United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of McLean County, Illinois

How To Use This Soil Survey

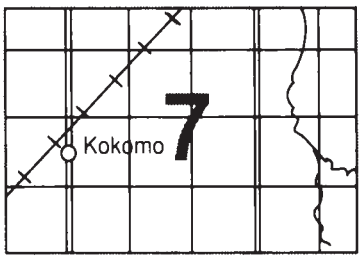
General Soil Map

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

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

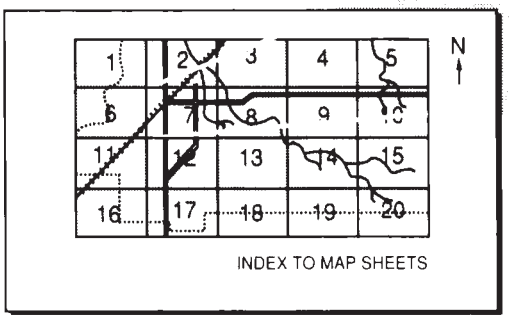
Detailed Soil Maps

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



MAP SHEET

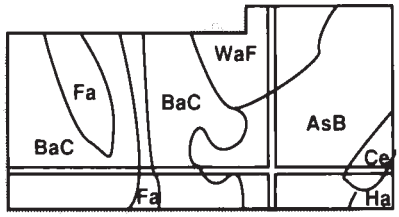
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

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

MAP SHEET



AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1990. Soil names and descriptions were approved in 1992. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1990. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the McLean County Soil and Water Conservation District. The Illinois Department of Agriculture and the McLean County Board provided financial assistance.

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

This soil survey is Illinois Agricultural Experiment Station Soil Report 159.

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Cover: The moderately well drained Birkbeck and Mayville soils in this area along Evergreen Lake are well suited to recreational uses.

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Foreword

This soil survey contains information that can be used in land-planning programs in McLean County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

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

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

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

William J. Gradle
State Conservationist
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Soil Survey of McLean County, Illinois

By Roger D. Windhorn, Natural Resources Conservation Service

Soils surveyed by Charles L. Love, Kent Brinkman, Donald J. Fehrenbacher, Thomas Ziegler, Thomas Guyse, Peter C. Weikle, Mark Carlson, Jeffrey Olson, Michael Walczynski, Eric E. Engel, and Roger D. Windhorn, Natural Resources Conservation Service, and Karla D. Hanson, James K. Hornickel, Steven R. Murkowski, B. Ward Lenz, Gloria J. Westphal, Julie W. Cully, Betsy Kaup, Dave Lohnes, and Dennis Keene, McLean County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with the Illinois Agricultural Experiment Station

McLean County is in the central part of Illinois (fig. 1). It has a total land area of 759,795 acres, or about 1,187 square miles. It is the largest county in the State. In 1988, the population of the county was 127,000. Bloomington is the county seat.

This soil survey updates the survey of McLean County published in 1915 (Hopkins and others, 1915). It provides more information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section provides general information about the survey area. It describes settlement and development, farming, physiography and drainage, and climate.

Settlement and Development

The survey area was inhabited as much as 10,000 years ago. Indian mounds are east of Heyworth and along the Mackinaw River in the Evergreen Lake area. The earliest recorded Indian activity is the Battle of Etnataek, which took place south of Arrowsmith in 1730 (Brigham, 1951). This battle was between the Fox Indians and the French. After a 23-day siege, the French defeated the Indians.

The first European families settled in the area in 1822 (Tate, 1972). They settled in wooded areas near streams. The uplands were the first areas cleared for farming. Later, with the help of tile and dredging, the lower areas were drained and converted to agricultural uses.

McLean County was established in 1830. It was named for John McLean, who was the first representative to Congress from the State of Illinois (McLean Centennial Association, 1955).

As a result of the Swamp Land Act of 1850, the State of Illinois gave 23,793 acres of the lowest land in the area to McLean County (Hopkins and others, 1915). These lands were to be reclaimed by dredging and tiling. Because no workable plan could be decided on, however, the wetlands were sold. With the proceeds from this sale, the county provided $70,000 for the purchase of land north of Bloomington, where Normal University (Illinois State University) had its beginning.

Transportation systems in the county are well developed. They include five State highways, four U.S. highways, two interstate highways, several railroad lines, one municipal airport, and numerous paved county roads.

Farming

Farming is among the primary enterprises in the county. Corn and soybeans are the main crops. Grasses and legumes and winter wheat are also grown.

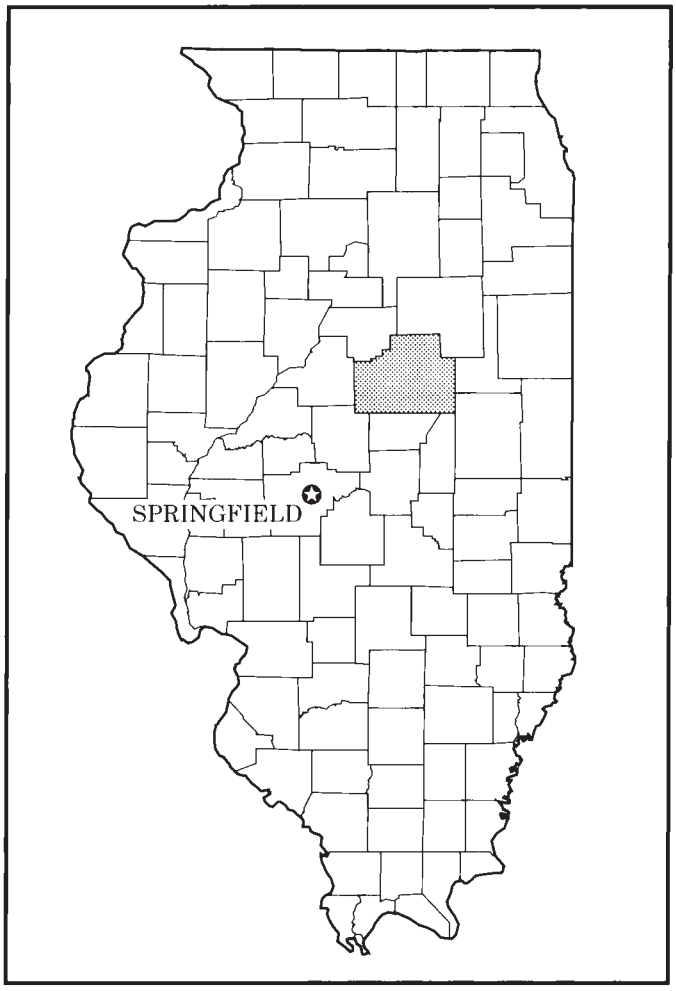

Figure 1.—Location of McLean County in Illinois.

Some of the farms raise livestock. Many of the animals are raised in confinement operations.

In 1982, the county had about 2,126 farms, which made up 745,113 acres, or about 98 percent of the total land area (U.S. Department of Commerce, 1983b). The average farm size was 350 acres, or about 50 acres larger than the average farm size for the State of Illinois (U.S. Department of Commerce, 1983a). Cropland made up 701,075 acres. Of this total, 385,729 acres was used for corn and 287,205 acres for soybeans. The rest of the acreage was used for small grain or for pasture and hay.

In 1982, the county produced about 24,000 head of cattle and calves and sold about 134,000 hogs and pigs (U.S. Department of Commerce, 1983b).

Physiography and Drainage

McLean County is mainly on a loess-covered till plain characterized by numerous terminal glacial moraines cutting diagonally across the county from northwest to southeast. Glacial ice, running water, and windblown deposits have all contributed to the landforms in the county. In general, nearly all of the ridges and knobs in the county have a glacial origin. These areas were then modified by the wearing down of erosion and the filling in of lower areas with outwash sediments. Finally, the entire landscape has been covered by a blanket of loess, which tends to smooth out landscape features.

The Bloomington Moraine is one of the major landform features, especially in the eastern and northwestern parts of the county. This moraine cuts through the center of the county. South of the moraine the landscape is mainly nearly level to sloping, except near the major streams, such as Kickapoo Creek and Sugar Creek. In these areas, stream dissection has resulted in more variable landscapes. In the northeastern part of the county, north of the moraine, the landscape is primarily gently sloping and sloping but varies near the Mackinaw and Sangamon Rivers. In the extreme northwestern part of the county, the landscape is gently sloping to very steep. This range is a result of the variable slopes on the Bloomington Moraine and of the stream dissection along the Mackinaw River.

One of the lowest points in the county is in the southwestern part where Sugar Creek flows out of the area. The elevation in this location is about 600 feet above sea level. One of the highest points is in the area due west of Moraine View State Park. This area is on the Bloomington Moraine and is at an elevation of about 920 feet above sea level.

In general, water south of the Bloomington Moraine flows to the southwest through a series of creeks, such as Kickapoo Creek, Sugar Creek, and Salt Creek. This water eventually empties into the Illinois River drainage system. The Sangamon River, in the eastern part of the county, flows to the east and eventually empties into the Illinois River outside of McLean County. North of the Bloomington Moraine, water flows to the northwest, toward the Mackinaw River, which is also part of the Illinois River drainage system. Surface water in the extreme northeastern part of the county flows due north into Livingston County and eventually empties into the Vermillion River.

The county has about 1,500 acres of impounded water. Most of this water is in Lake Bloomington, Dawson Lake, Evergreen Lake, and Spin Lake. The rest is in smaller, privately owned ponds.

Climate

Wayne Armstrong and Wayne Wendland, Illinois State Water Survey, helped prepare this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Chenoa in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 25.7 degrees F and the average daily minimum temperature is 17.3 degrees. The lowest temperature on record, which occurred on January 20, 1985, is -23 degrees. In summer, the average temperature is 72.6 degrees and the average daily maximum temperature is 84.3 degrees. The highest recorded temperature, which occurred on June 25 and August 16, 1988, is 103 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 34.8 inches. Of this, 21.5 inches, or 62 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18.18 inches. The heaviest 1-day rainfall during the period of record was 5.21 inches.

The average seasonal snowfall is 25.2 inches. The greatest snow depth at any one time during the period of record was 21 inches. On the average, 38 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 65 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 67 percent of the time possible in summer and 44 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 8.7 miles per hour, in March.

How This Survey Was Made

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

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

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

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

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil

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

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

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

Some of the soil names and delineations on the soil maps in this survey do not fully agree with those on the soil maps of the surveys of adjacent counties. Differences are mainly the result of variations in the extent of the soils in the survey areas.

Map Unit Composition

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

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

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

General Soil Map Units

The general soil map in this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

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

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Ipava-Sable Association

Nearly level, somewhat poorly drained and poorly drained, silty soils that formed in loess; on uplands

This association is on broad interfluves, on foot slopes, in shallow depressions, and in shallow drainageways. Slopes range from 0 to 2 percent.

This association makes up about 25 percent of the county. It is about 40 percent Ipava soils, 30 percent Sable soils, and 30 percent soils of minor extent.

The somewhat poorly drained Ipava soils are on broad interfluves, on foot slopes of low ridges, and in shallow drainageways. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 7 inches—black, friable silt loam

Subsurface layer:
7 to 11 inches—very dark gray, friable silt loam

Subsoil:
11 to 20 inches—brown, mottled, friable silty clay loam
20 to 28 inches—dark grayish brown, mottled, friable silty clay loam
28 to 52 inches—dark grayish brown, mottled, calcareous, friable silt loam

Substratum:
52 to 60 inches—dark grayish brown, mottled, calcareous, friable silt loam

The poorly drained Sable soils are on broad interfluves, in shallow depressions, and in shallow drainageways. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 12 inches—black, friable silty clay loam

Subsoil:
12 to 37 inches—very dark gray and gray, mottled, firm silty clay loam
37 to 54 inches—light gray, mottled, firm silt loam

Substratum:
54 to 60 inches—light gray, mottled, firm silt loam

Of minor extent in this association are the moderately well drained Catlin and Tama soils on the higher side slopes and shoulders and the very poorly drained Peotone soils in closed depressions.

This association is used mainly for cultivated crops, pasture, dwellings, or septic tank absorption fields.

This association is well suited to cultivated crops and moderately suited to pasture and hay. The wetness caused by a seasonal high water table is a major limitation. Ponding in the shallow depressions and erosion in the more sloping areas are also limitations.

This association is poorly suited to dwellings, septic tank absorption fields, and local roads and streets. The wetness is the main limitation affecting dwellings. The wetness and restricted permeability are the main concerns affecting septic tank absorption fields. Low strength, the wetness, and the potential for frost action are limitations on sites for local roads and streets.

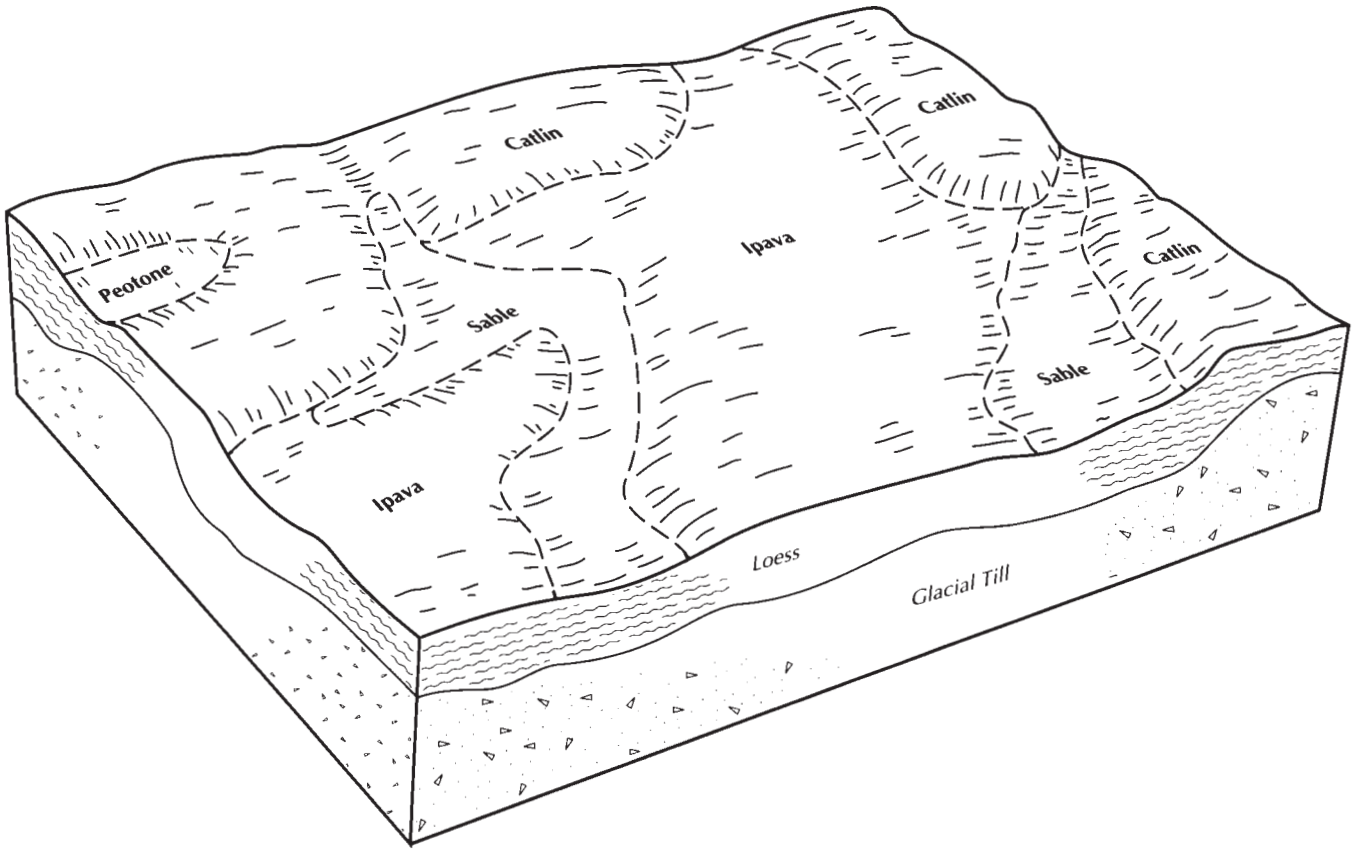

Figure 2.—Typical pattern of soils and parent material in the Catlin-Ipava-Sable association.

2. Catlin-Ipava-Sable Association

Nearly level to sloping, moderately well drained to poorly drained, silty soils that formed in loess and glacial till and in loess; on uplands

This association is on summits, shoulders, side slopes, foot slopes, and broad interfluves with shallow depressions. The landscape is incised by shallow upland drainageways. Slopes range from 0 to 10 percent.

This association makes up about 21 percent of the county. It is about 35 percent Catlin soils, 30 percent Ipava soils, 15 percent Sable soils, and 20 percent soils of minor extent (fig. 2).

The moderately well drained Catlin soils are on summits, shoulders, and side slopes. They are gently sloping and sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:

0 to 9 inches—black and very dark grayish brown (mixed with dark yellowish brown), friable silt loam

Subsoil:

9 to 18 inches—dark yellowish brown, friable silty clay loam
18 to 43 inches—yellowish brown, friable silt loam
43 to 48 inches—yellowish brown, calcareous, friable silt loam

Substratum:

48 to 60 inches—yellowish brown, calcareous, friable loam

The somewhat poorly drained Ipava soils are on broad interfluves and foot slopes and in shallow drainageways. They are nearly level. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:

0 to 7 inches—black, friable silt loam

Subsurface layer:
7 to 11 inches—very dark gray, friable silt loam

Subsoil:
11 to 20 inches—brown, mottled, friable silty clay loam
20 to 28 inches—dark grayish brown, mottled, friable silty clay loam
28 to 52 inches—dark grayish brown, mottled, calcareous, friable silt loam

Substratum:
52 to 60 inches—dark grayish brown, mottled, calcareous, friable silt loam

The poorly drained Sable soils are on broad interfluves, in shallow depressions, and in shallow drainageways. They are nearly level. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 12 inches—black, friable silty clay loam

Subsoil:
12 to 37 inches—very dark gray and gray, mottled, firm silty clay loam
37 to 54 inches—light gray, mottled, firm silt loam

Substratum:
54 to 60 inches—light gray, mottled, firm silt loam

Of minor extent in this association are the somewhat poorly drained Flanagan soils, the very poorly drained Peotone soils, and the moderately well drained Saybrook soils. Flanagan soils are in landscape positions similar to those of the Ipava soils. Peotone soils are in closed depressions, and Saybrook soils are on the more prominent side slopes.

This association is used mainly for cultivated crops, pasture, dwellings, or septic tank absorption fields and for local roads and streets in the Bloomington-Normal area. The wetness caused by the seasonal high water table is a major limitation. Ponding in the shallow depressions and erosion in the more sloping areas are also limitations.

The Catlin soils are moderately suited to cultivated crops and well suited to pasture and hay. The Ipava and Sable soils are well suited to cultivated crops and moderately suited to pasture and hay. The wetness, the ponding, and the hazard of erosion are the major management concerns.

The Catlin soils are moderately suited to dwellings and poorly suited to septic tank absorption fields. The Ipava and Sable soils are poorly suited to dwellings, septic tank absorption fields, and local roads and streets. The wetness is the main limitation affecting dwellings. The wetness and restricted permeability are concerns affecting septic tank absorption fields. Low strength, the wetness, and the potential for frost action are limitations on sites for local roads and streets.

3. Lawson-Sawmill Association

Nearly level, somewhat poorly drained and poorly drained, silty soils that formed in alluvial sediments; on flood plains

This association is on nearly level flood plains along the Mackinaw River and Kickapoo Creek and other major streams. The soils are subject to occasional flooding for brief periods in the spring. Slopes range from 0 to 2 percent.

This association makes up about 3 percent of the county. It is about 40 percent Lawson soils, 35 percent Sawmill soils, and 25 percent soils of minor extent.

The somewhat poorly drained Lawson soils are near streams in meanderbelts. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 16 inches—very dark gray, friable silt loam

Subsurface layer:
16 to 34 inches—very dark grayish brown, friable silt loam

Substratum:
34 to 60 inches—dark grayish brown, mottled, friable silt loam, loam, and sandy loam

The poorly drained Sawmill soils are in backlands and backswamps. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 23 inches—black, friable silty clay loam

Subsoil:
23 to 30 inches—very dark gray, mottled, friable silty clay loam
30 to 50 inches—dark gray and olive gray, mottled, friable silty clay loam and clay loam
50 to 60 inches—olive gray, mottled, calcareous, friable, stratified loam and sandy loam

Of minor extent in this association are Huntsville, Ross, Orion, Radford, Elburn, and Plano soils. The well drained Huntsville and Ross soils are on natural levees and flood-plain splays. The somewhat poorly drained Orion soils are on alluvial fans. Radford soils are in the smaller adjoining drainageways. The somewhat poorly drained Elburn and well drained Plano soils are on low, narrow terraces.

