.45 1.50-1.75 1.50-1.70	0.6-2.0 0.6-2.0 0.06-0.6 0.2-2.0	0.19-0.23 0.17-0.22 0.08-0.12 0.08-0.12	4.5-6.0 4.5-6.0 4.5-6.0 4.5-6.0	Low---------- Low---------- Low---------- Low----------	0.43 0.37 0.37 0.28	3	--- 	1-2

TABLE 20.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AaB, AaC2, AaD2--- Aaron	C	None	---	---	1.5-3.0	Perched	Nov-Mar	40-60	Soft	High	High	Moderate.
AcB:												
Aaron	C	None	---	---	1.5-3.0	Perched	Nov-Mar	40-60	Soft	High	High	Moderate.
Upshur	D	None	---	---	>6.0	---	---	>40	Soft	Moderate	High	Moderate.
AfB, AfC2 Alford	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	High.
BeB, BeD2, BeE--- Berks	C	None	---	---	>6.0	---	---	20-40	Soft	Low	Low	High.
BkF:												
Berks	C	None	---	---	>6.0	---	---	20-40	Soft	Low	Low	High.
Westmoreland	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
BoB, BoD, BpF Bethesda	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	High.
BsC2, BsE Brookside	C	None	---	---	2.5-4.0	Perched	Mar-Jun	>60	---	Moderate	Moderate	Moderate.
Cb Chagrin	B	Rare	---	---	4.0-6.0	Apparent	Feb-Mar	>60	---	Moderate	Low	Moderate.
CcA, CcB Chavies	B	None	---	---	>6.0	---	---	>60	---	---	Low	Moderate.
CeA, CeB, ChA, ChB, ChC Chili	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
CkA Cidermill	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
CnB, CnC2 Cincinnati	C	None	---	---	2.5-4.0	Perched	Jan-Apr	>60	---	High	Moderate	High.
CpC2 Clarksburg	C	None	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
CrC:												
Claysville	C	None	---	---	1.0-2.0	Perched	Nov-Jun	>60	---	High	High	Low.
Guernsey	C	None	---	---	1.5-3.0	Perched	Jan-Apr	>50	Soft	High	High	Moderate.
CsC2, CsD Coshocton	C	None	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High	High	High.
CtE:												
Coshocton	C	None	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High	High	High.
Westmoreland	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
Ds. Dumps and Pits												
FaB, FaD, FaE, FbF Fairpoint	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
FcA, FcB Fitchville	C	None	---	---	1.0-2.5	Perched	Nov-May	>60	---	High	High	Moderate.
FkB:												
Frankstown Variant	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	High.
Mertz	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
GdB, GdC2 Gilpin	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low	High.
GeD2, GeE2:												
Gilpin	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low	High.
Upshur	D	None	---	---	>6.0	---	---	>40	Soft	Moderate	High	Moderate.
GfA, GfB, GfC2 Glenford	C	None	---	---	2.0-3.5	Perched	Nov-May	>60	---	High	Moderate	Moderate.
GtC2, GtD2:												
Guernsey	C	None	---	---	1.5-3.0	Perched	Jan-Apr	>50	Soft	High	High	Moderate.
Upshur	D	None	---	---	>6.0	---	---	>40	Soft	Moderate	High	Moderate.
HaC2, HaD2 Homewood	C	None	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Low	Moderate.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
JtA---------- Jimtown	C	None---------	---	---	1.0-2.5	Apparent	Dec-May	>60	---	High-----	High-----	High.
KeB, KeC2---------- Keene	C	None---------	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High-----	High-----	High.
Km---------- Killbuck	C/D	Occasional	Brief-----	Jan-Dec	0-1.0	Apparent	Nov-Jun	>60	---	High-----	High-----	Moderate.
LaC---------- Lakin	A	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
LcD:												
Lakin----------	A	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
Alford----------	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	High.
Lk---------- Lindside	C	Occasional	Very brief or brief.	Dec-Apr	1.5-3.0	Apparent	Dec-Apr	>60	---	High-----	Moderate	Low.
Lm---------- Lobdell	B	Occasional	Brief-----	Jan-Apr	2.0-3.5	Apparent	Dec-Apr	>60	---	High-----	Low------	Moderate.
Lo---------- Lorain	C/D	None---------	---	---	+1-1.0	Perched	Jan-Apr	>60	---	High-----	High-----	Moderate.
LpC2, LpD2--------- Lowell	C	None---------	---	---	2.5-5.0	Perched	Jan-Mar	>40	Hard	Moderate	High-----	Moderate.
LrE2, LrF:												
Lowell----------	C	None---------	---	---	>6.0	---	---	>40	Hard	Moderate	High-----	Moderate.
Gilpin----------	C	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	High.
Lu---------- Luray	C/D	None---------	---	---	+1-1.0	Apparent	Nov-Jul	>60	---	High-----	High-----	Low.
MaB, MbC2--------- Markland	C	None---------	---	---	3.0-6.0	Perched	Mar-Apr	>60	---	Moderate	High-----	Moderate.
McD2:												
Markland----------	C	None---------	---	---	3.0-6.0	Perched	Mar-Apr	>60	---	Moderate	High-----	Moderate.
Glenford----------	C	None---------	---	---	2.0-3.5	Perched	Nov-May	>60	---	High-----	Moderate	Moderate.
MdA---------- McGary	C	None---------	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	Moderate	High-----	Low.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Me Melvin	D	Frequent	Brief	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High	High	Low.
MkD Mertz	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
MrB, MrD, MrF, MsB, MsC, MsD, MsE Morristown	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Ne Newark	C	Frequent	Brief	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High	High	Low.
No Nolin	B	Occasional	Brief	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	High	Low	Moderate.
OmB, OmC Omulga	C	None	---	---	2.0-3.5	Perched	Jan-Apr	>60	---	High	Moderate	High.
RaB Rawson	B	None	---	---	1.5-3.0	Perched	Jan-Apr	>60	---	Moderate	High	High.
RfC, RgD Rigley	B	None	---	---	>6.0	---	---	>60	---	---	Low	High.
RhE: Rigley	B	None	---	---	>6.0	---	---	>60	---	---	Low	High.
Coshocton	C	None	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High	High	High.
RoF Rodman	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Low.
Se Sebring	B/D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	High	High	Moderate.
St Stonelick	B	Occasional	Brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Low	Low.
Ta Tioga	B	Rare	---	---	3.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low	Moderate.
Tf Tioga	B	Occasional	Brief	Nov-May	3.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low	Moderate.
Ud, Ug, Uh. Udorthents												