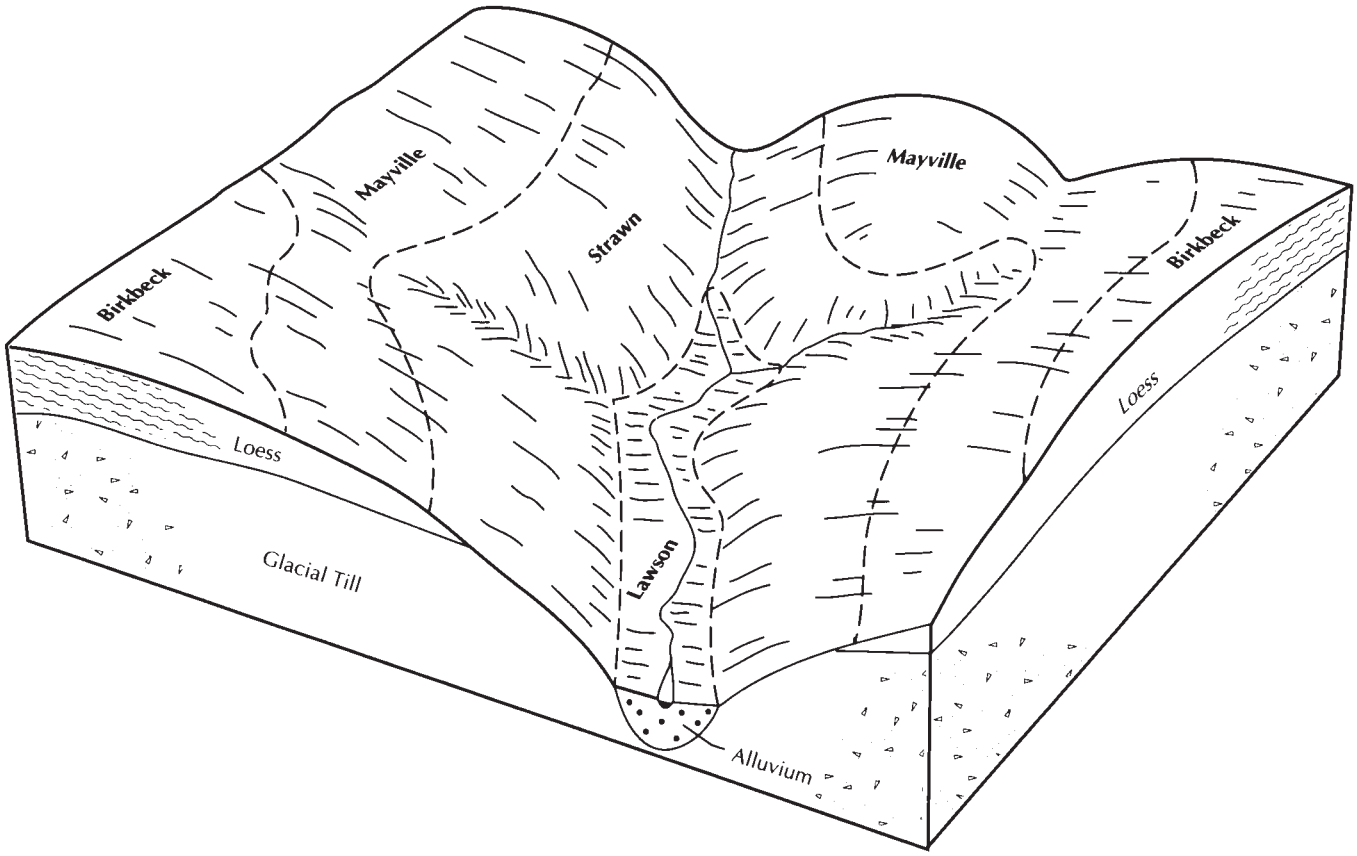

Figure 3.—Typical pattern of soils and parent material in the Strawn-Mayville-Birkbeck association.

This association is used mainly for cultivated crops or for pasture and hay.

The Lawson soils are well suited to cultivated crops and moderately suited to pasture and hay. The Sawmill soils are moderately suited to cultivated crops and to pasture and hay. The occasional flooding and the wetness caused by a seasonal high water table are the major limitations.

This association is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

4. Strawn-Mayville-Birkbeck Association

Gently sloping to very steep, well drained and moderately well drained, loamy and silty soils that formed in glacial till and in loess and glacial till; on uplands

This association is on strongly sloping to very steep side slopes of incised drainageways and on gently sloping or sloping shoulders and side slopes of interdrainage divides. Slopes range from 1 to 50 percent.

This association makes up about 13 percent of the county. It is about 35 percent Strawn soils, 30 percent Mayville soils, 25 percent Birkbeck soils, and 10 percent soils of minor extent (fig. 3).

The well drained Strawn soils are on side slopes and summits near streams. They are sloping to very steep. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 2 inches—very dark grayish brown, friable loam

Subsurface layer:
2 to 5 inches—dark brown, friable loam

Subsoil:
5 to 23 inches—dark yellowish brown and yellowish brown, friable clay loam that is calcareous in the lower part

Substratum:
23 to 60 inches—yellowish brown, calcareous, firm loam

The moderately well drained Mayville soils are on summits, shoulders, and side slopes. They are gently sloping to strongly sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 6 inches—dark brown and brown (mixed with dark yellowish brown), friable silt loam

Subsoil:
6 to 24 inches—dark yellowish brown, friable silty clay loam that is mottled in the lower few inches
24 to 29 inches—yellowish brown, mottled, friable clay loam
29 to 34 inches—brown, mottled, calcareous, firm loam

Substratum:
34 to 60 inches—light olive brown, mottled, calcareous, firm loam

The moderately well drained Birkbeck soils are on broad summits and on shoulders. They are gently sloping and sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 9 inches—dark grayish brown and brown (mixed with dark yellowish brown), friable silt loam

Subsoil:
9 to 19 inches—dark yellowish brown, friable silty clay loam
19 to 48 inches—dark yellowish brown, friable silty clay loam that is mottled in the lower few inches
48 to 55 inches—light olive brown, mottled, firm loam

Substratum:
55 to 60 inches—olive brown, mottled, calcareous, firm loam

Of minor extent in this association are the somewhat poorly drained Lawson soils and the poorly drained Sawmill soils in narrow drainageways.

This association is used mainly for woodland, pasture, dwellings, or septic tank absorption fields.

This association is well suited to woodland and moderately suited or well suited to pasture. The slope and the hazard of erosion are the major management concerns.

The sloping and strongly sloping areas of the Strawn soils are moderately suited to dwellings, but the steep and very steep areas are generally unsuited. The Mayville and Birkbeck soils are moderately suited to dwellings. The slope, the wetness, and the shrink-swell potential are the major limitations.

The sloping and strongly sloping areas of the Strawn soils and the Mayville and Birkbeck soils are poorly suited to septic tank absorption fields. The steep and very steep areas of the Strawn soils are generally unsuited to this use. The slope, the wetness, and restricted permeability are the major limitations.

5. Parr-Lisbon-Drummer Association

Nearly level to sloping, well drained, somewhat poorly drained, and poorly drained soils that formed in glacial till and in loess and glacial till; on uplands

This association is on gently sloping summits and shoulders, on nearly level interfluves with some shallow depressions, and on gently sloping and sloping foot slopes and side slopes. Slopes range from 0 to 10 percent.

This association makes up about 18 percent of the county. It is about 40 percent Parr soils, 25 percent Lisbon soils, 20 percent Drummer soils, and 15 percent soils of minor extent (fig. 4).

The well drained Parr soils are on summits, shoulders, and side slopes. They are gently sloping and sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 8 inches—mixed very dark grayish brown and brown, friable silt loam

Subsoil:
8 to 25 inches—brown and yellowish brown, friable and firm clay loam
25 to 31 inches—yellowish brown, calcareous, firm loam

Substratum:
31 to 60 inches—brown, calcareous, firm loam

The somewhat poorly drained Lisbon soils are on interfluves and foot slopes. They are nearly level. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 11 inches—black, friable silt loam

Subsoil:
11 to 14 inches—very dark grayish brown and brown, friable silty clay loam
14 to 25 inches—brown and yellowish brown, mottled, friable silty clay loam
25 to 32 inches—light olive brown, mottled, firm clay loam

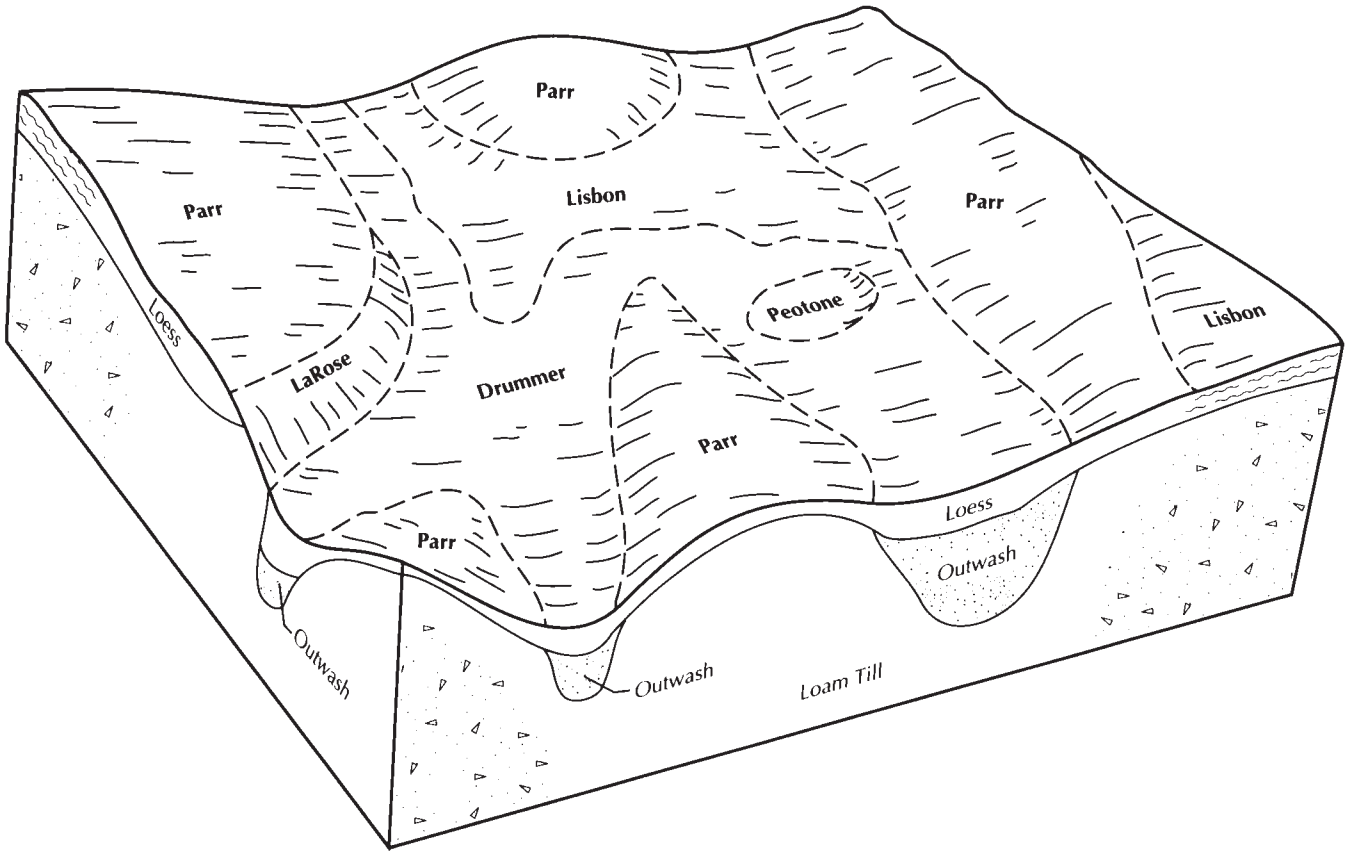

Figure 4.—Typical pattern of soils and parent material in the Parr-Lisbon-Drummer association.

Substratum:
32 to 60 inches—light olive brown, mottled, calcareous, firm loam

The poorly drained Drummer soils are on broad interfluves and in shallow depressions and drainageways. They are nearly level. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 10 inches—black, friable silty clay loam

Subsurface layer:
10 to 13 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
13 to 41 inches—grayish brown, olive gray, and light olive gray, mottled, friable silty clay loam
41 to 47 inches—light brownish gray, mottled, friable, calcareous silty clay loam

Substratum:
47 to 60 inches—yellowish brown and brownish yellow, mottled, friable, calcareous, stratified silt loam and loam

Of minor extent in this association are La Rose, Peotone, and Harpster soils. The well drained La Rose soils are on the shorter, steeper slopes. The very poorly drained Peotone soils are in closed depressions. The poorly drained Harpster soils are calcareous throughout. They are in shallow closed depressions.

This association is used mainly for cultivated crops or for pasture and hay.

This association is moderately well suited and well suited to cultivated crops and to pasture and hay. The hazard of erosion is the major concern in the more sloping areas. The wetness caused by a seasonal high water table and the ponding in shallow depressions are the major concerns in low, flat areas.

The Parr soils are moderately suited to dwellings but poorly suited to septic tank absorption fields. The

Lisbon and Drummer soils are poorly suited to dwellings and septic tank absorption fields. The wetness, the ponding, the shrink-swell potential, and restricted permeability are the major limitations.

6. Catlin-Dana Association

Gently sloping and sloping, moderately well drained, silty soils that formed in loess and glacial till; on uplands

This association is on shoulders and side slopes of ridges that have a few prominent knobs. It is also on broad, rolling interfluves. Slopes range from 1 to 10 percent.

This association makes up about 3 percent of the county. It is about 45 percent Catlin soils, 25 percent Dana soils, and 30 percent soils of minor extent.

Catlin soils are on summits, shoulders, and side slopes. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 8 inches—mixed very dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:
8 to 32 inches—dark yellowish brown, friable silty clay loam
32 to 45 inches—yellowish brown, friable silty clay loam

Substratum:
45 to 60 inches—dark yellowish brown, firm clay loam

Dana soils are on summits, shoulders, and side slopes. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 5 inches—very dark grayish brown, friable silt loam

Subsoil:
5 to 23 inches—dark yellowish brown, friable silty clay loam
23 to 46 inches—dark yellowish brown, mottled, friable loam

Substratum:
46 to 60 inches—dark yellowish brown, mottled, friable loam

Of minor extent in this association are Flanagan, Ipava, Peotone, and Sable soils. The somewhat poorly drained Flanagan and Ipava soils are in nearly level areas. The very poorly drained Peotone and poorly drained Sable soils are in slight depressions and in shallow drainageways.

This association is used mainly for cultivated crops or for pasture and hay.

This association is moderately suited or well suited to cultivated crops and to pasture and hay. Erosion in the more sloping areas is the major limitation.

This association is moderately suited to dwellings but is poorly suited to septic tank absorption fields. Wetness, the shrink-swell potential, and restricted permeability are the major limitations.

7. Chenoa-Ashkum-Varna Association

Nearly level to sloping, poorly drained to moderately well drained, silty soils that formed in loess and glacial till and in glacial till; on uplands

This association is on low ridges and long side slopes with broad interfluves dissected by drainageways and ditches. Slopes range from 0 to 10 percent.

This association makes up about 6 percent of the county. It is about 40 percent Chenoa soils, 30 percent Ashkum soils, 25 percent Varna soils, and 5 percent soils of minor extent (fig. 5).

The somewhat poorly drained Chenoa soils are between ridges on broad interfluves and foot slopes. They are gently sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 12 inches—very dark gray, friable silt loam

Subsoil:
12 to 16 inches—dark yellowish brown, friable silty clay loam
16 to 30 inches—dark yellowish brown, mottled, firm silty clay loam
30 to 42 inches—olive brown, mottled, firm silty clay loam that is calcareous in the lower part

Substratum:
42 to 60 inches—olive brown, mottled, calcareous, very firm silt loam

The poorly drained Ashkum soils are on broad interfluves and in shallow depressions and drainageways. They are nearly level. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 13 inches—black, friable silty clay loam

Subsoil:
13 to 20 inches—dark grayish brown, mottled, friable silty clay loam
20 to 31 inches—olive gray, mottled, friable silty clay loam

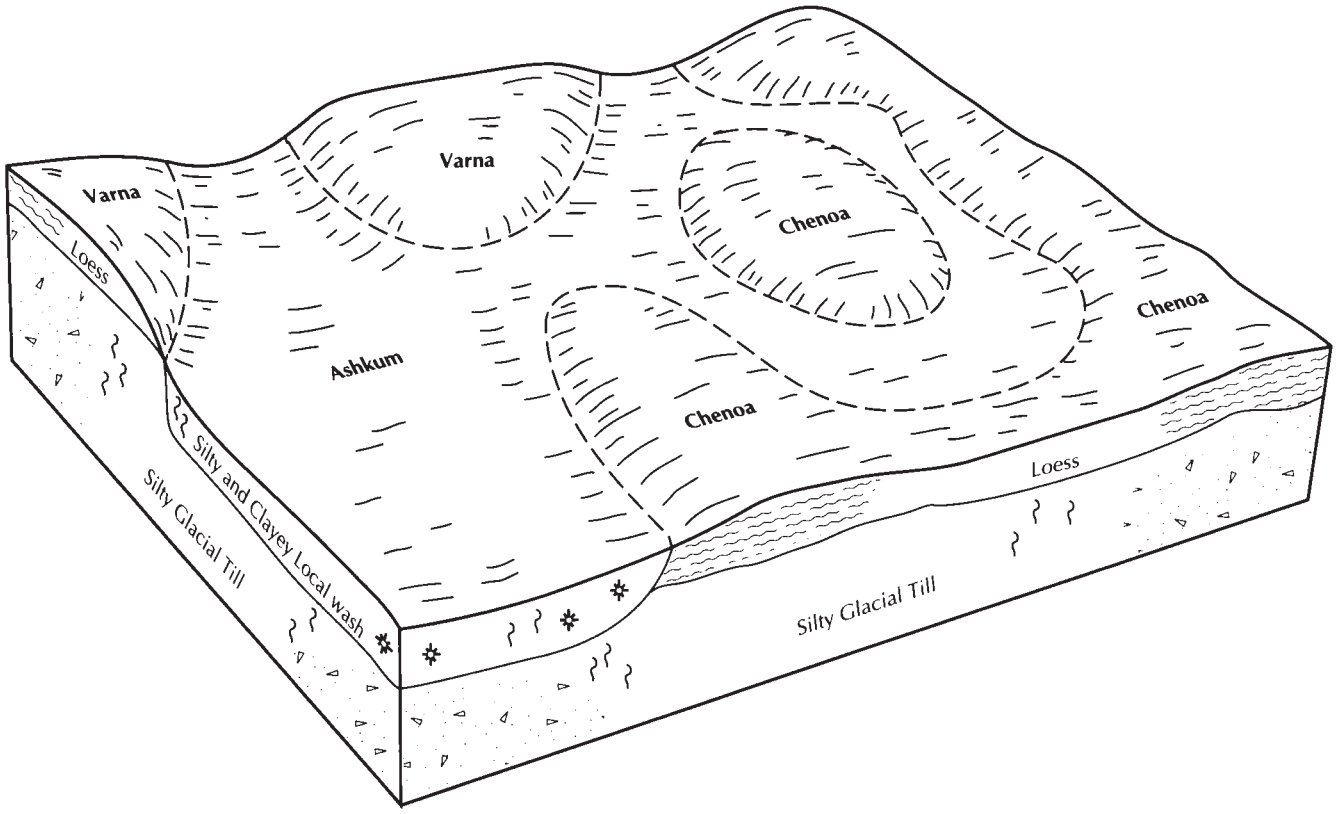

Figure 5.—Typical pattern of soils and parent material in the Chenoa-Ashkum-Varna association.

31 to 46 inches—light olive gray, mottled, friable silty clay loam

Substratum:

46 to 60 inches—olive gray, mottled, calcareous, firm silty clay loam

The moderately well drained Varna soils are on shoulders and side slopes. They are gently sloping and sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:

0 to 8 inches—very dark grayish brown, friable silt loam

Subsoil:

8 to 14 inches—dark yellowish brown, friable silty clay loam

14 to 18 inches—olive, mottled, firm silty clay loam

18 to 29 inches—light olive brown, mottled, calcareous, firm silty clay loam

Substratum:

29 to 60 inches—light olive brown, mottled, calcareous, firm silty clay loam

Of minor extent in this association are the somewhat poorly drained Andres and moderately well drained Symerton soils. These soils are on the more prominent knobs and ridges. They contain more sand in the subsoil than the major soils.

This association is used mainly for cultivated crops or for pasture and hay.

This association is well suited or moderately suited to cultivated crops and to pasture and hay. The wetness caused by a seasonal high water table is a major limitation. Ponding in the shallow depressions and erosion in the more sloping areas are also major concerns.

The Chenoa and Ashkum soils are poorly suited to dwellings and septic tank absorption fields. The Varna soils are moderately suited to dwellings but are poorly suited to septic tank absorption fields. The wetness, the ponding, the shrink-swell potential, and restricted permeability are the major limitations.

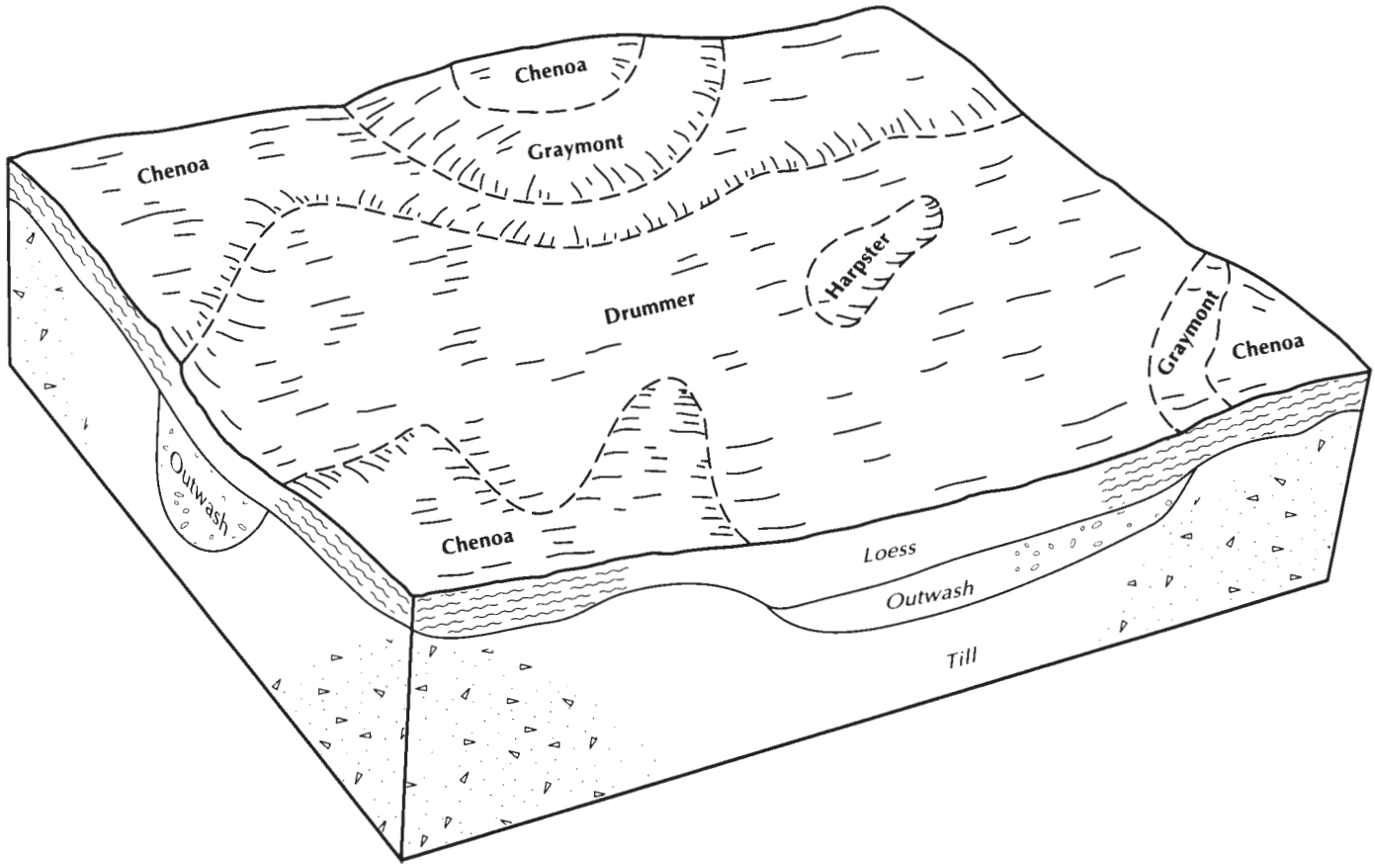

Figure 6.—Typical pattern of soils and parent material in the Chenoa-Drummer-Graymont association.

8. Chenoa-Drummer-Graymont Association

Nearly level and gently sloping, poorly drained to moderately well drained, silty soils that formed in loess and glacial till; on uplands

This association is on low ridges and convex side slopes and on broad, gently sloping interfluves that have shallow depressions and shallow drainageways. Slopes range from 0 to 5 percent.

This association makes up about 7 percent of the county. It is about 40 percent Chenoa soils, 30 percent Drummer soils, 20 percent Graymont soils, and 10 percent soils of minor extent (fig. 6).

The somewhat poorly drained Chenoa soils are on broad interfluves and foot slopes. They are gently sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 12 inches—very dark gray, friable silt loam

Subsoil:
12 to 16 inches—dark yellowish brown, friable silty clay loam
16 to 30 inches—dark yellowish brown, mottled, firm silty clay loam
30 to 42 inches—olive brown, mottled, firm silty clay loam that is calcareous in the lower part

Substratum:
42 to 60 inches—olive brown, mottled, calcareous, very firm silt loam

The poorly drained Drummer soils are on broad interfluves and in shallow depressions and drainageways. They are nearly level. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 10 inches—black, friable silty clay loam

Subsurface layer:
10 to 13 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
13 to 41 inches—grayish brown, olive gray, and light olive gray, mottled, friable silty clay loam
41 to 47 inches—light brownish gray, mottled, friable, calcareous silty clay loam

Substratum:
47 to 60 inches—yellowish brown and brownish yellow, mottled, friable, calcareous, stratified silt loam and loam

The moderately well drained Graymont soils are on shoulders and side slopes. They are gently sloping. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsoil:
8 to 27 inches—brown and dark yellowish brown, mottled, friable silty clay loam
27 to 34 inches—light olive brown, mottled, firm silty clay loam
34 to 39 inches—light olive brown, mottled, calcareous, firm silt loam

Substratum:
39 to 60 inches—light olive brown, mottled, calcareous, firm silt loam

Of minor extent in this association are the poorly drained Harpster and Hartsburg and very poorly drained Peotone soils in shallow depressions.

This association is used mainly for cultivated crops or for pasture and hay.

This association is well suited to cultivated crops and to pasture and hay. The wetness caused by a seasonal high water table is a major limitation. Ponding in the shallow depressions and erosion in the more sloping areas are also major concerns.

The Chenoa and Drummer soils are poorly suited to dwellings and septic tank absorption fields. The Graymont soils are moderately suited to dwellings but are poorly suited to septic tank absorption fields. The wetness, the ponding, and restricted permeability are the major limitations.

9. Drummer-Brenton Association

Nearly level, poorly drained and somewhat poorly drained, silty soils that formed in loess and outwash; on terraces

This association is on low ridges and foot slopes and on broad interfluves with shallow depressions. Slopes range from 0 to 2 percent.

This association makes up about 4 percent of the county. It is about 50 percent Drummer soils, 30 percent Brenton soils, and 20 percent soils of minor extent (fig. 7).

The poorly drained Drummer soils are on broad interfluves and in shallow depressions. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 10 inches—black, friable silty clay loam

Subsurface layer:
10 to 13 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
13 to 41 inches—grayish brown, olive gray, and light olive gray, mottled, friable silty clay loam
41 to 47 inches—light brownish gray, mottled, friable, calcareous silty clay loam

Substratum:
47 to 60 inches—yellowish brown and brownish yellow, mottled, friable, calcareous, stratified silt loam and loam

The somewhat poorly drained Brenton soils are on broad interfluves and foot slopes. The typical sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 8 inches—black, friable silt loam

Subsurface layer:
8 to 14 inches—very dark gray, friable silty clay loam

Subsoil:
14 to 17 inches—brown, friable silty clay loam
17 to 33 inches—olive brown and light olive brown, mottled, friable silty clay loam and silt loam
33 to 45 inches—olive brown and light olive brown, mottled, friable loam and fine sandy loam

Substratum:
45 to 60 inches—light olive brown and light brownish gray, friable, stratified loam and silt loam

Of minor extent in this association are Plano, Proctor, and Edgington soils. The well drained Plano and Proctor soils are on the higher or more prominent shoulders and side slopes. The poorly drained Edgington soils are in closed depressions.

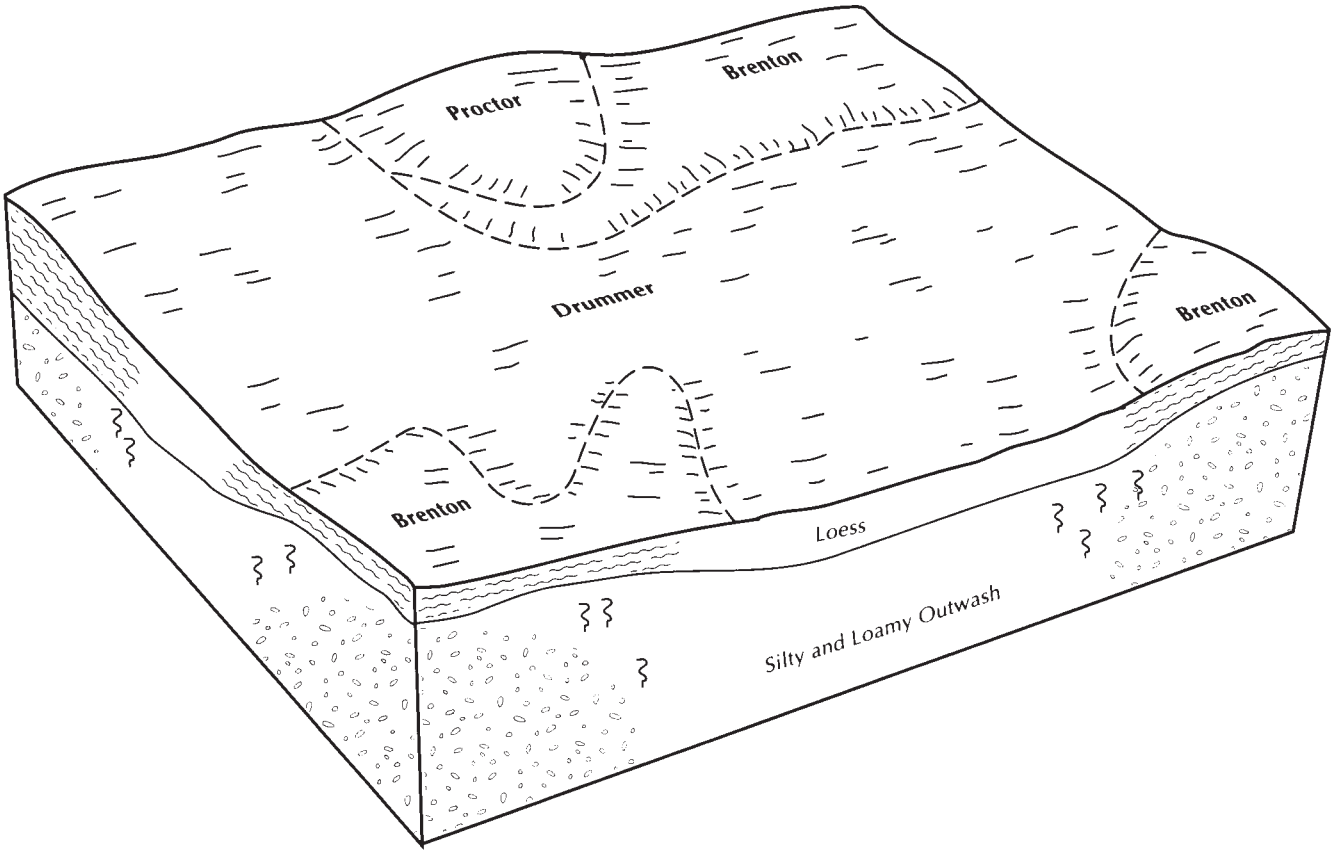

Figure 7.—Typical pattern of soils and parent material in the Drummer-Brenton association.

This association is used mainly for cultivated crops or for pasture and hay.

This association is well suited to cultivated crops and to pasture and hay. The wetness caused by a seasonal high water table is a major limitation. Ponding in the shallow depressions is also a major concern.

This association is poorly suited to dwellings and septic tank absorption fields. The wetness and the ponding are the main limitations.

Broad Land Use Considerations

The soils in McLean County vary greatly in their suitability for major land uses. Most of the acreage in the county is used for crops, mainly corn and soybeans. The cropland areas are throughout the county, but they are mainly in associations 1, 2, 5, 6, 7, 8, and 9. Slopes range mainly from nearly level to sloping in these associations, but some steeper areas and some depressional areas that are subject to ponding are also included. The major limitations affecting cultivated crops are wetness in the nearly level areas and the hazard of erosion in the more sloping areas. Ipava, Sable, Catlin, Parr, Lisbon, Drummer, Dana, Chenoa, Ashkum, Varna, Graymont, and Brenton soils are the major soils used for crops.

A small percentage of the land in McLean County is used for pasture and hay. All of the associations are generally suitable for grasses and legumes. Wetness is a limitation in associations 1 and 9. The major soils are Ipava, Sable, Drummer, and Brenton soils. Erosion is a hazard in areas of associations 4 and 6. In addition, the steep and very steep slopes in association 4 result in major equipment limitations, which hinder the seeding and harvesting of hay crops. The major soils in these areas are Strawn, Mayville, Birkbeck, Catlin, Dana, Chenoa, and Graymont soils. The soils in association 3 are subject to occasional flooding, which can delay harvesting in some years. In the other associations, wetness in the nearly level areas and erosion in the more sloping areas are limitations affecting pasture and hay. Catlin, Ipava, Sable, Parr, Lisbon, Drummer, Dana, Chenoa, Ashkum, Varna, and Graymont soils are the major soils in these areas.

A small percentage of the land in the county is used as woodland or as pastured woodland. Nearly all of the woodland is in associations 3 and 4. The soils in these associations, which include Lawson, Sawmill, Strawn, Mayville, and Birkbeck soils, are generally well suited to woodland. Erosion is the main concern in association 4, especially in the steep and very steep areas. The slope is an additional limitation that affects the harvesting of trees. The occasional flooding in areas of association 3 is also a limitation.

In general, the gently sloping and sloping areas in the county have the best potential for urban uses. These areas are mainly in associations 2, 4, 5, and 6. A high shrink-swell potential, restricted permeability, a seasonal high water table, and the slope are the major limitations on sites for dwellings or septic tank absorption fields. Low strength and the potential for frost action are additional limitations on sites for local roads and streets. The soils in association 3 are generally unsuitable for most urban uses because of the flooding.

Suitability for recreational activities ranges from poor to good, depending on the intensity of use. Camp areas and picnic areas require gently sloping or sloping soils, such as those in associations 2, 4, 5, and 6. Soils that are wet or subject to flooding, such as those in associations 1, 3, 7, 8, and 9, are generally poorly suited to most intensive recreational uses. The steep and very steep areas in association 4 are also limited for many recreational uses. Small areas that are suitable for intensive recreational development are generally available in all of the associations in the county.

Associations 1, 2, 5, 6, 7, 8, and 9 are well suited to habitat for openland wildlife. The soils that are best suited to woodland wildlife habitat are in associations 3 and 4. Some areas in association 3 are suited to certain types of wetland wildlife habitat.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, La Rose silt loam, 5 to 10 percent slopes, eroded, is a phase of the La Rose series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Parr-Urban land complex, 5 to 10 percent slopes, is an example.

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

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

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

17—Keomah silt loam

Composition

Keomah and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, loess plains
Landscape position: Broad interfluves, foot slopes, and shallow depressions
Shape of areas: Irregular or linear
Size of areas: 5 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of 2 to 4 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—dark grayish brown, friable silt loam

Subsurface layer:
6 to 10 inches—grayish brown, mottled, friable silt loam

Subsoil:
10 to 41 inches—brown and olive brown, mottled, friable and firm silty clay loam
41 to 46 inches—olive brown, mottled, calcareous, friable silt loam

Substratum:
46 to 60 inches—light olive brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that have a thicker or darker surface layer
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains and subsurface tile function satisfactorily if suitable outlets are available.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the moderately slow permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 3A
Windbreak suitability group: 1

27B2—Miami loam, 2 to 5 percent slopes, eroded

Composition

Miami and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 3 inches—dark brown, friable loam

Subsurface layer:
3 to 7 inches—brown, friable silt loam

Subsoil:
7 to 18 inches—yellowish brown, friable silty clay loam
18 to 25 inches—yellowish brown, calcareous, friable silty clay loam that is mottled in the lower part

Substratum:
25 to 60 inches—light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill and somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have free carbonates at a depth of less than 20 inches
• Soils that do not have a silty loess layer in the upper part
• Soils that contain more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting and improves tilth.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

27C2—Miami loam, 5 to 10 percent slopes, eroded

Composition

Miami and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown, friable loam

Subsoil:
7 to 11 inches—yellowish brown, friable silty clay loam
11 to 23 inches—light olive brown, friable clay loam
23 to 36 inches—light olive brown, calcareous, friable loam

Substratum:
36 to 60 inches—light olive brown and light olive gray, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill and somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have free carbonates at a depth of less than 20 inches
• Soils that do not have a silty loess layer in the upper part
• Soils that contain much more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and improve the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

27D2—Miami loam, 10 to 15 percent slopes, eroded

Composition

Miami and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 60 acres
Major use: Wooded pastures

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—mixed very dark grayish brown and dark grayish brown, friable loam

Subsoil:
4 to 12 inches—brown, friable silty clay loam
12 to 28 inches—brown, mottled, friable clay loam
28 to 33 inches—light olive brown, mottled, calcareous, friable clay loam

Substratum:
33 to 60 inches—light olive brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have free carbonates at a depth of less than 20 inches
• Soils that contain a component of silty loess in the upper part of the subsoil
• Soils that contain more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
• Stripcropping also helps to control erosion.
• Adding organic material and returning crop residue to the soil help to prevent crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Moderately suited
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

27E2—Miami silt loam, 15 to 30 percent slopes, eroded

Composition

Miami and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 80 acres
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—brown, friable silt loam

Subsoil:
4 to 9 inches—yellowish brown, friable silt loam
9 to 31 inches—yellowish brown, friable clay loam that is mottled in the lower part

31 to 36 inches—light olive brown, mottled, calcareous, friable loam

Substratum:

36 to 60 inches—light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:

• The poorly drained Sawmill and somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:

• Soils that have free carbonates at a depth of less than 20 inches
• Soils that do not have a silty loess layer in the upper part
• Soils that contain much more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Unsuited because of the slope and the hazard of erosion

Pasture and hay

Suitability: Moderately suited
Management considerations:

• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• In areas where the pasture is established, seeding legumes on the contour with a no-till seeder improves the forage quality.
• The plants should not be grazed or clipped until they are sufficiently established.
• Maintaining a permanent cover of pasture plants helps to control erosion and maintains tilth.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management considerations:

• Plant competition affects the seedlings of desirable species. The competition from undesirable species in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture help to control erosion.
• Skidding logs and trees uphill with a cable and winch helps to overcome the slope.
• Firebreaks should be the grass type.
• Machinery should be used only when the soil is firm enough to support the equipment.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management considerations:

• Food plots of grain or seed crops should be established only in the less sloping areas.
• All plantings should be on the contour.
• Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: 5R
Windbreak suitability group: 3

36A—Tama silt loam, 0 to 2 percent slopes

Composition

Tama and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, loess plains, terraces, outwash plains
Landscape position: Broad interfluves
Shape of areas: Oblong
Size of areas: 2 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—very dark grayish brown, friable silt loam

Subsoil:
12 to 17 inches—brown, friable silt loam
17 to 43 inches—dark yellowish brown and yellowish brown, friable silty clay loam
43 to 50 inches—dark yellowish brown, mottled, friable silt loam

Substratum:
50 to 60 inches—dark yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable and Edgington soils in drainageways and shallow depressions

Similar inclusions:
• Soils that formed partially in loamy sediments
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited to dwellings with basements
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 3

36B—Tama silt loam, 2 to 5 percent slopes

Composition

Tama and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, loess plains, terraces, outwash plains
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—very dark gray, friable silt loam

Subsoil:
12 to 16 inches—brown, friable silty clay loam
16 to 46 inches—dark yellowish brown, friable silty clay loam that is mottled in the lower part
46 to 60 inches—dark yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils in drainageways

Similar inclusions:
• Soils that formed partially in the underlying loamy glacial till
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

36B2—Tama silt loam, 2 to 5 percent slopes, eroded

Composition

Tama and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, loess plains
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam; mixed with brown subsoil material

Subsoil:
8 to 39 inches—brown, dark yellowish brown, and yellowish brown, mottled, friable silty clay loam

Substratum:
39 to 60 inches—brown and yellowish brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils in drainageways

Similar inclusions:
• Soils that formed partially in the underlying loamy glacial till
• Soils that have a seasonal high water table closer to the surface
• Soils that have more clay in the surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Incorporating crop residue into the soil or adding other

organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

41—Muscatine silt loam

Composition

Muscatine and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, loess plains, terraces, outwash plains
Landscape position: Broad interfluves and foot slopes
Shape of areas: Irregular
Size of areas: 5 to 1,000 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of 2 to 4 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—dark brown, friable silt loam

Subsoil:
12 to 17 inches—brown, mottled, friable silt loam
17 to 44 inches—brown, yellowish brown, and dark yellowish brown, mottled, friable silty clay loam

Substratum:
44 to 60 inches—brown and yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that have more clay in the subsoil
• Soils that have a gray or grayish brown subsurface layer
• Soils that have glacial till within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.

• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

43—Ipava silt loam

Composition

Ipava and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Uplands, loess plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 2 to 400 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—black, friable silt loam
Subsurface layer:
7 to 11 inches—very dark gray, friable silt loam
Subsoil:
11 to 20 inches—brown, mottled, friable silty clay loam
20 to 28 inches—dark grayish brown, mottled, friable silty clay loam
28 to 52 inches—dark grayish brown, mottled, calcareous, friable silt loam
Substratum:
52 to 60 inches—dark grayish brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The very poorly drained Peotone soils that are subject to ponding; in shallow depressions
• The poorly drained Sable and Drummer soils that are subject to ponding; in shallow depressions and drainageways
Similar inclusions:
• Soils that are deeper to a seasonal high water table
• Soils that contain less clay in the subsoil
• Soils that have slopes of more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the moderately slow permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

56B2—Dana silt loam, 2 to 5 percent slopes, eroded

Composition

Dana and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 5 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—mixed very dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:
7 to 19 inches—dark yellowish brown, friable silty clay loam
19 to 34 inches—yellowish brown, mottled, friable silty clay loam
34 to 53 inches—light olive brown, mottled, friable clay loam that is calcareous in the lower part

Substratum:
53 to 60 inches—light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils in heads of drainageways

Similar inclusions:
• Soils that have free carbonates above a depth of 40 inches
• Soils that do not have underlying loamy material

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

56C2—Dana silt loam, 5 to 10 percent slopes, eroded

Composition

Dana and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Long and narrow
Size of areas: 3 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown, friable silt loam

Subsoil:
5 to 23 inches—dark yellowish brown, friable silty clay loam
23 to 46 inches—dark yellowish brown, mottled, friable loam

Substratum:
46 to 60 inches—dark yellowish brown, mottled, friable loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils in heads of drainageways and along drainageways

Similar inclusions:
• Soils that have free carbonates above a depth of 40 inches
• Soils that have loamy glacial till at a shallower depth
• Soils that do not have underlying loamy glacial till and are silty

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and improve the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

59—Lisbon silt loam

Composition

Lisbon and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves and foot slopes
Shape of areas: Irregular or oblong
Size of areas: 3 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—black, friable silt loam

Subsoil:
11 to 14 inches—very dark grayish brown and brown, friable silty clay loam
14 to 25 inches—brown and yellowish brown, mottled, friable silty clay loam
25 to 32 inches—light olive brown, mottled, firm clay loam

Substratum:
32 to 60 inches—light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The well drained Parr soils on side slopes and knobs above the Lisbon soil
• The poorly drained Drummer and Sable soils that are subject to ponding; in shallow depressions and heads of drainageways below the Lisbon soil

Similar inclusions:
• Soils that have free carbonates at a depth of more than 40 inches
• Soils that are deeper to a seasonal high water table

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

60B2—La Rose silt loam, 2 to 5 percent slopes, eroded

Composition

La Rose and similar soils: 90 percent
Contrasting inclusions: 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 10 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—mixed dark brown and brown, friable silt loam

Subsoil:
7 to 15 inches—brown, friable clay loam
15 to 19 inches—pale brown, mottled, calcareous, friable loam

Substratum:
19 to 60 inches—pale brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer and Sable soils that are subject to ponding; in heads of drainageways and in shallow drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that have a silty layer 20 to 40 inches thick above the till
• Soils that have more clay or more sand in the surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

60C2—La Rose silt loam, 5 to 10 percent slopes, eroded

Composition

La Rose and similar soils: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular and long and narrow
Size of areas: 2 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 10 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—mixed dark brown and dark yellowish brown, friable silt loam

Subsoil:
7 to 16 inches—dark yellowish brown and yellowish brown, firm clay loam that is calcareous in the lower part
16 to 22 inches—yellowish brown, calcareous, firm loam

Substratum:
22 to 60 inches—yellowish brown, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that have a seasonal high water table closer to the surface
• Soils that have more sand and less clay in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and improve the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

60C3—La Rose loam, 5 to 10 percent slopes, severely eroded

Composition

La Rose and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material

Parent material: Loess less than 10 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Tilth: Poor; enough of the subsoil has been mixed with the surface soil to change the behavior and tilth of the plow layer from that of the slightly eroded and moderately eroded areas
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—mixed very dark grayish brown and brown, friable loam

Subsoil:
4 to 9 inches—brown, friable silty clay loam
9 to 14 inches—brown, calcareous, friable clay loam

Substratum:
14 to 60 inches—brown, mottled, calcareous, firm clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils; in drainageways and in heads of drainageways

Similar inclusions:
• Soils that have a thicker and darker surface layer
• Soils that have free carbonates at a depth of more than 20 inches
• Soils that have more clay in the surface layer

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Further erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a crop rotation that is dominated by forage crops.
• Tilling when the soil is wet causes surface cloddiness, compaction, and excessive runoff and can result in further erosion.
• Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration, minimize the formation of a plowpan, and help to prevent surface crusting and sealing.
• Soil amendments, such as fertilizers and herbicides, generally are not successful in severely eroded areas where the subsoil has been extensively mixed into the plow layer. Tillage of any kind exposes the soil to further damage from erosion.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control further erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Seedbed preparation is difficult on severely eroded side slopes. A no-till method of seeding or pasture renovation helps to establish forage species and helps to control erosion.
• The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IVe
Windbreak suitability group: 3

60D2—La Rose silt loam, 10 to 15 percent slopes, eroded

Composition

La Rose and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately

slow in the underlying material
Parent material: Loess less than 10 inches thick and the underlying loamy glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—mixed dark brown and dark yellowish brown, friable silt loam
Subsoil:
7 to 11 inches—dark yellowish brown, friable clay loam
11 to 21 inches—yellowish brown, mottled, calcareous, friable loam
Substratum:
21 to 60 inches—yellowish brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways
Similar inclusions:
• Soils that do not have free carbonates above a depth of 20 inches
• Soils that have a silty layer as much as 30 inches thick
• Soils that have more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
• Stripcropping also helps to control erosion.
• Adding organic material and returning crop residue to the soil help to prevent crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

61—Atterberry silt loam

Composition

Atterberry and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, loess plains
Landscape position: Broad interfluves
Shape of areas: Oblong
Size of areas: 3 to 15 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown, friable silt loam

Subsurface layer:
7 to 12 inches—dark grayish brown, friable silt loam

Subsoil:
12 to 30 inches—olive brown and dark grayish brown, mottled, friable silty clay loam
30 to 43 inches—light olive brown, mottled, friable, calcareous silt loam

Substratum:
43 to 60 inches—light olive brown, mottled, friable, calcareous silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that have more clay in the subsoil
• Soils that have more organic matter in the surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitabilty Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Woodland ordination symbol: 4A
Windbreak suitability group: 1

67—Harpster silty clay loam

Composition

Harpster and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, terraces, and outwash plains
Landscape position: Shallow closed depressions and shallow drainageways
Shape of areas: Round or oblong
Ponding: Brief periods in the spring
Size of areas: 2 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—black, calcareous, friable silty clay loam

Subsurface layer:
12 to 20 inches—very dark gray, mottled, calcareous, friable silty clay loam

Subsoil:
20 to 28 inches—olive gray, mottled, calcareous, friable silty clay loam
28 to 33 inches—gray, mottled, calcareous, friable silt loam
Substratum:
33 to 60 inches—gray, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• Soils that are slightly higher on the landscape than the Harpster soil and are not subject to ponding
Similar inclusions:
• Soils that have more clay in the subsoil
• Soils that do not have free carbonates in the surface and subsurface layers

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.
• Subsurface tile drains and surface inlet tile drains help to lower the water table.

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2L

68—Sable silty clay loam

Composition

Sable and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Uplands, loess plains
Landscape position: Broad interfluves, shallow drainageways, and shallow depressions
Shape of areas: Oblong or round
Ponding: Brief periods in the spring
Size of areas: 2 to 500 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—black, friable silty clay loam
Subsoil:
12 to 37 inches—very dark gray and gray, mottled, firm silty clay loam
37 to 54 inches—light gray, mottled, firm silt loam
Substratum:
54 to 60 inches—light gray, mottled, firm silt loam

Inclusions

Contrasting inclusions:
• Poorly drained soils that are in the slightly higher landscape positions and that are not subject to ponding
Similar inclusions:
• Soils that have a seasonal high water table at a greater depth
• Soils that contain free carbonates throughout

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.
• Subsurface tile drains and surface inlet tile drains help to lower the water table.

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

91B2—Swygert silty clay loam, 2 to 4 percent slopes, eroded

Composition

Swygert and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Foot slopes and toe slopes
Shape of areas: Long and narrow
Size of areas: 3 to 10 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow in the upper part and very slow in the underlying material
Parent material: Loess less than 30 inches thick and the underlying clayey glacial till
Runoff: Medium
Available water capacity: Low or moderate
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—mixed dark brown and dark yellowish brown, friable silty clay loam

Subsoil:
5 to 9 inches—dark yellowish brown, mottled, friable silty clay loam
9 to 24 inches—olive and olive gray, mottled, very firm silty clay that is calcareous in the lower part

Substratum:
24 to 60 inches—olive, mottled, calcareous, very firm silty clay

Inclusions

Contrasting inclusions:
• Chenoa soils, which are not so dense in the subsoil and the substratum as the Swygert soil; in landscape positions similar to those of the Swygert soil

Similar inclusions:
• Soils that have slopes of more than 4 percent
• Soils that have a subsoil of silty clay loam

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Because of the high content of clay in the subsoil, this soil is highly susceptible to excess surface runoff and erosion.
• Subsurface drains help to lower the seasonal high water table. Installing the drains on the contour helps to intercept seepage water.
• In areas where slopes are long, erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting.
• Tilling when the soil is wet causes surface

compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available and if the lines can be installed on the contour.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Overcoming the very slow permeability is difficult.
• A septic tank system may function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.
• Sewage lagoons or mounds are alternative methods of waste disposal.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 4L

125—Selma loam

Composition

Selma and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Terraces, outwash plains
Landscape position: Drainageways
Shape of areas: Long and narrow
Ponding: Brief periods in the spring
Size of areas: 5 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loamy material 40 to 60 inches thick and the underlying stratified loamy material
Runoff: Very slow
Available water capacity: Moderate
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 21 inches—black and very dark gray, friable loam

Subsoil:
21 to 53 inches—dark gray and olive gray, mottled, friable clay loam

Substratum:
53 to 60 inches—olive and olive gray, mottled, calcareous, friable loam and sandy loam

Inclusions

Contrasting inclusions:
• Ashkum soils, which contain more clay in the subsoil than the Selma soil; in landscape positions similar to those of the Selma soil

Similar inclusions:
• Soils that do not have loamy material in the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.
• Subsurface tile drains and surface inlet tile drains help to lower the water table.

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

134B2—Camden silt loam, 2 to 5 percent slopes, eroded

Composition

Camden and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Stream terraces
Landscape position: Shoulders and convex back slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown, friable silt loam
Subsoil:
8 to 31 inches—yellowish brown, friable silty clay loam
31 to 50 inches—yellowish brown and dark yellowish brown, mottled, friable loam and clay loam
50 to 60 inches—dark yellowish brown, mottled, friable sandy clay loam that has strata of sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways
Similar inclusions:
• Soils that have a seasonal high water table closer to the surface
• Soils that do not have loamy material in the subsoil
• Soils that have loamy material at a depth of more than 40 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 7A
Windbreak suitability group: 3

134C2—Camden silt loam, 5 to 10 percent slopes, eroded

Composition

Camden and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Stream terraces
Landscape position: Convex back slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsurface layer:
7 to 10 inches—yellowish brown, friable silt loam

Subsoil:
10 to 32 inches—yellowish brown, friable silty clay loam
32 to 48 inches—yellowish brown, friable loam

Substratum:
48 to 60 inches—yellowish brown, very friable, stratified sandy loam and very fine sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways

Similar inclusions:
• Soils that have a seasonal high water table closer to the surface
• Soils that do not have loamy material in the subsoil and are silt loam
• Soils that contain more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and improve the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to

prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 7A
Windbreak suitability group: 3

145B2—Saybrook silt loam, 2 to 5 percent slopes, eroded

Composition

Saybrook and similar soils: 85 percent
Contrasting inclusions: 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Shape of areas: Irregular or oblong
Size of areas: 5 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark brown and brown, friable silt loam

Subsoil:
8 to 29 inches—brown, dark brown, yellowish brown, and dark yellowish brown, friable silty clay loam
29 to 39 inches—light olive brown and olive yellow, mottled, calcareous, friable loam

Substratum:
39 to 60 inches—light yellowish brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer and Sable soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that are shallower to the substratum
• Soils that formed in more than 40 inches of loess

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations can help to prevent the structural

damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

145C2—Saybrook silt loam, 5 to 10 percent slopes, eroded

Composition

Saybrook and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—mixed very dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:
9 to 27 inches—dark yellowish brown and yellowish brown, friable silty clay loam that is mottled in the lower part
27 to 34 inches—light olive brown, mottled, calcareous, friable clay loam

Substratum:
34 to 60 inches—light olive brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways and in heads of drainageways

Similar inclusions:
• Soils that have free carbonates at a depth of more than 40 inches
• Soils that do not have loamy material in the lower part
• Soils that formed entirely in loamy glacial till

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains can help to lower

the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

148A—Proctor silt loam, 0 to 2 percent slopes

Composition

Proctor and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Broad interfluves
Shape of areas: Oblong
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 16 inches—black, friable silt loam
Subsoil:
16 to 29 inches—brown and dark yellowish brown, friable silty clay loam
29 to 46 inches—dark yellowish brown and yellowish brown, mottled, friable clay loam and loam
46 to 60 inches—yellowish brown, mottled, friable gravelly sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in shallow depressions
Similar inclusions:
• Soils that do not have underlying loamy material
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 3

148B2—Proctor silt loam, 2 to 5 percent slopes, eroded

Composition

Proctor and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Interfluves and foot slopes

Shape of areas: Irregular or oblong
Size of areas: 4 to 50 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—mixed very dark grayish brown and brown, friable silt loam

Subsoil:
11 to 26 inches—dark yellowish brown and brown, friable silty clay loam
26 to 35 inches—dark yellowish brown, friable clay loam
35 to 40 inches—strong brown, friable sandy clay loam

Substratum:
40 to 60 inches—dark yellowish brown and strong brown, friable sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in heads of drainageways and in drainageways

Similar inclusions:
• Soils that have a loamy substratum at a greater depth
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

148C2—Proctor silt loam, 5 to 10 percent slopes, eroded

Composition

Proctor and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Side slopes and foot slopes
Shape of areas: Irregular or oblong
Size of areas: 4 to 50 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate

Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—mixed very dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:
9 to 35 inches—dark yellowish brown, friable silty clay loam
35 to 47 inches—dark yellowish brown, mottled, friable loam

Substratum:
47 to 60 inches—dark yellowish brown, mottled, loose sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in heads of drainageways and in drainageways

Similar inclusions:
• Soils that have a loamy substratum at a greater depth
• Soils that have a seasonal high water table closer to the surface
• Soils that have more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

149—Brenton silt loam

Composition

Brenton and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Terraces, stream terraces, and outwash plains
Landscape position: Interfluves and foot slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—black, friable silt loam

Subsurface layer:
8 to 14 inches—very dark gray, friable silty clay loam

Subsoil:
14 to 17 inches—brown, friable silty clay loam
17 to 33 inches—olive brown and light olive brown, mottled, friable silty clay loam and silt loam

33 to 45 inches—olive brown and light olive brown, mottled, friable loam and fine sandy loam

Substratum:

45 to 60 inches—light olive brown and light brownish gray, friable, stratified loam and silt loam

Inclusions

Contrasting inclusions:

• The poorly drained Drummer soils that are subject to ponding; in shallow depressions

Similar inclusions:

• Soils that have loamy outwash at a greater depth
• Soils that have a seasonal high water table at a greater depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:

• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:

• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:

• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:

• Installing subsurface tile drains can help to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

152—Drummer silty clay loam

Composition

Drummer and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, till plains, terraces, outwash plains
Landscape position: Broad interfluves and shallow depressions
Shape of areas: Oblong or round
Ponding: Brief periods in the spring
Size of areas: 2 to 400 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:

0 to 10 inches—black, friable silty clay loam

Subsurface layer:

10 to 13 inches—very dark gray, mottled, friable silty clay loam

Subsoil:

13 to 41 inches—grayish brown, olive gray, and light olive gray, mottled, friable silty clay loam
41 to 47 inches—light brownish gray, mottled, friable, calcareous silty clay loam

Substratum:

47 to 60 inches—yellowish brown and brownish yellow, mottled, friable, calcareous, stratified silt loam and loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to ponding; in the slightly higher landscape positions

Similar inclusions:
• Soils that do not have a stratified substratum
• Soils that have a seasonal high water table at a greater depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.
• Subsurface tile drains and surface inlet tile drains help to lower the water table.

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

154—Flanagan silt loam

Composition

Flanagan and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Shape of areas: Irregular or oblong
Size of areas: 3 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1.5 to 3.5 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 15 inches—black and very dark grayish brown, friable silt loam

Subsoil:
15 to 47 inches—yellowish brown, brown, and light olive brown, mottled, firm silty clay loam
47 to 55 inches—light olive brown, mottled, friable clay loam
55 to 60 inches—grayish brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that have a seasonal high water table at a greater depth
• Soils that do not have underlying loamy material and are silty to a greater depth
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, and small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the moderately slow permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

171B—Catlin silt loam, 1 to 4 percent slopes

Composition

Catlin and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular or oblong
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3.5 to 6.0 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—very dark grayish brown, friable silt loam

Subsurface layer:
11 to 16 inches—dark brown, friable silty clay loam

Subsoil:
16 to 26 inches—dark yellowish brown, friable silty clay loam
26 to 41 inches—dark yellowish brown, mottled, friable silty clay loam
41 to 46 inches—yellowish brown, mottled, calcareous, friable silt loam

Substratum:
46 to 60 inches—light olive brown, mottled, calcareous, firm clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable and Drummer soils that are subject to ponding; in drainageways and shallow depressions

Similar inclusions:
• Soils that do not have a loamy substratum
• Soils that have a loamy substratum at a shallower depth
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited

Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

171B2—Catlin silt loam, 2 to 5 percent slopes, eroded

Composition

Catlin and similar soils: 90 to 96 percent
Contrasting inclusions: 4 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 2 to 200 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3.5 to 6.0 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:
8 to 32 inches—dark yellowish brown, friable silty clay loam
32 to 45 inches—yellowish brown, friable silty clay loam

Substratum:
45 to 60 inches—dark yellowish brown, firm clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in heads of drainageways

Similar inclusions:
• Soils that do not have loamy glacial till to a depth of more than 60 inches
• Soils that have free carbonates at a depth of less than 40 inches
• Soils that have loamy glacial till within a depth of 40 inches
• Soils that contain more clay in the surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited

Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

171C2—Catlin silt loam, 5 to 10 percent slopes, eroded

Composition

Catlin and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3.5 to 6.0 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—mixed black, very dark grayish brown, and dark yellowish brown, friable silt loam

Subsoil:
9 to 18 inches—dark yellowish brown, friable silty clay loam
18 to 43 inches—yellowish brown, friable silt loam
43 to 48 inches—yellowish brown, calcareous, friable silt loam

Substratum:
48 to 60 inches—yellowish brown, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable and Drummer soils that are subject to ponding; in drainageways and in heads of drainageways

Similar inclusions:
• Soils that do not have loamy material in the substratum
• Soils that have loamy material above a depth of 40 inches

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.

• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

193B2—Mayville silt loam, 2 to 5 percent slopes, eroded

Composition

Mayville and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular or oblong
Size of areas: 3 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess 20 to 30 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of 2 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—dark grayish brown, friable silt loam; mixed with brown subsoil material

Subsurface layer:
6 to 8 inches—dark grayish brown, very friable silt loam

Subsoil:
8 to 27 inches—brown and dark yellowish brown, firm silty clay loam that is mottled in the lower part
27 to 34 inches—brown, mottled, calcareous, firm clay loam

Substratum:
34 to 60 inches—pale brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways and in heads of drainageways

Similar inclusions:
• Soils that have slopes of more than 5 percent
• Soils that have a loamy substratum at a greater depth
• Soils that formed entirely in glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Dwellings

Suitability: Moderately suited to dwellings without basements
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

193C2—Mayville silt loam, 5 to 10 percent slopes, eroded

Composition

Mayville and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess 20 to 30 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of 2 to 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—dark brown and brown (mixed with dark yellowish brown), friable silt loam

Subsoil:
6 to 24 inches—dark yellowish brown, friable silty clay loam that is mottled in the lower few inches
24 to 29 inches—yellowish brown, mottled, friable clay loam
29 to 34 inches—brown, mottled, calcareous, firm loam

Substratum:
34 to 60 inches—light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways and in heads of drainageways

Similar inclusions:
• Soils that have loamy glacial till substratum at a greater depth
• Soils that have free carbonates at a shallower depth
• Soils that have more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Moderately suited to dwellings without basements
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

193D2—Mayville silt loam, 10 to 15 percent slopes, eroded

Composition

Mayville and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 40 acres
Major use: Pasture and hayland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess 20 to 30 inches thick and the underlying loamy glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of 2 to 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—mixed dark grayish brown and yellowish brown, friable silt loam

Subsoil:
6 to 11 inches—yellowish brown, friable silt loam
11 to 26 inches—yellowish brown, mottled, friable silty clay loam
26 to 38 inches—yellowish brown and light olive brown, mottled, friable clay loam

Substratum:
38 to 60 inches—light olive brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils; in drainageways

Similar inclusions:
• Soils that have a substratum of loamy glacial till at a shallower depth
• Soils that have free carbonates at a shallower depth

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
• Stripcropping also helps to control erosion.
• Adding organic material and returning crop residue to the soil help to prevent crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited

Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management considerations:
• All food plots of grain or seed crops should be established on the contour.
• Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited to dwellings without basements
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.
• Installing subsurface tile drains near the foundations lowers the water table.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderate absorption of liquid waste.
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

198—Elburn silt loam

Composition

Elburn and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Broad interfluves and foot slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 14 inches—black, friable silt loam

Subsoil:
14 to 42 inches—olive brown and light olive brown, mottled, friable silt loam and silty clay loam
42 to 46 inches—olive gray, mottled, calcareous, very friable loam and fine sandy loam

Substratum:
46 to 60 inches—olive gray, mottled, calcareous, very friable, stratified loam, fine sandy loam, and sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in shallow depressions and in heads of drainageways
• The well drained Proctor soils on knobs and narrow ridges above the Elburn soil

Similar inclusions:
• Soils that do not have loamy material in the lower part of the subsoil and the substratum
• Soils that contain more clay in the subsoil
• Soils that have a seasonal high water table at a greater depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, and small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue

on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

199A—Plano silt loam, 0 to 2 percent slopes

Composition

Plano and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Outwash plains and stream terraces
Landscape position: Broad interfluves
Shape of areas: Oblong or round
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 18 inches—very dark brown and dark brown, friable silt loam

Subsoil:
18 to 52 inches—dark yellowish brown and yellowish brown, friable silty clay loam that is mottled in the lower few inches
52 to 60 inches—yellowish brown, friable, stratified sandy loam and clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways and shallow depressions

Similar inclusions:
• Soils that are silty in the lower part
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 3

199B—Plano silt loam, 2 to 5 percent slopes

Composition

Plano and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Outwash plains and stream terraces
Landscape position: Broad interfluves and side slopes
Shape of areas: Oblong or round
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 15 inches—very dark grayish brown and dark brown, friable silt loam

Subsoil:
15 to 41 inches—dark yellowish brown, friable silty clay loam that is mottled in the lower few inches
41 to 60 inches—dark yellowish brown, friable clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in drainageways and shallow depressions

Similar inclusions:
• Soils that are silty in the lower part
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

213—Normal silt loam

Composition

Normal and similar soils: 85 percent
Contrasting inclusions: 15 percent

Setting

Landform: Terraces, outwash plains
Landscape position: Broad interfluves, shallow drainageways, and shallow depressions
Shape of areas: Oblong
Size of areas: 2 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—very dark grayish brown, friable silt loam

Subsurface layer:
11 to 20 inches—grayish brown, mottled, friable silt loam

Subsoil:
20 to 37 inches—brown and yellowish brown, mottled, friable silty clay loam
37 to 52 inches—yellowish brown, mottled, friable silt loam

Substratum:
52 to 60 inches—yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Edgington soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that have a seasonal high water table closer to the surface
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• This soil is sufficiently drained for corn, soybeans, and small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring. Subsurface tile functions satisfactorily if suitable outlets are available.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth and helps to prevent surface compaction and crusting.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I

221B2—Parr silt loam, 2 to 5 percent slopes, eroded

Composition

Parr and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Shape of areas: Irregular or oblong
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till

Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark grayish brown and dark yellowish brown, friable silt loam
Subsoil:
8 to 16 inches—dark yellowish brown, friable silty clay loam
16 to 28 inches—olive brown, mottled, friable and firm clay loam
28 to 39 inches—yellowish brown, mottled, calcareous, firm clay loam
Substratum:
39 to 60 inches—light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer and somewhat poorly drained Raub soils; in drainageways and in heads of drainageways
Similar inclusions:
• Soils that have a seasonal high water table closer to the surface
• Soils that have free carbonates above a depth of 20 inches
• Soils that have a loamy substratum at a depth of more than 40 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

221C2—Parr silt loam, 5 to 10 percent slopes, eroded

Composition

Parr and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 3 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark grayish brown and brown, friable silt loam
Subsoil:
8 to 25 inches—brown and yellowish brown, friable and firm clay loam
25 to 31 inches—yellowish brown, calcareous, firm loam
Substratum:
31 to 60 inches—brown, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in heads of drainageways and in drainageways
Similar inclusions:
• Soils that have free carbonates closer to the surface
• Soils that have a thicker mantle of silt
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

223B2—Varna silt loam, 2 to 5 percent slopes, eroded

Composition

Varna and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Shape of areas: Irregular or oblong
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and slow in the underlying material
Parent material: Loess less than 20 inches thick and the underlying silty glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, friable silt loam
Subsoil:
8 to 18 inches—brown, friable silty clay loam
18 to 31 inches—light yellowish brown and dark yellowish brown, mottled, firm silty clay loam
31 to 41 inches—brown and light olive brown, mottled, calcareous, firm silty clay loam
Substratum:
41 to 60 inches—olive, mottled, calcareous, very firm silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Ashkum soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that contain less clay and more sand in the subsoil
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water.
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 4L

223C2—Varna silt loam, 5 to 10 percent slopes, eroded

Composition

Varna and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 2 to 20 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and slow in the underlying material
Parent material: Loess less than 20 inches thick and the underlying silty glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsoil:
8 to 14 inches—dark yellowish brown, friable silty clay loam
14 to 18 inches—olive, mottled, firm silty clay loam
18 to 29 inches—light olive brown, mottled, calcareous, firm silty clay loam

Substratum:
29 to 60 inches—light olive brown, mottled, calcareous, firm silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Ashkum soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that contain less clay and more sand in the subsoil
• Soils that have a seasonal high water table at a greater depth
• Soils that contain more clay in the surface layer

Use and Management

Cropland

Suitability: Moderately well suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and helps to control erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water.
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 4L

224C2—Strawn loam, 5 to 10 percent slopes, eroded

Composition

Strawn and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—dark brown, friable loam

Subsoil:
4 to 18 inches—brown, yellowish brown, and dark yellowish brown, friable clay loam that is calcareous in the lower few inches
18 to 24 inches—yellowish brown, calcareous, friable loam

Substratum:
24 to 60 inches—yellowish brown, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that have a silty layer in the upper part

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

224C3—Strawn clay loam, 5 to 10 percent slopes, severely eroded

Composition

Strawn and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 15 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loamy glacial till
Runoff: Medium
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Very low
Erosion hazard: Severe
Tilth: Poor; enough of the subsoil has been mixed with the surface soil to change the behavior and tilth of the plow layer from that of the slightly eroded and moderately eroded areas
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 3 inches—dark yellowish brown, friable and cloddy clay loam

Subsoil:
3 to 7 inches—yellowish brown, calcareous, firm clay loam
7 to 13 inches—light olive brown, mottled, calcareous, firm loam

Substratum:
13 to 60 inches—light olive brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that have free carbonates at the surface

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Further erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a crop rotation that is dominated by forage crops.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration, improve tilth, and help to prevent surface crusting and sealing.
• Soil amendments, such as fertilizers and herbicides, generally are not successful in severely eroded areas where the subsoil has been extensively mixed into the plow layer. Tillage of any kind exposes the soil to further damage from erosion.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control further erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Seedbed preparation is difficult on severely eroded side slopes. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion.
• The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

224D2—Strawn silt loam, 10 to 15 percent slopes, eroded

Composition

Strawn and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 80 acres
Major use: Pasture

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loamy glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 6 inches—dark grayish brown, friable silt loam
Subsoil:
6 to 18 inches—brown and dark yellowish brown, friable silty clay loam and clay loam
18 to 23 inches—dark yellowish brown, friable clay loam
Substratum:
23 to 60 inches—yellowish brown, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have free carbonates below a depth of 24 inches
• Soils that have a silty layer as much as 30 inches thick
• Soils that have more sand in the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
• Stripcropping also helps to control erosion.
• Adding organic material and returning crop residue to the soil help to prevent crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management considerations:
• All food plots of grain or seed crops should be established on the contour.
• Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

224D3—Strawn clay loam, 10 to 15 percent slopes, severely eroded

Composition

Strawn and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, moraines
Landscape position: Side slopes
Shape of areas: Long and narrow
Size of areas: 4 to 80 acres
Major use: Pasture

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loamy glacial till
Runoff: Rapid
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Very low
Erosion hazard: Severe
Tilth: Poor; enough of the subsoil material has been mixed with the surface soil to change the behavior and tilth of the plow layer from that of the slightly eroded and moderately eroded areas
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 3 inches—dark yellowish brown, friable clay loam
Subsoil:
3 to 7 inches—yellowish brown, firm clay loam
7 to 12 inches—olive brown, mottled, calcareous, firm loam
Substratum:
12 to 60 inches—olive brown and light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways
Similar inclusions:
• Soils that have free carbonates at a depth of more than 20 inches
• Soils that have a thicker and darker surface layer

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control further erosion.
• Stripcropping also helps to control erosion.
• Tilling when the soil is wet causes surface cloddiness, compaction and excessive runoff, and further erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration, minimize the formation of a plowpan, and help to prevent surface crusting and sealing.
• Soil amendments, such as fertilizers and herbicides, generally are not successful in severely eroded areas where the subsoil has been extensively mixed into the plow layer. Tillage of any kind exposes the soil to further damage from erosion.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Establishing pasture and hay crops helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Seedbed preparation is difficult on severely eroded side slopes where the subsoil is exposed. A no-till method of pasture renovation or seeding helps in establishing forage species and in controlling further erosion.
• The plants should not be grazed until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management considerations:
• All food plots of grain or seed crops should be established on the contour.
• Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

224E2—Strawn silt loam, 15 to 30 percent slopes, eroded

Composition

Strawn and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Uplands, moraines
Landscape position: Side slopes
Shape of areas: Long and narrow
Size of areas: 5 to 80 acres
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loamy glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 5 inches—dark grayish brown, friable silt loam
Subsoil:
5 to 18 inches—dark yellowish brown, friable silty clay loam and clay loam
18 to 20 inches—yellowish brown, calcareous, friable clay loam
Substratum:
20 to 60 inches—yellowish brown, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford and Orion soils that are subject to flooding; in drainageways
Similar inclusions:
• Soils that have free carbonates below a depth of 24 inches
• Soils that have free carbonates at the surface

Use and Management

Cropland

Suitability: Unsuited because of the slope

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• In areas where the pasture is established, seeding legumes on the contour with a no-till seeder improves the forage quality.
• The plants should not be grazed or clipped until they are sufficiently established.
• Maintaining a permanent cover of pasture plants helps to control erosion and maintains tilth.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management considerations:
• Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture help to control erosion.
• Skidding logs or trees uphill with a cable and winch helps to overcome the slope.
• Firebreaks should be the grass type.
• Machinery should be used only when the soil is firm enough to support the equipment.
• The seedling mortality rate can be reduced by eliminating competing vegetation from near the seedlings and by selecting older and larger seedlings for planting. Some replanting may be needed.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management considerations:
• Food plots of grain or seed crops should be established only in the less sloping areas.
• All plantings should be on the contour.
• Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: 4R

224G—Strawn loam, 30 to 50 percent slopes

Composition

Strawn and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Uplands, moraines
Landscape position: Side slopes
Shape of areas: Long and narrow
Size of areas: 5 to 80 acres
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loamy glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 2 inches—very dark grayish brown, friable loam

Subsurface layer:
2 to 5 inches—dark brown, friable loam

Subsoil:
5 to 23 inches—dark yellowish brown and yellowish brown, friable clay loam that is calcareous in the lower part

Substratum:
23 to 60 inches—yellowish brown, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford and Orion soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have free carbonates at the surface
• Soils that have a silty layer at the surface to a depth of 20 inches
• Soils that have free carbonates at a depth of more than 24 inches

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Poorly suited
Management considerations:
• In the areas used for pasture, erosion is a hazard. Also, because large machinery generally cannot cross the short, very steep slopes, the only method of seeding, applying fertilizer, and spraying is by airplane or by hand.
• Some kind of ground cover is essential to control erosion.
• Proper stocking rates, deferred grazing, applications of fertilizer, and rotation grazing help to keep the pasture in good condition and help to control erosion.

Woodland

Suitability: Moderately suited
Management considerations:
• Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture help to control erosion.
• Skidding logs or trees uphill with a cable and winch helps to overcome the slope.
• Firebreaks should be the grass type.
• Machinery should be used only when the soil is firm enough to support the equipment.
• The seedling mortality rate can be reduced by eliminating competing vegetation from near the seedlings and by selecting the older and larger seedlings for planting. Some replanting may be needed.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management considerations:
• Food plots of grain or seed crops should be established only in the less sloping areas.
• All plantings should be on the contour.
• Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: 4R

232—Ashkum silty clay loam

Composition

Ashkum and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains
Landscape position: Broad interfluves and shallow depressions
Shape of areas: Oblong or round
Ponding: Brief periods in the spring
Size of areas: 4 to 400 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Up to 40 inches of colluvial material and the underlying silty glacial till
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: 1 foot above to 2 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 13 inches—black, friable silty clay loam
Subsoil:
13 to 20 inches—dark grayish brown, mottled, friable silty clay loam
20 to 31 inches—olive gray, mottled, friable silty clay loam
31 to 46 inches—light olive gray, mottled, friable silty clay loam
Substratum:
46 to 60 inches—olive gray, mottled, calcareous, firm silty clay loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to ponding
Similar inclusions:
• Soils that have a seasonal high water table at a greater depth
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.
• Subsurface tile drains and surface inlet tile drains help to lower the water table.

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

233B—Birkbeck silt loam, 1 to 4 percent slopes

Composition

Birkbeck and similar soils: 85 to 98 percent
Contrasting inclusions: 2 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits
Shape of areas: Irregular or oblong
Size of areas: 2 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till

Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 3 inches—very dark grayish brown, friable silt loam

Subsurface layer:
3 to 8 inches—brown, friable silt loam

Subsoil:
8 to 21 inches—brown and dark yellowish brown, friable silt loam and silty clay loam
21 to 46 inches—brown, dark yellowish brown, and yellowish brown, mottled, friable silty clay loam
46 to 60 inches—yellowish brown, mottled, calcareous, friable clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that are silty to a depth of more than 60 inches
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

233B2—Birkbeck silt loam, 2 to 5 percent slopes, eroded

Composition

Birkbeck and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Shape of areas: Irregular or oblong
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—dark grayish brown and brown (mixed with dark yellowish brown), friable silt loam

Subsoil:
9 to 19 inches—dark yellowish brown, friable silty clay loam
19 to 48 inches—dark yellowish brown, friable silty clay loam that is mottled in the lower few inches
48 to 55 inches—light olive brown, mottled, firm loam
Substratum:
55 to 60 inches—olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in heads of drainageways
Similar inclusions:
• Soils that have more clay in the subsoil
• Soils that are silty to a depth of more than 60 inches
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

233C2—Birkbeck silt loam, 5 to 10 percent slopes, eroded

Composition

Birkbeck and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silt loam
Subsoil:
9 to 33 inches—dark yellowish brown and yellowish brown, friable silty clay loam that is mottled in the lower part
33 to 42 inches—brown and yellowish brown, mottled, friable silt loam
42 to 48 inches—brown, mottled, calcareous, friable loam
Substratum:
48 to 60 inches—olive brown and light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in heads of drainageways and in drainageways

Similar inclusions:
• Soils that have a seasonal high water table closer to the surface
• Soils that have a loamy substratum at a depth of less than 40 inches
• Soils that are silty in the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

236—Sabina silt loam

Composition

Sabina and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Uplands, till plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Shape of areas: Oblong or round
Size of areas: 4 to 20 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1.5 to 3.5 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—brown and dark grayish brown, friable silt loam

Subsurface layer:
7 to 14 inches—grayish brown, friable silt loam

Subsoil:
14 to 18 inches—dark grayish brown, mottled, friable silt loam
18 to 45 inches—brown, mottled, friable silty clay loam and silt loam
45 to 51 inches—olive brown, mottled, calcareous, firm loam

Substratum:
51 to 60 inches—olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that have a thicker and darker surface layer
• Soils that do not have a loamy substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains and subsurface tile function satisfactorily if suitable outlets are available.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the moderately slow permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 4A
Windbreak suitability group: 1

243A—St. Charles silt loam, 0 to 2 percent slopes

Composition

St. Charles and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces
Landscape position: Interfluves
Shape of areas: Round or oblong
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—brown, friable silt loam

Subsoil:
8 to 44 inches—dark yellowish brown, friable silty clay loam that is mottled in the lower few inches
44 to 53 inches—dark yellowish brown, mottled, friable silt loam

Substratum:
53 to 60 inches—dark yellowish brown, very friable loam

Inclusions

Contrasting inclusions:
• The poorly drained Edgington and Drummer soils that are subject to ponding; in shallow depressions and drainageways

Similar inclusions:
• Soils that have a seasonal high water table closer to the surface
• Soils that do not have loamy material in the substratum.
• Soils that have loamy material at a shallower depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Woodland ordination symbol: 7A
Windbreak suitability group: 3

243B—St. Charles silt loam, 2 to 5 percent slopes

Composition

St. Charles and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces
Landscape position: Interfluves, side slopes, and terrace breaks
Shape of areas: Round or oblong
Size of areas: 5 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown, friable silt loam
Subsurface layer:
7 to 11 inches—brown, friable silt loam
Subsoil:
11 to 46 inches—dark yellowish brown, mottled, friable silty clay loam
46 to 50 inches—dark yellowish brown, mottled, friable loam
Substratum:
50 to 60 inches—dark yellowish brown, friable sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in heads of drainageways and in drainageways
Similar inclusions:
• Soils that have loamy material at a shallower depth
• Soils that have a seasonal high water table closer to the surface
• Soils that have more sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Returning crop residue to the soil and regularly adding

other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 7A
Windbreak suitability group: 3

244—Hartsburg silty clay loam

Composition

Hartsburg and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Uplands, loess plains
Landscape position: Broad interfluves, shallow depressions, and shallow drainageways
Shape of areas: Oblong or round
Ponding: Brief periods in the spring
Size of areas: 2 to 200 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—black, friable silty clay loam
Subsoil:
12 to 29 inches—dark grayish brown and grayish brown, mottled, friable silty clay loam that is calcareous in the lower part
29 to 36 inches—grayish brown, mottled, calcareous, friable silt loam
Substratum:
36 to 60 inches—grayish brown, mottled, calcareous silt loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to ponding
Similar inclusions:
• Soils that have a seasonal high water table at a greater depth
• Soils that do not have free carbonates to a depth of more than 40 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to

prevent surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.
• Subsurface tile drains and surface inlet tile drains help to lower the water table.

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

272—Edgington silt loam

Composition

Edgington and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Terraces, outwash plains
Landscape position: Broad interfluves and shallow closed depressions
Shape of areas: Oblong or round
Ponding: Brief periods in the spring
Size of areas: 4 to 160 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Loess more than 60 inches thick
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—very dark gray, friable silt loam

Subsurface layer:
11 to 21 inches—dark grayish brown, mottled, friable silt loam

Subsoil:
21 to 31 inches—light brownish gray, mottled, friable silty clay loam
31 to 53 inches—grayish brown, mottled, friable silty clay loam

Substratum:
53 to 60 inches—grayish brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to ponding

Similar inclusions:
• Soils that have a seasonal high water table at a greater depth
• Soils that have a loamy substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.
• Subsurface tile drains and surface inlet tile drains help to lower the water table.