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Uk:												
Udorthents.												
Pits.												
UsB:												
Urban land.												
Glenford	C	None	---	---	2.0-3.5	Perched	Nov-May	>60	---	High	Moderate	Moderate.
UtA:												
Urban land.												
Nolin	B	Rare	---	---	3.0-6.0	Apparent	Feb-Mar	>60	---	---	Low	Moderate.
UvB:												
Urban land.												
Watertown	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
UwC:												
Urban land.												
Wellston	B	None	---	---	>6.0	---	---	>40	Soft	High	Moderate	High.
WaB, WaC	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
Watertown												
WhB, WhC2	B	None	---	---	>6.0	---	---	>40	Soft	High	Moderate	High.
Wellston												
WmB, WmC2	C	None	---	---	2.0-3.5	Perched	Dec-Apr	60-80	Soft	High	High	Moderate.
Westgate												
WtC2, WtD2, WtE	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
Westmoreland												
WuC2, WuD2, WuE2:												
Westmoreland	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
Guernsey	C	None	---	---	1.5-3.0	Perched	Jan-Apr	>50	Soft	High	High	Moderate.
WvD:												
Westmoreland	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
Urban land.												
ZnB, ZnC2	C	None	---	---	2.0-3.0	Perched	Dec-Apr	>60	Hard	High	Moderate	High.
Zanesville												