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

279B2—Rozetta silt loam, 2 to 5 percent slopes, eroded

Composition

Rozetta and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, loess plains
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately permeable
Parent material: Loess more than 60 inches thick
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—mixed brown and dark yellowish brown, friable silt loam

Subsoil:
6 to 40 inches—dark yellowish brown and yellowish brown, mottled, friable silty clay loam
40 to 53 inches—yellowish brown, mottled, friable silty clay loam

Substratum:
53 to 60 inches—yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in heads of drainageways

Similar inclusions:
• Soils that have more clay in the subsoil
• Soils that have loamy glacial till within a depth of 60 inches
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

290A—Warsaw silt loam, 0 to 2 percent slopes

Composition

Warsaw and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Interfluves
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 30 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and very rapid in the lower part
Parent material: Loamy material 20 to 40 inches thick and the underlying sand and gravel
Runoff: Slow
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 13 inches—very dark brown and dark brown, friable silt loam and loam

Subsoil:
13 to 27 inches—brown, friable loam
27 to 37 inches—brown, friable clay loam
37 to 40 inches—brown, friable gravelly clay loam

Substratum:
40 to 60 inches—brown, calcareous, loose gravelly medium sand

Inclusions

Contrasting inclusions:
• The poorly drained Edgington soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that have sand and gravel at a shallower depth
• Soils that have a seasonal high water table closer to the surface
• Soils that do not have sand and gravel within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.
• The shallow root zone and reduced available water capacity can be overcome by using shorter season crops and using grasses and legumes more frequently in a cropping rotation.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Because of the sand and gravel in the substratum, this soil has a poor filtering capacity. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIs
Windbreak suitability group: 6G

290B2—Warsaw silt loam, 2 to 5 percent slopes, eroded

Composition

Warsaw and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Side slopes and terrace breaks
Shape of areas: Irregular or long and narrow
Size of areas: 10 to 50 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the upper part and very rapid in the lower part
Parent material: Loamy material 20 to 40 inches thick and the underlying sand and gravel
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 9 inches—mixed very dark grayish brown and brown, friable silt loam

Subsoil:
9 to 28 inches—brown, friable sandy clay loam
28 to 35 inches—yellowish brown, friable gravelly sandy loam

Substratum:
35 to 60 inches—yellowish brown, calcareous, friable sand and gravel

Inclusions

Contrasting inclusions:
• The poorly drained Edgington soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that have sand and gravel at a shallower depth
• Soils that have a seasonal high water table closer to the surface
• Soils that have calcareous material at a greater depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Because of the sand and gravel in the substratum, this soil has a poor filtering capacity. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 6G

290C2—Warsaw silt loam, 5 to 10 percent slopes, eroded

Composition

Warsaw and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Side slopes and terrace breaks
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and very rapid in the lower part
Parent material: Loamy material 20 to 40 inches thick and the underlying sand and gravel
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsoil:
9 to 13 inches—brown, friable loam
13 to 18 inches—dark yellowish brown, friable sandy loam
18 to 25 inches—yellowish brown, friable gravelly sandy loam
Substratum:
25 to 60 inches—yellowish brown, calcareous, friable gravelly loamy sand

Inclusions

Contrasting inclusions:
• The poorly drained Edgington soils that are subject to ponding; in shallow depressions
Similar inclusions:
• Soils that have sand and gravel at a shallower depth
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Because of the sand and gravel in the substratum, this soil has a poor filtering capacity. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 6G

293—Andres silt loam

Composition

Andres and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Uplands, till plains
Landscape position: Back slopes and foot slopes
Shape of areas: Irregular
Size of areas: 5 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess and loamy material and the underlying silty glacial till
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 14 inches—black and very dark gray, friable silt loam
Subsoil:
14 to 24 inches—dark yellowish brown, mottled, friable silty clay loam
24 to 44 inches—light olive brown, mottled, friable loam and silt loam
44 to 51 inches—olive brown, mottled, firm silt loam
Substratum:
51 to 60 inches—olive brown and grayish brown, mottled, calcareous, firm silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Ashkum soils that are subject to ponding; in shallow depressions
• Soils that contain more sand in the subsoil than the

Andres soil and have a seasonal high water table at a greater depth

Similar inclusions:
- Soils that do not have a loamy layer in the subsoil
- Soils that contain more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- No major limitations affect the use of this soil for corn, soybeans, or small grain.
- Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
- A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
- Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
- Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
- Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
- Installing subsurface tile drains near the foundations helps to overcome the wetness.
- Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Installing tile drains helps to lower the seasonal high water table.
- Enlarging the absorption area helps to overcome the restricted permeability.
- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

294B—Symerton silt loam, 2 to 5 percent slopes

Composition

Symerton and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess and loamy sediments 20 to 40 inches thick and the underlying silty glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3.5 to 6.0 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 13 inches—very dark gray and very dark grayish brown, friable silt loam

Subsoil:
13 to 23 inches—dark yellowish brown, friable silty clay loam
23 to 49 inches—dark yellowish brown, friable clay loam, sandy clay loam, and silty clay loam; mottled in the lower part
49 to 53 inches—olive brown, mottled, calcareous, firm silt loam

Substratum:
53 to 60 inches—olive brown, mottled, calcareous, firm silt loam

Inclusions

Contrasting inclusions:
- The poorly drained Ashkum soils that are subject to ponding; in heads of drainageways and shallow depressions

Similar inclusions:
- Soils that do not have loamy subsoil layers and contain more clay

• Soils that have a seasonal high water table closer to the surface
• Soils that have a firm substratum at a shallower depth
• Soils that have slopes of less than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the restricted permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

318B2—Lorenzo silt loam, 2 to 5 percent slopes, eroded

Composition

Lorenzo and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Terrace divides, terrace breaks, and side slopes
Shape of areas: Long and narrow
Size of areas: 3 to 20 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Loamy material 12 to 20 inches thick and the underlying sand and gravel
Runoff: Medium
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Low

Typical Profile

Surface layer:
0 to 7 inches—dark brown and strong brown, friable silt loam

Subsoil:
7 to 14 inches—strong brown, friable clay loam
14 to 22 inches—brown, friable sandy clay loam

Substratum:
22 to 60 inches—brown and yellowish brown, loose, calcareous sand and gravel

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils in drainageways and in heads of drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that have gravel at a greater depth
• Soils that have slopes of 0 to 8 percent or 5 to 7 percent

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting helps to control erosion and conserves soil moisture.
• Selecting short-season or drought-tolerant crop varieties helps to overcome the low available water capacity and the shallow root zone. Including grasses and legumes in the rotation as a fallow crop also conserves moisture.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Because of the sand and gravel in the substratum, this soil has a poor filtering capacity. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIIs
Windbreak suitability group: 6G

322B2—Russell silt loam, 2 to 5 percent slopes, eroded

Composition

Russell and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—brown, friable silt loam

Subsoil:
6 to 30 inches—yellowish brown, friable silty clay loam
30 to 46 inches—yellowish brown and dark yellowish brown, mottled, firm clay loam

Substratum:
46 to 60 inches—light olive brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to occasional flooding; in drainageways

Similar inclusions:
• Soils that have a seasonal high water table at a shallower depth
• Soils that have free carbonates at a depth of less than 40 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.

• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

322C2—Russell silt loam, 5 to 10 percent slopes, eroded

Composition

Russell and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—mixed dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:
5 to 33 inches—yellowish brown and dark yellowish brown, friable silty clay loam that is mottled in the lower few inches
33 to 42 inches—dark yellowish brown, mottled, friable clay loam

Substratum:
42 to 60 inches—olive brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that have a seasonal high water table at a shallower depth
• Soils that have free carbonates at a depth of less than 40 inches
• Soils that are silty throughout the subsoil and substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity and tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.

• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

327B2—Fox silt loam, 2 to 5 percent slopes, eroded

Composition

Fox and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces
Landscape position: Shoulders and side slopes
Shape of areas: Oblong
Size of areas: 5 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Less than 24 inches of loess and the underlying sand and gravel
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 6 inches—mixed brown and yellowish brown, friable silt loam

Subsurface layer:
6 to 10 inches—yellowish brown, friable silt loam

Subsoil:
10 to 21 inches—yellowish brown, mottled, friable silty clay loam
21 to 37 inches—dark brown and brown, mottled, friable clay loam and sandy clay loam

Substratum:
37 to 60 inches—yellowish brown and brown, calcareous, loose, stratified sand and gravel

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in heads of drainageways and in drainageways

Similar inclusions:
• Soils that have sand and gravel at a shallower depth
• Soils that have free carbonates at a greater depth
• Soils that have slopes of 0 to 2 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume

improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Moderately well suited
Management considerations:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Because of the sand and gravel in the substratum, this soil has a poor filtering capacity. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A
Windbreak suitability group: 6G

327C2—Fox silt loam, 5 to 10 percent slopes, eroded

Composition

Fox and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces
Landscape position: Shoulders and side slopes
Shape of areas: Oblong
Size of areas: 5 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Parent material: Less than 24 inches of loess and the underlying sand and gravel
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—mixed dark grayish brown and yellowish brown, friable silt loam

Subsoil:
8 to 22 inches—yellowish brown, friable silty clay loam
22 to 28 inches—dark yellowish brown, friable sandy clay loam
28 to 35 inches—dark yellowish brown, friable gravelly sandy clay loam

Substratum:
35 to 60 inches—yellowish brown, calcareous, loose gravelly coarse sand that has strata of loamy sand

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in heads of drainageways and in drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that are silty to a greater depth

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity and tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.

• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Because of the sand and gravel in the substratum, this soil has a poor filtering capacity. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Windbreak suitability group: 6G

330—Peotone silty clay loam

Composition

Peotone and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, till plains, and loess plains
Landscape position: Shallow closed depressions
Shape of areas: Oblong or round
Ponding: Brief periods in the spring
Size of areas: 2 to 50 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Very poorly drained
Permeability: Moderately slow
Parent material: Colluvial sediments more than 60 inches thick
Runoff: Ponded (fig. 8)
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—very dark gray, firm silty clay loam

Subsurface layer:
12 to 15 inches—black, firm silty clay loam

Subsoil:
15 to 46 inches—very dark gray, mottled, firm silty clay loam

Substratum:
46 to 60 inches—olive gray, mottled, firm silt loam

Inclusions

Contrasting inclusions:
• Somewhat poorly drained soils that are not subject to flooding

Similar inclusions:
• Soils that have a seasonal high water table at a greater depth
• Soils that have a thinner or lighter colored surface layer and subsurface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management consideration:
• The ponding can be controlled by surface drains, ditches, and surface inlet tile.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and helps to maintain tilth.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

Figure 8.—Ponding in an area of Peotone silty clay loam.

440B2—Jasper loam, 2 to 5 percent slopes, eroded

Composition

Jasper and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Summits, shoulders, and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess less than 20 inches thick and the underlying stratified loamy sediments
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown and very dark brown (mixed with dark yellowish brown), friable loam

Subsoil:
8 to 15 inches—dark yellowish brown, friable loam
15 to 44 inches—dark yellowish brown, friable sandy clay loam and sandy loam
44 to 53 inches—yellowish brown, friable very fine sandy loam that is mottled below a depth of 50 inches

Substratum:
53 to 60 inches—yellowish brown, mottled, calcareous, friable silt loam and very fine sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that have less sand and more clay in the subsoil
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

440C2—Jasper loam, 5 to 10 percent slopes, eroded

Composition

Jasper and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 3 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess less than 20 inches thick and the underlying stratified loamy sediments
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—mixed very dark brown and brown, friable loam

Subsoil:
7 to 13 inches—brown, friable loam
13 to 37 inches—yellowish brown and dark yellowish brown, friable clay loam that is mottled in the lower few inches
37 to 42 inches—dark yellowish brown, mottled, very friable sandy loam

Substratum:
42 to 60 inches—dark yellowish brown, mottled, loose, stratified medium and coarse sand

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that have less sand and more clay in the subsoil
• Soils that have a seasonal high water table closer to the surface
• Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material maintain productivity, help to prevent crusting, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 3

481—Raub silt loam

Composition

Raub and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 22 to 40 inches thick and the underlying loamy glacial till
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—black, friable silt loam

Subsurface layer:
7 to 18 inches—very dark gray, friable silt loam

Subsoil:
18 to 33 inches—brown and olive brown, mottled, friable silty clay loam
33 to 39 inches—olive brown, mottled, friable silty clay loam; noticeable sand grains
39 to 45 inches—olive brown, mottled, calcareous, friable loam

Substratum:
45 to 60 inches—light olive brown, mottled, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that have free carbonates closer to the surface
• Soils that have a seasonal high water table closer to the surface
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring. Subsurface tile functions satisfactorily if suitable outlets are available.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited

Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 1

484—Harco silt loam

Composition

Harco and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, loess plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Shape of areas: Irregular or round
Size of areas: 3 to 50 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—black, friable silt loam

Subsoil:
12 to 30 inches—brown, olive brown, and light olive brown, mottled, friable silty clay loam
30 to 39 inches—light olive brown, mottled, calcareous, friable silt loam

Substratum:
39 to 60 inches—light olive brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that contain more clay in the subsoil
• Soils that have a seasonal high water table at a greater depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• Measures that maintain the drainage system are needed to overcome the wetness, which can delay planting in the spring.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 1

496—Fincastle silt loam

Composition

Fincastle and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves and foot slopes
Shape of areas: Oblong
Size of areas: 2 to 30 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—brown, friable silt loam

Subsurface layer:
6 to 11 inches—grayish brown, friable silt loam

Subsoil:
11 to 27 inches—olive brown, mottled, firm silty clay loam
27 to 36 inches—light olive brown, mottled, friable silty clay loam
36 to 42 inches—light olive brown, mottled, friable, calcareous clay loam

Substratum:
42 to 60 inches—light olive brown, mottled, friable, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding

Similar inclusions:
• Soils that have loamy sediments at a depth of more than 40 inches
• Soils that contain more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains and subsurface tile function satisfactorily if suitable outlets are available.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.

• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the restricted permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 4A
Windbreak suitability group: 1

533—Urban land

Composition

Urban land: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Generally, uplands
Landscape position: Generally, ridgetops and other areas that have been built up or altered by human activity
Shape of areas: Long and narrow or rectangular
Flooding frequency: Not subject to significant flooding
Ponding: Small areas may be ponded for brief periods following heavy rains if storm sewers are at capacity.
Size of areas: 3 to 100 acres
Major uses: Parking lots adjacent to shopping centers, industrial plants, insurance offices, or commercial buildings

Soil Properties and Qualities

Permeability: Generally impermeable, except for included areas
Runoff: Runoff is generally very rapid, and the water is commonly diverted to storm drainage systems. In some areas, however, the water is diverted to areas of adjacent soils.
Other characteristics:
• Areas of this unit are covered by pavement and buildings. The soils have been modified so extensively by cutting and filling that they cannot be identified.

Inclusions

Contrasting inclusions:
• The loamy and silty Orthents in areas where development is not as intense or in areas used for landscaping purposes
• The poorly drained Sable and Drummer soils in shallow depressions and old drainageways
• Various other natural soils in areas that were excluded from development

Use and Management

• Because the areas of this unit are so variable, intensive onsite investigation is needed to determine the suitability for most uses.

Interpretive Groups

Land capability classification: None assigned

541B2—Graymont silt loam, 2 to 5 percent slopes, eroded

Composition

Graymont and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 5 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying silty glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam
Subsoil:
8 to 27 inches—brown and dark yellowish brown, mottled, friable silty clay loam
27 to 34 inches—light olive brown, mottled, firm silty clay loam
34 to 39 inches—light olive brown, mottled, calcareous, firm silt loam

Substratum:
39 to 60 inches—light olive brown, mottled, calcareous, firm silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer and Ashkum soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that have free carbonates at a greater depth
• Soils that are shallower to the substratum
• Soils that contain more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

567A—Elkhart silt loam, 0 to 2 percent slopes

Composition

Elkhart and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Uplands, loess plains
Landscape position: Shoulders and side slopes
Shape of areas: Oblong
Size of areas: 3 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 14 inches—very dark grayish brown and very dark gray, friable silt loam

Subsoil:
14 to 18 inches—brown, friable silty clay loam
18 to 30 inches—brown and yellowish brown, mottled, friable silty clay loam
30 to 35 inches—brown, mottled, calcareous, friable silt loam

Substratum:
35 to 60 inches—yellowish brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Hartsburg soils that are subject to ponding; in shallow depressions

Similar inclusions:
• Soils that do not have free carbonates above a depth of 40 inches

• Soils that have more sand and less silt in the subsoil and the substratum
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for corn, soybeans, or small grain.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted pasture and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: I
Windbreak suitability group: 3

567B—Elkhart silt loam, 2 to 4 percent slopes

Composition

Elkhart and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, loess plains
Landscape position: Shoulders
Shape of areas: Irregular or oblong
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 14 inches—very dark gray, friable silt loam

Subsoil:
14 to 27 inches—yellowish brown, friable silty clay loam
27 to 31 inches—brownish yellow, friable silty clay loam

Substratum:
31 to 60 inches—brownish yellow, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Hartsburg soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that do not have free carbonates above a depth of 40 inches
• Soils that have more sand in the subsoil and the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited

Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderate
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

567B2—Elkhart silt loam, 2 to 5 percent slopes, eroded

Composition

Elkhart and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Uplands, loess plains
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or oblong
Size of areas: 2 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark gray and brown, friable silt loam

Subsoil:
8 to 26 inches—brown, dark yellowish brown, and yellowish brown, friable silty clay loam
26 to 30 inches—yellowish brown, mottled, calcareous, friable silt loam

Substratum:
30 to 60 inches—yellowish brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Hartsburg soils that are subject to ponding; in shallow depressions and in heads of drainageways

Similar inclusions:
• Soils that do not have free carbonates above a depth of 40 inches
• Soils that have more sand in the subsoil and the substratum
• Soils that contain more clay in the surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Incorporating crop residue into the soil or adding other organic material helps to prevent crusting, improves tilth, and increases the rate of water infiltration.
• A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Pasture and hay

Suitability: Well suited
Management considerations:
• Adapted forage and hay plants grow well on this soil.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the

pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 3

570D2—Martinsville silt loam, 8 to 18 percent slopes, eroded

Composition

Martinsville and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces
Landscape position: Shoulders and side slopes
Shape of areas: Oblong
Size of areas: 2 to 30 acres
Major use: Pasture

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy material more than 60 inches thick
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 6 inches—mixed dark grayish brown and brown, friable silt loam

Subsurface layer:
6 to 10 inches—brown, friable silt loam

Subsoil:
10 to 18 inches—dark yellowish brown, friable loam
18 to 41 inches—dark yellowish brown and yellowish brown, mottled, friable clay loam
41 to 60 inches—dark yellowish brown, mottled, friable sandy clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils that are subject to flooding; in drainageways

Similar inclusions:
• Soils that do not have loamy sediments in the subsoil and underlying material
• Soils that have free carbonates at a shallower depth

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
• Stripcropping also helps to control erosion.
• Adding organic material and returning crop residue to the soil help to prevent crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Moderately suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to

prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Moderately suited
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderate permeability.
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4A
Windbreak suitability group: 3

614B—Chenoa silt loam, 1 to 3 percent slopes

Composition

Chenoa and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves and foot slopes
Shape of areas: Irregular or round
Size of areas: 2 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Parent material: Loess 20 to 40 inches thick and the underlying silty glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—very dark gray, friable silt loam
Subsoil:
12 to 16 inches—dark yellowish brown, friable silty clay loam
16 to 30 inches—dark yellowish brown, mottled, firm silty clay loam
30 to 42 inches—olive brown, mottled, firm silty clay loam that is calcareous in the lower part
Substratum:
42 to 60 inches—olive brown, mottled, calcareous, very firm silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Ashkum soils that are subject to ponding; in shallow depressions and in heads of drainageways
• Well drained soils that contain much more sand in the subsoil than the Chenoa soil
Similar inclusions:
• Soils that contain less clay in the subsoil
• Soils that do not have a substratum of very firm silt loam

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Subsurface drains help to lower the seasonal high water table. Installing the drains on the contour helps to intercept seepage water.
• In areas where slopes are very long, erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting.
• Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of

fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the moderately slow permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 1

740—Darroch loam

Composition

Darroch and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Interfluves and foot slopes
Shape of areas: Irregular or oval
Size of areas: 5 to 20 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately rapid in the underlying material
Parent material: Loess less than 20 inches thick and the underlying loamy material
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

0 to 16 inches—black and very dark gray, friable loam
Subsoil:
16 to 22 inches—olive brown, mottled, friable clay loam
22 to 38 inches—olive brown, mottled, friable sandy loam
Substratum:
38 to 60 inches—light olive brown, mottled, calcareous sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils that are subject to ponding; in shallow depressions and in heads of drainageways
Similar inclusions:
• Soils that have more gravel in the lower part of the subsoil and in the substratum
• Soils that have a seasonal high water table at a greater depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Improved drainage is needed in some areas. Surface drains and subsurface tile function satisfactorily if suitable outlets are available.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing

the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 1

801—Orthents, silty

Composition

Orthents and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Generally, uplands
Landscape position: Low, flat areas, shallow depressions, or raised mounds
Shape of areas: Rectangular or oblong
Ponding: Subject to ponding in some areas for brief periods in the spring
Size of areas: 3 to 40 acres
Major use: Generally used as cut-and-fill areas along the major highways or other major excavations or in areas that have been scraped to remove topsoil for other purposes

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Variable because of compaction by construction equipment and because of variable textures
Parent material: Silty material
Runoff: Rapid to slow, depending on the permeability and the slope
Available water capacity: Generally, moderate
Erosion hazard: Slight or moderate
Other characteristics:
• These soils generally are in cut-and-fill areas and are fine or moderately fine textured. In the cut areas, the topsoil has been removed and the subsoil or the underlying material has been exposed. In the fill areas, additional silty material has been placed on the original surface layer and in many cases has been mixed with the original soil.