TABLE 21.--ENGINEERING INDEX TEST DATA

(Tests performed by State of Ohio, Department of Transportation, Division of Highways, Testing Laboratory. Dashes indicate that data were not available. RN means report number; HO, horizon; MAX, maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; AA, AASHTO; UN, Unified; and NP, nonplastic)

Soil name and location	Parent material	RN	Depth	HO	Moisture density		Mechanical analysis							LL	PI	Classification	
							Percentage passing sieve--				Percentage smaller than--						
					MAX	OPT	No. 4	No. 10	No. 40	No. 200	0.02 mm	0.005 mm	0.002 mm			AA	UN
			In		Lb/ cu ft	Pct								Pct			
Alford silt loam:	Loess	MS-26															
6 miles north		37761	0-10	Ap	105	17	100	100	100	98	---	24	---	28	6	A-4	CL-ML
of Zanesville,		37762	20-30	Bt2	108	17	100	100	100	99	---	31	---	36	16	A-6	CL
in Muskingum		37763	50-65	C	113	16	100	100	100	99	---	24	---	28	7	A-4	CL-ML
Township; 3,400 feet west and 2,000 feet north of the southeast corner of sec. 21, T. 2 N., R. 8 W.																	
Claysville silty clay loam:	Colluvium from clay shale, limestone, and siltstone	MS-32															
3.5 miles east		47023	0-13	A	95	24	100	100	97	92	---	52	---	53	27	A-7	CH
of Gaysport, in		47024	13-54	B	110	16	97	89	83	76	---	49	---	57	33	A-7	CH
Bluerock		47025	54-75	C	107	17	90	79	75	73	---	50	---	50	28	A-7	CL, CH
Township; 2,400 feet east of Imlay Road intersection along Cutler Lake Road, and 300 feet north of road; in sec. 24, T. 12 N., R. 12 W.																	

TABLE 21.--ENGINEERING INDEX TEST DATA--Continued

Soil name and location	Parent material	RN	Depth	HO	Moisture density		Mechanical analysis							LL	PI	Classification	
							Percentage passing sieve--				Percentage smaller than--						
					MAX	OPT	No. 4	No. 10	No. 40	No. 200	0.02 mm	0.005 mm	0.002 mm			AA	UN
			In		Lb/ cu ft	Pct								Pct			
Keene silt loam: 6.0 miles southwest of Dresden, in Licking Township; 1,400 feet east along old Stagecoach Road from the intersection with Baker Road, and 150 feet south; T. 2 N., R. 9 W.	Loess and the underlying residuum of clay shale and siltstone	MS-25 37757	0-8	Ap	105	18	100	100	97	94	---	23	---	34	10	A-4	CL-ML
		37758	13-22	Bt1	108	18	100	100	99	96	---	30	---	34	9	A-4	CL-ML
		37759	30-38	Bt3	109	18	99	96	91	85	---	47	---	37	12	A-6	CL-ML
		37760	58-74	2C	106	19	99	95	88	81	---	57	---	36	12	A-6	CL-ML
Westgate silt loam: 3.5 miles southeast of Duncan Falls, in Bluerock Township; about 1,710 feet south and 1,740 feet west of the northeast corner of sec. 3, T. 12 N., R. 12 W.	Loess and the underlying residuum of siltstone, clay shale, and limestone	MS-28 45110	1-7	Ap	107	15	100	100	99	97	---	30	---	---	NP	A-4	ML
		45111	18-28	Bt2	109	18	100	100	99	98	---	44	---	40	25	A-6	CL
		45112	43-57	2Bt5	116	15	100	100	100	98	---	55	---	40	20	A-6	CL
		45113	75-118	2Cr	113	17	100	100	98	95	---	52	---	46	22	A-7	CL