Inclusions

Contrasting inclusions:
• Urban land in small, isolated areas of this unit, typically near the edges of the mapped areas
• The poorly drained Sable and Drummer soils and the somewhat poorly drained Ipava soils

Similar inclusions:
• The loamy Orthents in locations similar to those of the major soils

Use and Management

• Because these soils are so variable, extensive onsite investigation is needed to determine the suitability for most uses.

Interpretive Groups

Land capability classification: None assigned

802—Orthents, loamy

Composition

Orthents and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Generally, uplands
Landscape position: Low, flat areas or ridgelike areas
Shape of areas: Rectangular or long and narrow
Ponding: Subject to ponding in some areas for brief periods in the spring
Size of areas: 5 to 80 acres
Major use: Generally used as cut-and-fill areas near major excavations, including gravel pits, or near other areas that have been scraped to remove topsoil or the underlying material. In some areas the material left behind is a mixture of the topsoil, subsoil, and the underlying material.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Variable because of compaction by construction equipment and because of variable textures
Parent material: Loamy material
Runoff: Slow to rapid
Available water capacity: Generally, moderate or low
Erosion hazard: Slight to severe
Other characteristics:
• These soils generally are in cut-and-fill areas that are moderately fine to moderately coarse textured. In the cut areas, the topsoil has been removed and the subsoil or the underlying material has been exposed. In the fill areas, additional loamy material has been placed on the

original surface layer and in many cases has been mixed with the original soil.

Inclusions

Contrasting inclusions:
• Urban land in small, isolated areas of this unit, typically near the edges of the mapped areas
• The somewhat poorly drained Flanagan and Raub soils and the moderately well drained Catlin, Dana, and Saybrook soils

Similar inclusions:
• The silty Orthents in locations similar to those of the major soils
• Areas that have a seasonal high water table at a depth of 1 to 3 feet
• Areas that have a seasonal high water table at a depth of 3 to 6 feet

Use and Management

• Because these soils are so variable, intensive onsite investigation is needed to determine the suitability for most uses.

Interpretive Groups

Land capability classification: None assigned

865—Pits, gravel

Composition

Pits, gravel: 95 to 100 percent
Contrasting inclusions: 0 to 5 percent

Setting

Landform: Stream terraces and outwash plains
Landscape position: Side slopes and broad, flat plains
Shape of areas: Oblong or rectangular
Size of areas: 5 to 200 acres
Major use: This map unit consists of areas from which gravel, sand, or both have been removed and includes the surrounding area in which the mining by-products have been placed.

Soil Properties and Qualities

Drainage class: Well drained to excessively drained
Permeability: Rapid or very rapid in the gravel material
Runoff: Slow or medium
Available water capacity: Low
Erosion hazard: Low or moderate
Other characteristics:
• This unit consists of excavations from which sand and gravel have been or are being removed and includes the areas immediately surrounding these excavations. The soils do not support vegetation. They are moderately coarse or coarse textured and generally contain little or no organic material.

Inclusions

Contrasting inclusions:
• Orthents; in areas that were overlooked in the mining process or that have been preserved near the edges of the unit for esthetic purposes

Use and Management

• Because the soils are so variable, intensive onsite investigation is needed to determine the suitability for most uses.

Interpretive Groups

Land capability classification: None assigned

2221C—Parr-Urban land complex, 5 to 10 percent slopes

Composition

Parr and similar soils: 60 percent
Urban land: 25 percent
Contrasting inclusions: 15 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Shape of areas: Irregular or long and narrow
Size of areas: 40 to 100 acres
Major use: Residential, commercial, industrial, or recreational areas in Bloomington-Normal

Soil Properties and Qualities

Parr

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Urban land

Permeability: Generally impermeable, except for included areas
Runoff: Runoff is generally very rapid, and the water is commonly diverted to storm drainage systems. In some areas, however, the water is diverted to areas of adjacent soils.

Typical Profile

Parr

Surface layer:
0 to 8 inches—mixed very dark grayish brown and brown, friable silt loam

Subsoil:
8 to 25 inches—brown and yellowish brown, friable and firm clay loam
25 to 31 inches—yellowish brown, calcareous, firm loam

Substratum:
31 to 60 inches—brown, calcareous, firm loam

Inclusions

Contrasting inclusions:
• Poorly drained soils in depressions and drainageways that are subject to ponding
• Orthents; in areas where development is not as intense or has been avoided
• Areas of natural soils that were purposely excluded from development and are used for landscaping, esthetics, or construction purposes

Similar inclusions:
• Soils that have free carbonates at a shallower depth
• Soils that have a thicker mantle of silt

Use and Management

Dwellings

Suitability: Parr—moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Parr—poorly suited
Management considerations:
• A septic tank system can function satisfactorily if the moderately slowly permeable material is replaced with more permeable material and if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. In the urban areas, most homes are on a central sewage disposal system.

Interpretive Groups

Land capability classification: None assigned

2892A—Sawmill-Lawson-Urban land complex, 0 to 2 percent slopes

Composition

Sawmill and similar soils: 35 percent
Lawson and similar soils: 30 percent
Urban land: 20 percent
Contrasting inclusions: 15 percent

Setting

Landform: Flood plains, first bottom
Landscape position: Flat areas along streams
Shape of areas: Long and narrow
Flooding frequency: Rare because of construction and engineering activities
Flooding duration: Very brief
Size of areas: 20 to 200 acres
Major use: Residential, commercial, industrial, or recreational areas in Bloomington-Normal

Soil Properties and Qualities

Sawmill

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Silty alluvium more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: High
Erosion hazard: Scour potential
Shrink-swell potential: Moderate
Potential for frost action: High

Lawson

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Silty alluvium more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Scour potential
Shrink-swell potential: Moderate
Potential for frost action: High

Urban land

Permeability: Generally impermeable, except in included areas
Runoff: Runoff is generally very rapid, and the water is commonly diverted to storm drainage systems. In some areas, however, the water is diverted to areas of adjacent soils.

Typical Profile

Sawmill

Surface layer:
0 to 23 inches—black, friable silty clay loam

Subsoil:
23 to 30 inches—very dark gray, mottled, friable silty clay loam
30 to 50 inches—dark gray and olive gray, mottled,

friable silty clay loam and clay loam
50 to 60 inches—olive gray, mottled, calcareous, friable, stratified loam and sandy loam

Lawson

Surface layer:
0 to 16 inches—very dark gray, friable silt loam

Subsurface layer:
16 to 34 inches—very dark grayish brown, friable silt loam

Substratum:
34 to 60 inches—dark grayish brown, mottled, friable silt loam, loam, and sandy loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to flooding
• Orthents; in areas where development is not as intense or in areas used for landscaping purposes

Similar inclusions:
• Soils that have less clay in the subsoil
• Soils that have more sand in the subsoil

Use and Management

Dwellings

Suitability: Generally unsuited because of the flooding
Management considerations:
• Some residential areas have been protected from flooding by levees and fill material, which raises the site above the common flood levels.

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding
Management considerations:
• Many areas are on a central sewage disposal system.

Interpretive Groups

Land capability classification: None assigned

2893B—Catlin-Saybrook-Urban land complex, 1 to 5 percent slopes

Composition

Catlin and similar soils: 45 percent
Saybrook and similar soils: 35 percent
Urban land: 10 percent
Contrasting inclusions: 10 percent

Setting

Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Shape of areas: Irregular or rectangular
Size of areas: 40 to 200 acres
Major use: Residential, commercial, industrial, or recreational areas in Bloomington-Normal

Soil Properties and Qualities

Catlin

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 3.5 to 6.0 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Saybrook

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Runoff: Medium
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Urban land

Permeability: Generally impermeable, except in included areas
Runoff: Runoff is generally very rapid, and the water is commonly diverted to storm drainage systems. In some areas, however, the water is diverted to areas of adjacent soils.

Typical Profile

Catlin

Surface layer:
0 to 11 inches—very dark grayish brown, friable silt loam

Subsurface layer:
11 to 16 inches—dark brown, friable silty clay loam

Subsoil:
16 to 26 inches—dark yellowish brown, friable silty clay loam
26 to 41 inches—dark yellowish brown, mottled, friable silty clay loam
41 to 46 inches—yellowish brown, mottled, calcareous, friable silt loam

Substratum:
46 to 60 inches—light olive brown, mottled, calcareous, firm clay loam

Saybrook

Surface layer:
0 to 8 inches—mixed very dark brown and brown, friable silt loam

Subsoil:
8 to 29 inches—brown, dark brown, yellowish brown, and dark yellowish brown, friable silty clay loam
29 to 39 inches—light olive brown and olive yellow, mottled, calcareous, friable loam

Substratum:
39 to 60 inches—light yellowish brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:
• Very poorly drained soils in depressional areas below the Catlin and Saybrook soils
• Orthents; in areas where development is not as intense or in areas that are used for landscaping purposes

Similar inclusions:
• Soils that have a loamy substratum at a shallower depth
• Soils that have free carbonates at a greater depth

Use and Management

Dwellings

Suitability: Moderately suited
Management considerations:
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations lowers the water table.

Septic tank absorption fields

Suitability: Catlin—poorly suited; Saybrook—moderately suited
Management considerations:
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

Interpretive Groups

Land capability classification: None assigned

2902A—Ipava-Sable-Urban land complex, 0 to 2 percent slopes

Composition

Ipava and similar soils: 60 percent
Sable and similar soils: 20 percent
Urban land: 10 percent
Contrasting inclusions: 10 percent

Setting

Landform: Uplands, loess plains
Landscape position: Broad interfluves, foot slopes, shallow depressions, and shallow drainageways
Shape of areas: Irregular
Ponding: Sable—brief periods in the spring
Size of areas: 40 to 400 acres
Major use: Residential, commercial, industrial, or recreational areas in Bloomington-Normal

Soil Properties and Qualities

Ipava

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess more than 60 inches thick
Runoff: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Sable

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess more than 60 inches thick
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Urban land

Permeability: Generally impermeable, except in included areas
Runoff: Runoff is generally very rapid, and the water is commonly diverted to storm drainage systems. In some areas, however, the water is diverted to areas of adjacent soils.

Typical Profile

Ipava

Surface layer:
0 to 7 inches—black, friable silt loam

Subsurface layer:
7 to 11 inches—very dark gray, friable silt loam

Subsoil:
11 to 20 inches—brown, mottled, friable silty clay loam

20 to 28 inches—dark grayish brown, mottled, friable silty clay loam
28 to 52 inches—dark grayish brown, mottled, calcareous, friable silt loam

Substratum:
52 to 60 inches—dark grayish brown, mottled, friable silt loam that is calcareous in the lower part

Sable

Surface layer:
0 to 12 inches—black, friable silty clay loam

Subsoil:
12 to 37 inches—very dark gray and gray, mottled, firm silty clay loam
37 to 54 inches—light gray, mottled, firm silt loam

Substratum:
54 to 60 inches—light gray, mottled, firm silt loam

Inclusions

Contrasting inclusions:
• Very poorly drained soils in depressional areas below the Ipava soil and in landscape positions similar to those of the Sable soil
• Orthents; in areas where development is not as intense or in areas that are used for landscaping purposes

Similar inclusions:
• Soils that are deeper to a seasonal high water table
• Soils that contain less clay in the subsoil
• Soils that have slopes of more than 2 percent

Use and Management

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
• Ponding can be controlled by diverting surface water from the site and by constructing the building on raised fill material.

Septic tank absorption fields

Suitability: Ipava—poorly suited; Sable—generally unsuited because of the ponding
Management considerations:
• Installing tile drains helps to lower the seasonal high water table.
• Enlarging the absorption area helps to overcome the moderately slow permeability.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: None assigned

8073—Ross loam, occasionally flooded

Composition

Ross and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Flood plains, first bottom
Landscape position: Natural levees
Shape of areas: Long and narrow
Flooding frequency: Occasional
Flooding duration: Brief periods from March through June
Size of areas: 10 to 40 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loamy alluvium more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet
Organic matter content: Moderate
Erosion hazard: Scour potential
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—black, friable loam

Subsurface layer:
8 to 32 inches—black, very dark gray, and very dark grayish brown, friable loam

Subsoil:
32 to 39 inches—brown, mottled, friable silt loam

Substratum:
39 to 60 inches—dark yellowish brown, mottled, calcareous, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill soils in shallow depressions and old stream channels

Similar inclusions:
• Soils that have a seasonal high water table closer to the surface
• Soils that contain more clay and less sand throughout

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Dikes or diversions can reduce the extent of crop damage caused by floodwater. Selecting crop varieties adapted to shorter growing seasons and to wetter conditions also reduces the extent of this damage.
• Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing causes surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Flooding delays the harvesting of hay in some years.

Woodland

Suitability: Moderately suited
Management considerations:
• Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5A
Windbreak suitability group: 1

8074—Radford silt loam, occasionally flooded

Composition

Radford and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Flood plains, first bottom
Landscape position: Meanderbelts and shallow drainageways
Shape of areas: Long and narrow
Flooding frequency: Occasional
Flooding duration: Brief periods from March through June
Size of areas: 5 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Silty alluvium 20 to 40 inches thick and the underlying older buried soils
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: Moderate
Erosion hazard: Scour potential
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsurface layer:
8 to 27 inches—very dark grayish brown and brown, mottled, friable silt loam

Next layer:
27 to 60 inches—black and dark gray, mottled, firm silt loam and silty clay loam

Inclusions

Contrasting inclusions:
• Moderately well drained soils that contain much more sand in the lower part than the Radford soil

Similar inclusions:
• Soils that do not have an underlying black and dark gray layer
• Soils that have a seasonal high water table at a greater depth

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Subsurface tile drains function satisfactorily if suitable outlets are available.
• Surface ditches and drains help to remove excess water.

• Dikes or diversions reduce the extent of crop damage caused by floodwater. Selecting varieties adapted to shorter growing seasons and wetter soil conditions also reduces the extent of this damage.
• Tilling when the soil is wet causes surface cloddiness and excessive runoff and erosion. Returning crop residue to the soil and minimizing tillage help to maintain tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Management considerations:
• Subsurface tile drains help to lower the water table.
• The flooding delays the harvesting of hay in some years.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 1

8077—Huntsville silt loam, occasionally flooded

Composition

Huntsville and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Flood plains, first bottom
Landscape position: Natural levees and splays
Shape of areas: Long and narrow
Flooding frequency: Occasional
Flooding duration: Brief periods from March through June
Size of areas: 5 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Silty alluvium more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Scour potential
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 33 inches—very dark gray and very dark grayish brown, friable silt loam

Subsurface layer:
33 to 49 inches—dark yellowish brown, friable silt loam

Substratum:
49 to 60 inches—dark yellowish brown, mottled, friable, stratified silt loam, loam, and sandy loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill soils in low areas

Similar inclusions:
• Soils that contain more sand in the substratum
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Dikes or diversions can reduce the extent of crop damage caused by floodwater. Selecting crop varieties adapted to shorter growing seasons and to wetter conditions also reduces the extent of this damage.
• Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Overgrazing causes surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Flooding delays the harvesting of hay in some years.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 7A
Windbreak suitability group: 1

8107—Sawmill silty clay loam, occasionally flooded

Composition

Sawmill and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Flood plains, first bottom
Landscape position: Backlands and backswamps
Shape of areas: Long and narrow
Flooding frequency: Occasional
Flooding duration: Brief periods from March through June
Size of areas: 5 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Silty alluvium more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: High
Erosion hazard: Scour potential (fig. 9)
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 23 inches—black, friable silty clay loam

Subsoil:
23 to 30 inches—very dark gray, mottled, friable silty clay loam
30 to 50 inches—dark gray and olive gray, mottled, friable silty clay loam and clay loam
50 to 60 inches—olive gray, mottled, calcareous, friable, stratified loam and sandy loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to flooding

Similar inclusions:
• Soils that have less clay in the subsoil
• Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Subsurface tile drains function satisfactorily if suitable outlets are available.
• Surface ditches or drains help to remove excess water.
• Dikes or diversions can reduce the extent of crop damage caused by floodwater.
• A conservation tillage system that leaves crop residue on the surface after planting improves tilth, minimizes surface cloddiness, helps to prevent surface compaction and crusting, and increases the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Subsurface drains and surface inlet tile drains help to remove excess water.
• Canarygrass and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Deferring grazing when the soil is too wet helps to prevent surface compaction and poor tilth.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 5W
Windbreak suitability group: 2

8415—Orion silt loam, occasionally flooded

Composition

Orion and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Flood plains, alluvial fans
Landscape position: Foot slopes
Shape of areas: Long and narrow and fan shaped
Flooding frequency: Occasional
Flooding duration: Very brief from March through June
Size of areas: 5 to 60 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Figure 9.—Scour erosion caused by stream activity in an area of Sawmill silty clay loam, occasionally flooded.

Permeability: Moderate
Parent material: Silty colluvium 20 to 40 inches thick and an underlying older buried soil
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: Moderate
Erosion hazard: Scour potential
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown, friable silt loam

Subsurface layer:
8 to 22 inches—dark grayish brown, mottled, friable, stratified silt loam and silty clay loam

Next layer:
22 to 41 inches—black and very dark grayish brown, mottled, friable silt loam and silty clay loam

Substratum:
41 to 60 inches—dark grayish brown, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to flooding

Similar inclusions:
• Soils that have a seasonal high water table at a greater depth
• Soils that do not have a buried layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Subsurface tile drains function satisfactorily if suitable outlets are available.
• Surface ditches or drains help to remove excess water.
• Dikes or diversions reduce the extent of crop damage caused by floodwater. Selecting varieties adapted to shorter growing seasons and wetter soil conditions also reduces the extent of this damage.
• Tilling when the soil is wet causes surface cloddiness and excessive runoff and erosion. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Subsurface tile drains help to lower the water table.
• The flooding delays the harvesting of hay in some years.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 2W
Windbreak suitability group: 1

8451—Lawson silt loam, occasionally flooded

Composition

Lawson and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Flood plains, first bottom
Landscape position: Meanderbelts
Shape of areas: Oblong
Flooding frequency: Occasional
Flooding duration: Brief periods from March through June
Size of areas: 5 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Silty alluvium more than 60 inches thick
Runoff: Slow
Available water capacity: High
Seasonal high water table: At a depth of 1 to 3 feet
Organic matter content: High
Erosion hazard: Scour potential
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 16 inches—very dark gray, friable silt loam

Subsurface layer:
16 to 34 inches—very dark grayish brown, friable silt loam

Substratum:
34 to 60 inches—dark grayish brown, mottled, friable silt loam, loam, and sandy loam

Inclusions

Contrasting inclusions:
• Soils that are not subject to flooding

Similar inclusions:
• Soils that contain more clay in the substratum
• Soils that have a seasonal high water table closer to the surface

Use and Management

Cropland

Suitability: Well suited

Figure 10.—In the Bloomington area, prime farmland is being converted to subdivisions and shopping centers.

Management considerations:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Subsurface tile drains function satisfactorily if suitable outlets are available.
• Surface ditches or drains help to remove excess water.
• Dikes or diversions reduce the extent of crop damage caused by floodwater. Selecting varieties adapted to shorter growing seasons and wetter soil conditions also reduces the extent of this damage.
• Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Subsurface tile drains help to lower the water table.
• The flooding delays the harvesting of hay in some years.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw

Woodland ordination symbol: 2A
Windbreak suitability group: 1

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 574,000 acres in the survey area, or 76 percent of the total acreage, meets the soil requirements for prime farmland. Most of this land is in associations 1, 2, 3, 8, and 9, which are described under the heading "General Soil Map Units." This land is used for crops, mainly corn and soybeans.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses (fig. 10). The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Soils that have a seasonal high water table qualify as prime farmland only in areas where this limitation has been overcome by drainage measures. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not this limitation has been overcome by corrective measures. In McLean County, most of the naturally wet soils have been adequately drained.

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.

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.

Approximately 707,870 acres in McLean County was used for crops and pasture in 1982 (U.S. Department of Commerce, 1983b). Of this total, 671,934 acres was used for row crops; 3,592 acres for winter wheat; and 7,257 acres for hay and pasture. Corn and soybeans are the major row crops, and winter wheat is the major small grain crop. Forage crops include smooth brome, orchardgrass, alfalfa, and red clover. Specialty crops in McLean County are produced on a maple syrup farm in Funks Grove and on a few vegetable, fruit, and tree farms scattered throughout the county. Vegetable and nursery crops can be grown on most of the well drained or moderately well drained soils in the county. Soils in low areas, however, where frost is frequent and drainage is poor, generally are poorly suited to early vegetables and small fruits.

The potential of the soils in McLean County for increased food production is good. If the latest food production technology is applied to all cropland, food production can be increased. This soil survey can facilitate the application of such technology.

The major management concerns affecting cropland and pasture in the county are water erosion, soil blowing, soil tilth, soil wetness, flooding, and soil fertility.

Erosion is a major concern on approximately 37 percent of the cropland and pasture in McLean County. It is a hazard in areas where slopes are more than 2 percent, such as areas of Tama, Catlin, and Saybrook soils.