TABLE 22.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Aaron	Fine, mixed, mesic Aquic Hapludalfs
Alford	Fine-silty, mixed, mesic Typic Hapludalfs
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Brookside	Fine, mixed, mesic Typic Hapludalfs
Chagrin	Fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Chavies	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Chili	Fine-loamy, mixed, mesic Typic Hapludalfs
Cidermill	Fine-silty, mixed, mesic Ultic Hapludalfs
Cincinnati	Fine-silty, mixed, mesic Typic Fragiudalfs
Clarksburg	Fine-loamy, mixed, mesic Typic Fragiudalfs
Claysville	Fine, mixed, mesic Aquic Hapludolls
Coshocton	Fine-loamy, mixed, mesic Aquultic Hapludalfs
Fairpoint	Loamy-skeletal, mixed, nonacid, mesic Typic Udorthents
Fitchville	Fine-silty, mixed, mesic Aeric Ochraqualfs
Frankstown Variant	Fine-loamy, mixed, mesic Typic Hapludults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Glenford	Fine-silty, mixed, mesic Aquic Hapludalfs
Guernsey	Fine, mixed, mesic Aquic Hapludalfs
Homewood	Fine-loamy, mixed, mesic Typic Fragiudalfs
Jimtown	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Keene	Fine-silty, mixed, mesic Aquic Hapludalfs
Killbuck	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Lakin	Mixed, mesic Alfic Udipsamments
Lindside	Fine-silty, mixed, mesic Fluvaquentic Eutrochrepts
Lobdell	Fine-loamy, mixed, mesic Fluvaquentic Eutrochrepts
Lorain	Fine, illitic, mesic Mollic Ochraqualfs
Lowell	Fine, mixed, mesic Typic Hapludalfs
Luray	Fine-silty, mixed, mesic Typic Argiaquolls
Markland	Fine, mixed, mesic Typic Hapludalfs
McGary	Fine, mixed, mesic Aeric Ochraqualfs
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Mertz	Loamy-skeletal, mixed, mesic Typic Hapludults
Morristown	Loamy-skeletal, mixed (calcareous), mesic Typic Udorthents
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
*Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Omulga	Fine-silty, mixed, mesic Typic Fragiudalfs
*Rawson	Fine-loamy, mixed, mesic Typic Hapludalfs
Rigley	Coarse-loamy, mixed, mesic Typic Hapludults
Rodman	Sandy-skeletal, mixed, mesic Typic Hapludolls
Sebring	Fine-silty, mixed, mesic Typic Ochraqualfs
Stonelick	Coarse-loamy, mixed (calcareous), mesic Typic Udifluvents
Tioga	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Udorthents	Udorthents
Upshur	Fine, mixed, mesic Typic Hapludalfs
Watertown	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Wellston	Fine-silty, mixed, mesic Ultic Hapludalfs
Westgate	Fine-silty, mixed, mesic Typic Hapludalfs
Westmoreland	Fine-loamy, mixed, mesic Ultic Hapludalfs
Zanesville	Fine-silty, mixed, mesic Typic Fragiudalfs

Interpretive Groups

INTERPRETIVE GROUPS

(Dashes indicate that the soil is not assigned to the interpretive group)

Map symbol and soil name	Land capability	Pasture and hayland suitability group	Woodland ordination symbol (north/south aspect)	Prime farmland
AaB---- Aaron	IIe	A-6	4C	Yes
AaC2---- Aaron	IIIe	A-6	4C	No
AaD2---- Aaron	IVe	A-2	4R	No
AcB:				
Aaron----	IIe	A-6	4C	Yes
Upshur----	IIe	F-5	3C	Yes
AfB---- Alford	IIe	A-6	5A	Yes
AfC2---- Alford	IIIe	A-6	5A	No
BeB---- Berks	IIe	F-1	4F	No
BeD2---- Berks	IVe	F-1	4R/3R	No
BeE---- Berks	VIe	F-2	4R/3R	No
BkF:				
Berks----	VIIe	H-1	4R/3R	No
Westmoreland----	VIIe	H-1	4R	No
BoB, BoD---- Bethesda	VIs	E-3	---	No
BpF---- Bethesda	VIIe	H-1	---	No
BsC2---- Brookside	IIIe	A-1	5A	No
BsE---- Brookside	VIe	A-3	5R/4R	No
Cb---- Chagrin	I	A-5	5A	Yes
CcA---- Chavies	I	A-1	4A	Yes
CcB---- Chavies	IIe	A-1	4A	Yes
CeA---- Chili	IIs	A-1	4A	Yes

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Pasture and hayland suitability group	Woodland ordination symbol (north/south aspect)	Prime farmland
CeB---- Chili	IIe	A-1	4A	Yes
ChA---- Chili	IIs	A-1	4A	Yes
ChB---- Chili	IIe	A-1	4A	Yes
ChC---- Chili	IIIe	A-1	4A	No
CkA---- Cidermill	I	A-1	5A	Yes
CnB---- Cincinnati	IIe	F-3	4A	Yes
CnC2---- Cincinnati	IIIe	F-3	4A	No
CpC2---- Clarksburg	IIIe	F-3	4A	No
CrC:				
Claysville----	IIIw	C-2	---	No
Guernsey----	IIIw	A-6	4A	No
CsC2---- Coshocton	IIIe	A-6	4A	No
CsD---- Coshocton	IVe	A-2	4R/3R	No
CtE:				
Coshocton----	VIe	A-3	4R/3R	No
Westmoreland----	VIe	A-3	4R	No
Ds. Dumps and Pits				
FaB---- Fairpoint	IIIs	B-4	---	No
FaD---- Fairpoint	IVs	B-4	---	No
FaE---- Fairpoint	VIe	E-2	---	No
FbF---- Fairpoint	VIIe	H-1	---	No
FcA---- Fitchville	IIw	C-1	5A	Yes*
FcB---- Fitchville	IIe	C-1	5A	Yes*

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Pasture and hayland suitability group	Woodland ordination symbol (north/south aspect)	Prime farmland
FkB:				
Frankstown Variant	IIe	F-1	4D	No
Mertz	IIe	B-1	4F	No
GdB	IIe	F-1	4A	Yes
Gilpin				
GdC2	IIIe	F-1	4A	No
Gilpin				
GeD2:				
Gilpin	IVe	F-1	4R	No
Upshur	IVe	F-5	4R/3R	No
GeE2:				
Gilpin	VIe	F-2	4R	No
Upshur	VIe	F-6	4R/3R	No
GfA	I	A-6	5A	Yes
Glenford				
GfB	IIe	A-6	5A	Yes
Glenford				
GfC2	IIIe	A-6	5A	No
Glenford				
GtC2:				
Guernsey	IVe	A-6	4A	No
Upshur	IVe	F-5	3C	No
GtD2:				
Guernsey	VIe	A-6	4R	No
Upshur	VIe	F-5	4R/3R	No
HaC2	IIIe	F-3	5D	No
Homewood				
HaD2	IVe	F-3	5R	No
Homewood				
JtA	IIw	C-1	5A	Yes*
Jimtown				
KeB	IIe	A-6	4A	Yes
Keene				
KeC2	IIIe	A-6	4A	No
Keene				
Km	IIIw	C-3	5W	Yes*
Killbuck				
LaC	IVs	B-1	3S	No
Lakin				

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Pasture and hayland suitability group	Woodland ordination symbol (north/south aspect)	Prime farmland
LcD:				
Lakin	IVe	B-1	3S	No
Alford	IVe	A-2	5R	No
Lk Lindside	IIw	A-5	5A	Yes
Lm Lobdell	IIw	A-5	5A	Yes
Lo Lorain	IIIw	C-2	5W	Yes*
LpC2 Lowell	IIIe	A-1	4C	No
LpD2 Lowell	IVe	A-2	4C/3C	No
LrE2:				
Lowell	VIe	A-3	5R	No
Gilpin	VIe	A-3	4R	No
LrF:				
Lowell	VIIe	H-1	5R	No
Gilpin	VIIe	H-1	4R	No
Lu Luray	IIw	C-1	5W	Yes*
MaB Markland	IIIe	F-5	4C	Yes
MbC2 Markland	IVe	F-5	4C	No
McD2:				
Markland	VIe	F-5	4R	No
Glenford	VIe	A-2	5R	No
MdA McGary	IIIw	C-2	4W	Yes*
Me Melvin	IIIw	C-3	4W	Yes**
MkD Mertz	VIe	A-3	4F	No
MrB, MrD Morristown	VIs	E-3	---	No
MrF Morristown	VIIe	H-1	---	No

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Pasture and hayland suitability group	Woodland ordination symbol (north/south aspect)	Prime farmland
MsB---------- Morristown	IIIs	B-4	---	No
MsC, MsD---------- Morristown	IVs	B-4	---	No
MsE---------- Morristown	VIe	E-2	---	No
Ne---------- Newark	IIw	C-3	5W	Yes**
No---------- Nolin	IIw	A-5	5A	Yes
OmB---------- Omulga	IIe	F-3	4D	Yes
OmC---------- Omulga	IIIe	F-3	4D	No
RaB---------- Rawson	IIe	A-1	4A	Yes
RfC---------- Rigley	IIIe	A-1	4A	No
RgD---------- Rigley	IVe	A-2	4R/3R	No
RhE:				
Rigley----------	VIe	A-3	4R/3R	No
Coshocton---------	VIe	A-3	4R/3R	No
RoF---------- Rodman	VIIs	H-1	4R	No
Se---------- Sebring	IIIw	C-2	5W	Yes*
St---------- Stonelick	IIw	A-5	4A	Yes
Ta---------- Tioga	IIs	A-5	4A	Yes
Tf---------- Tioga	IIw	A-5	4A	Yes
Ud, Ug, Uh. Udorthents				
Uk: Udorthents.				
Pits.				
UsB: Urban land.				

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Pasture and hayland suitability group	Woodland ordination symbol (north/south aspect)	Prime farmland
UsB:				
Glenford.				
UtA:				
Urban land.				
Nolin.				
UvB:				
Urban land.				
Watertown.				
UwC:				
Urban land.				
Wellston.				
WaB---------- Watertown	IIIs	B-1	4A	No
WaC---------- Watertown	IIIe	B-1	4A	No
WhB---------- Wellston	IIe	A-6	4A	Yes
WhC2---------- Wellston	IIIe	A-6	4A	No
WmB---------- Westgate	IIe	A-6	4A	Yes
WmC2---------- Westgate	IIIe	A-6	4A	No
WtC2---------- Westmoreland	IIIe	A-1	4A	No
WtD2---------- Westmoreland	IVe	A-2	4R	No
WtE---------- Westmoreland	VIe	A-3	4R	No
WuC2:				
Westmoreland------	IIIe	A-1	4A	No
Guernsey----------	IIIe	A-6	4A	No
WuD2:				
Westmoreland------	IVe	A-2	4R	No
Guernsey----------	IVe	A-2	4R	No
WuE2:				
Westmoreland------	VIe	A-3	4R	No
Guernsey----------	VIe	A-3	4R	No

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability	Pasture and hayland suitability group	Woodland ordination symbol (north/south aspect)	Prime farmland
WvD: Westmoreland. Urban land.				
ZnB---------- Zanesville	IIe	F-3	4A	Yes
ZnC2---------- Zanesville	IIIe	F-3	4A	No

* Where drained.

** Where drained and either protected from flooding or not frequently flooded during the growing season.

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