Loss of the surface layer through erosion is

Figure 11.—In areas of clayey soils, tilling during wet periods can result in cloddiness. Preparing a good seedbed is difficult in these areas.

damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils having a subsoil that is unfavorable for plant growth, such as Varna soils; on soils that tend to be droughty, such as Lorenzo soils; and on soils that are severely eroded, such as Strawn soils. Second, erosion on farmland results in the sedimentation of streams. Controlling erosion minimizes this pollution and improves the quality of water for municipal and recreational uses and for fish and other wildlife.

In clayey spots in many sloping fields, preparing a good seedbed and tilling are difficult because the original friable surface layer has been lost through erosion (fig. 11). Such spots are common in areas of the severely eroded La Rose and Strawn soils.

Erosion-control measures provide a protective plant cover, increase the rate of water infiltration, and reduce the runoff rate. A cropping system that keeps plants on the surface for extended periods reduces the hazard of erosion and preserves the productive capacity of the soils. On livestock farms, where pasture and hay are needed, including forage crops of grasses and legumes in the cropping sequence helps to control erosion in the more sloping areas. It also provides nitrogen and improves tilth for the following crop.

Terraces reduce the hazard of erosion by shortening the slopes and by controlling runoff. If a tile outlet terrace is used, the water that collects behind the terrace is removed by tile at a slow, controlled rate.

Contour farming involves tilling and conducting other fieldwork along the contour rather than up and down the slope. This practice helps to control erosion because it results in the formation of small ridges perpendicular to the slope of the land. The ridges greatly reduce the velocity of the water moving down the hills.

Stripcropping, although not used widely in the survey area, is an effective erosion-control measure if used in combination with other methods. It involves alternating rows or strips of one crop with rows of another crop that has a different rate of maturity and a different canopy

cover. The rows are planted on the contour. The protective vegetative cover that is maintained as a result of this practice helps to control erosion and protects the surface from the impact of raindrops.

Most of the cropland in McLean County can be protected from erosion by using a conservation tillage system. Conservation tillage includes any noninversion tillage practice that retains a protective amount of residue on the surface throughout the year. The crop residue increases the rate of water infiltration by improving tilth. It also protects the surface from the beating action of raindrops, helps to prevent surface crusting, and generally provides a more friable seedbed for good germination.

Chisel tillage is a common system of conservation tillage used in McLean County. When this system is applied, crop residue covers 20 to 60 percent of the surface. The extent of the coverage depends on the type of chisel plow used, the speed with which the equipment moves through the field, and the kind of crop planted. Chisel tillage often follows stalk chopping in the fall, but it can also be used immediately prior to planting in the spring.

No-till farming is being used on an increasing acreage in the county. When this system is applied, a grain crop, generally corn, is planted directly in a cover crop, sod, or the previous year's crop residue. A special planter that disturbs only the row area is used. Herbicides are used to control competing vegetation. The nearly complete ground cover protects the soil from the impact of raindrops and helps to control erosion caused by runoff.

Erosion-control measures are effective alone or in combinations on most of the farmland in the county. The combination used and its effectiveness depend on soil characteristics and topography. Information about the design of erosion-control practices for each kind of soil is provided in the Technical Guide, which is available in the local office of the Natural Resources Conservation Service.

Soil blowing is a hazard if some soils that have a surface layer of silt loam are used for cultivated crops. Maintaining a plant cover or a surface mulch or keeping the surface rough through proper tillage minimizes this hazard. Field windbreaks also are effective in controlling soil blowing.

Soil tilth affects the germination of seeds and the rate of water infiltration. Some of the soils in McLean County have a surface layer of silt loam that is low or moderately low in content of organic matter. Generally, the structure of such soils is weakened by tillage. A crust forms on the surface during periods of intensive rainfall. The crust is hard when dry and is nearly impervious to water. As a result, it reduces the infiltration rate and increases the runoff rate and the hazard of erosion. Regular additions of crop residue, manure, and other organic material improve soil structure and help to prevent crusting. A conservation tillage system that leaves crop residue on the surface after planting also helps to prevent crusting.

Tilth can also be a problem in areas of the poorly drained, dark Sable and Sawmill soils. These soils have a surface layer of silty clay loam. They stay wet until late in spring. If they are tilled when wet, they tend to be very cloddy when dry. As a result, preparing a good seedbed is difficult.

Soils that have a surface layer of silt loam or silty clay loam commonly have a plowsole, or plowpan, in the lower part. This pan is caused by the tillage equipment used to work the soil. It reduces the rate of water infiltration and can increase the runoff rate and thus the susceptiblity to erosion.

Soil wetness is a management concern on much of the acreage used for crops and pasture in McLean County. Most of the soils are already drained by tile, but many drainage systems are old and should be replaced if maximum efficiency is to be achieved.

Some soils are naturally so wet that the production of crops generally is not possible unless a drainage system is installed. Examples are the poorly drained Ashkum, Drummer, Edgington, Harpster, Hartsburg, Peotone, Sable, and Sawmill soils. Most of these soils have been drained. Unless a drainage system is installed, the wetness in areas of Ipava, Lawson, Orion, Radford, and other somewhat poorly drained soils can delay planting during some years.

The design of surface and subsurface drainage systems varies with the kind of soil and the availability of drainage outlets. In some areas of poorly drained soils in depressions, a combination of surface drains and tile drains is needed. The tile should be more closely spaced in the more slowly permeable soils than in the more rapidly permeable soils.

Further information about drainage systems is provided in the Technical Guide, which is available in local offices of the Natural Resources Conservation Service and the Cooperative Extension Service.

Flooding is a hazard in some areas of the county. Most of the affected soils are occasionally flooded by stream overflow. In these areas, flooding is expected infrequently under normal weather conditions, or 5 to 50 times in 100 years. Levees can protect the adjacent soils. The flood-prone soils are better suited to crop varieties that require a relatively short growing season than to other varieties. Also, they are better suited to less intensive land uses.

Soil fertility varies in the soils on uplands in McLean County. The light colored soils, such as Birkbeck,

Keomah, and Rozetta soils, are naturally more acid in the subsoil and less fertile than the dark Ipava, Sable, and Tama soils. Lawson, Sawmill, and other soils on flood plains are neutral to moderately alkaline throughout and are naturally high in content of plant nutrients. Soils that are severely eroded and have lost all of their natural, nutrient-rich topsoil, such as La Rose and Strawn soils, are much less fertile than uneroded or moderately eroded soils of the same series.

In most areas of the light colored upland soils, periodic applications of lime are needed. Lime may also be needed in areas of the darker soils, which become acid when they are farmed and when certain fertilizers are applied.

Natural phosphorus levels in the soils on loess-covered uplands are high. On all soils, the kinds and amounts of lime and fertilizers to be applied should be based on soil tests, on the needs of the crop, and on the desired level of yields. The Cooperative Extension Service can help in determining the kinds and amounts needed.

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 (Fehrenbacher and others, 1978). 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 (USDA, 1961). 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 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

Since the early days of settlement, much of the woodland in McLean County has been cleared and is used for row crops. Most of the remaining woodland is in areas that are too steep, too wet, or too remote and isolated for cultivation. Generally, each year some additional small acreage of woodland is cleared for use as cropland or pasture.

Many of the steeper areas are subject to severe erosion after they are cleared. The timber canopy and the accumulation of leaf litter on the surface provide very effective protection from the impact of raindrops and the force of flowing water on the surface. If this cover is removed, extensive erosion is possible. The hazard of erosion is very severe in some of the strongly sloping areas that are cleared for use as marginal farmland. As a result, these areas are better suited to timber than to row crops.

The largest areas of woodland are in associations 3 and 4, which are described under the heading "General Soil Map Units." The most common trees in the uplands are white oak, northern red oak, hickory, white ash, green ash, sugar maple, silver maple, boxelder, walnut, and American elm. The most common trees on the flood plains are cottonwood, sycamore, willow, white oak, and hickory.

Management of existing stands of woodland is possible, and many stands can be improved by thinning out mature trees and trees of low value. Measures that protect the woodland from fire and grazing are needed. Shaping and seeding access roads help to control erosion. Constructing properly shaped water bars across the trails also helps to control erosion. Interplanting is needed for maximum woodland protection. Control or removal of competing vegetation is needed if seedlings are planted. Maintaining a cover of grass between rows of seedlings helps to control erosion in bare, sloping areas.

Table 7 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 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

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

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period

does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

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

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

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. 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 *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare 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.

Windbreaks and Environmental Plantings

Many farmsteads in McLean County are in areas of nearly level and gently sloping soils that support no trees. Examples are Catlin, Tama, Birkbeck, Rozetta, Saybrook, Ipava, Keomah, and Mayville soils. Windbreaks can be established on these soils if careful consideration is given to species and site selection, site preparation, planting technique, spacing, and maintenance. Common trees and shrubs in windbreaks are northern whitecedar, eastern white pine, Norway spruce, Amur honeysuckle, autumn-olive, gray dogwood, flowering dogwood, Russian-olive, silky dogwood, eastern cottonwood, and pin oak.

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 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 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.

At the end of each map unit description, the soil has been assigned to a windbreak suitability group. These groups are based primarily on the suitability of the soil for certain species, management needs, and potential productivity. Detailed interpretations for each windbreak

suitability group in the county are provided in the Technical Guide, which is available in the local office of the Natural Resources Conservation Service.

Recreation

McLean County offers a variety of recreational facilities. Some of the major areas include Moraine View State Park, Evergreen Lake, Lake Bloomington, and numerous city parks. These areas, along with privately owned recreational facilities, offer camping, fishing, hunting, swimming, hiking, and golfing.

The demand for recreational facilities has increased greatly in the past several years because of an increase in population and a general increase in recreational interest. The potential for additional recreational development in the county is good in association 4, which is described under the heading "General Soil Map Units." This association is characterized by hilly terrain and wooded slopes and has good potential for the development of ponds. The major limitation affecting recreational uses in areas of this association is the slope.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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

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

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

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

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

Wildlife Habitat

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

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

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 owls, opossum, thrushes, woodpeckers, squirrels, 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, and beaver.

The soil associations in the county, which are described under the heading "General Soil Map Units," have been grouped into two wildlife areas. These areas are described in the following paragraphs.

Wildlife Area 1 consists of soils in associations 1, 2, 5, 6, 7, 8, and 9. These soils are nearly level to sloping and are poorly drained to moderately well drained.

This wildlife area is mainly cropland, much of which is used for corn and soybeans. A few small areas are used as pasture or woodland or are idle land. Areas

along field borders, minor streams, and grassed waterways and pastured areas provide habitat for openland wildlife, such as pheasants, cottontail rabbits, red fox, ground squirrels, and songbirds.

Measures that can improve the habitat in this area include leaving roadsides, waterways, and other areas unmowed until August, when nesting is complete, and keeping pastured areas in good condition. A cover of crop residue should be maintained on the surface throughout the winter. Woody cover and brush should be allowed to become established along fence rows and minor streams.

Wildlife Area 2 consists of soils in associations 3 and 4. These soils are nearly level to very steep and are poorly drained to well drained.

This wildlife area generally borders major streams in the county and is more diversified than wildlife area 1. Because it consists of woodland, pasture, cropland, and idle land, it supports a variety of woodland, wetland, and openland wildlife species. These include deer, squirrels, raccoons, muskrats, rabbits, quail, and many kinds of birds.

Measures that can improve the habitat in this area include those suggested for wildlife area 1. In addition, native trees, shrubs, and prairie plants provide good cover if they are protected from grazing by livestock. Establishing hedgerows, strips of grass or grass-legume mixtures, and farmstead windbreaks can also improve the habitat in this wildlife area.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

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

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

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

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

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to

overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of 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 the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. 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 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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

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

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

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to 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 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

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

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

The ratings do not indicate the ability of the natural

Figure 12.—Grassed waterways help to control erosion by removing concentrated water from a field at a nonerosive velocity.

soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The

construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

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 (fig. 12). 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, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

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.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986).

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

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

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

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The

percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

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

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

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

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

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

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

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

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; 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 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are 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 17, 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 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs 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 17 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 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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.

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.

Engineering Index Test Data

Table 18 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 Illinois Department of Transportation, Springfield, Illinois.

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 (USDA, 1975). 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 19 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 Mollisol.

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 Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

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 Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquolls*, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Haplaquolls.

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 substratum 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. 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" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1975). 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."

Andres Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material

Landform: Uplands, till plains
Landscape position: Back slopes and foot slopes
Parent material: Loess and loamy material and the underlying silty glacial till
Slope range: 0 to 2 percent
Taxonomic class: Fine-loamy, mixed, mesic Aquic Argiudolls

Typical Pedon

Andres silt loam, 20 feet south and 924 feet east of the northwest corner of sec. 5, T. 26 N., R. 5 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium and coarse subangular blocky structure; friable; neutral; clear smooth boundary.

A—9 to 14 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine and medium subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

Bt1—14 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Bt2—24 to 36 inches; light olive brown (2.5Y 5/4) loam; common fine and medium prominent yellowish brown (10YR 5/6) and few fine prominent grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

3Bt3—36 to 44 inches; light olive brown (2.5Y 5/4) silt loam; few fine prominent grayish brown (10YR 5/2) and common fine and medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few faint very dark grayish brown (10YR 3/2) clay films on faces of peds and in root channels; common fine concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

3BC—44 to 51 inches; olive brown (2.5Y 4/4) silt loam; common fine and medium prominent grayish brown (10YR 5/2) and many fine and medium prominent yellowish brown (10YR 5/6) mottles; very weak medium prismatic structure; firm; few faint very dark grayish brown (10YR 3/2) clay films in root channels; common fine concretions of iron and manganese oxide; 2 percent fine gravel; neutral; clear smooth boundary.

3C—51 to 60 inches; olive brown (2.5Y 4/4) and grayish brown (2.5Y 5/2) silt loam; common fine and medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine concretions of iron and manganese oxide; 5 to 10 percent fine gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 55 inches
Thickness of the mollic epipedon: 12 to 16 inches
Thickness of the loess: Less than 24 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam, loam, or clay loam
Content of clay—27 to 35 percent in the control section
Content of sand—15 to 40 percent in the control section

3C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 8
Texture—silty clay loam or silt loam
Content of clay—more than 24 percent

Ashkum Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landform: Uplands, till plains
Landscape position: Broad interfluves and shallow depressions
Parent material: Up to 40 inches of colluvial material and the underlying silty glacial till
Slope range: 0 to 1 percent
Taxonomic class: Fine, mixed, mesic Typic Haplaquolls

Typical Pedon

Ashkum silty clay loam, 2,400 feet east and 180 feet north of the southwest corner of sec. 20, T. 26 N., R. 5 E.

Ap—0 to 13 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate fine and medium subangular blocky structure; friable; medium acid; clear smooth boundary.

BA—13 to 20 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; few faint very dark gray (N 3/0) clay films occurring as linings in root channels and many faint dark gray (N 4/0) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

Bg1—20 to 31 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent light olive brown (2.5Y 5/6) and many fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few faint very dark grayish brown (2.5Y 3/2) clay films in root channels and many faint gray (5Y 5/1) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

2Bg2—31 to 46 inches; light olive gray (5Y 6/2) silty clay loam; common fine prominent light olive brown (2.5Y 5/6) mottles; weak medium and coarse angular blocky structure; friable; few faint very dark grayish brown (2.5Y 3/2) clay films occurring as linings in root channels and many faint gray (5Y 5/1) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; few black krotovinas; 2 percent fine gravel; mildly alkaline; abrupt smooth boundary.

2C—46 to 60 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent light olive brown (2.5Y 5/6) mottles; massive; firm; common fine gray (N 5/0) and dark gray (5Y 4/1) clay films occurring as linings in root channels; few fine stains and concretions of iron and manganese oxide; few black krotovinas; 5 to 8 percent fine gravel; strongly effervescent; mildly alkaline.

Range in Characteristics

Depth to carbonates: 30 to 55 inches
Thickness of the mollic epipedon: 12 to 23 inches
Thickness of the silty material: 15 to 35 inches

A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam; silt loam in overwash areas

Bg horizon:
Hue—2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam or silty clay
Content of clay—35 to 44 percent in the control section

C horizon:
Hue—2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 6
Texture—silty clay loam or silt loam
Content of clay—more than 24 percent

Atterberry Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Uplands, loess plains
Landscape position: Broad interfluves
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Udollic Ochraqualfs

Typical Pedon

Atterberry silt loam, 70 feet south and 110 feet east of the northwest corner of sec. 7, T. 25 N., R. 3 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; mildly alkaline; abrupt smooth boundary.

AE—7 to 12 inches; dark grayish brown (10YR 4/2) silt loam; weak thick platy structure; friable; many distinct light gray (10YR 6/1) silt coatings on faces of peds; neutral; clear smooth boundary.

Bt—12 to 20 inches; olive brown (2.5Y 4/4) silty clay loam; few fine distinct dark grayish brown (2.5Y 4/2) and prominent light olive brown (2.5Y 5/6) mottles; weak medium subangular blocky structure; friable; common distinct grayish brown (10YR 5/2) clay films and few faint light gray (10YR 6/1) silt coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg—20 to 30 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common medium distinct olive brown (2.5Y 4/4) and prominent light olive brown (2.5Y 5/6) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; friable; common distinct grayish brown (10YR 5/2) clay films and few faint light gray (10YR 6/1) silt coatings on faces of peds; common medium stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

BC—30 to 43 inches; light olive brown (2.5Y 5/4) silt loam; common medium distinct dark grayish brown

(2.5Y 4/2) and prominent olive yellow (2.5Y 6/8) mottles; weak medium angular blocky structure; friable; few fine grayish brown (10YR 5/2) clay films on faces of peds; common medium stains of iron and manganese oxide; slight effervescence; mildly alkaline; clear smooth boundary.

C—43 to 60 inches; light olive brown (2.5Y 5/4) silt loam; common distinct dark grayish brown (2.5Y 4/2) and olive yellow (2.5Y 6/8) mottles; massive; friable; common medium stains and concretions of iron and manganese oxide; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 25 to 60 inches
Thickness of the loess: More than 60 inches
Other features: An E horizon in some pedons

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 6
Texture—silt loam

Birkbeck Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Slope range: 1 to 10 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Birkbeck silt loam, 2 to 5 percent slopes, eroded, 2,442 feet north and 561 feet east of the southwest corner of sec. 7, T. 25 N., R. 2 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; mixed with some streaks of dark yellowish brown (10YR 4/4) subsoil material; moderate fine subangular blocky structure with some moderate thick platy structure in the lower part; friable; medium acid; abrupt smooth boundary.

Bt1—9 to 12 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine angular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—12 to 19 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine and medium angular blocky structure; friable; many distinct brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—19 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles in the lower 2 inches; weak medium prismatic structure parting to strong medium angular blocky; friable; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds and common distinct brown (10YR 4/3) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt4—30 to 48 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine and medium distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; common faint light brownish gray (10YR 6/2) silt coatings on faces of peds and common distinct brown (10YR 4/3) clay films on faces of peds and occurring as linings in root channels; common fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2BC—48 to 55 inches; light olive brown (2.5Y 5/4) loam; few fine distinct grayish brown (2.5Y 5/2) and common fine and medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few faint brown (10YR 4/3) clay films occurring as linings in root channels; common fine stains and concretions of iron and manganese oxide; 2 percent fine gravel; mildly alkaline; clear smooth boundary.

2C—55 to 60 inches; olive brown (2.5Y 4/4) loam; few fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine stains and concretions of iron and manganese oxide; 2 percent fine gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the loess: 40 to 60 inches
Other features: An E horizon in some pedons

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 or 3

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

2C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—loam, clay loam, or silt loam

Brenton Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Terraces, stream terraces, and outwash plains
Landscape position: Interfluves and foot slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Brenton silt loam, 525 feet east and 1,620 feet south of the northwest corner of sec. 15, T. 22 N., R. 5 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure; friable; slightly acid; friable; neutral; abrupt smooth boundary.

AB—8 to 14 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to weak medium granular; friable; neutral; abrupt smooth boundary.

Bt1—14 to 17 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt2—17 to 22 inches; olive brown (2.5Y 4/4) silty clay loam; few fine prominent dark grayish brown (10YR 4/2) mottles; weak fine prismatic structure parting to moderate fine angular blocky; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—22 to 28 inches; olive brown (2.5Y 4/4) silty clay loam; few fine prominent grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles; weak fine prismatic structure parting to moderate fine and medium angular blocky; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt4—28 to 33 inches; light olive brown (2.5Y 5/4) silt loam; common fine and medium distinct grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; few distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

2BC—33 to 45 inches; olive brown (2.5Y 4/4) loam and light olive brown (2.5Y 5/6) fine sandy loam; few fine distinct grayish brown (2.5Y 5/2) and common fine and medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few thin very dark grayish brown (2.5Y 3/2) clay films occurring as linings in root channels and few thin grayish brown (2.5Y 5/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

2C—45 to 60 inches; light olive brown (2.5Y 5/6) and light brownish gray (2.5Y 6/2), stratified loam and silt loam; massive; friable; common fine stains and concretions of iron and manganese oxide; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 45 inches
Thickness of the mollic epipedon: 11 to 15 inches
Thickness of the loess: 30 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam

Content of clay—27 to 33 percent in the control section

2BC horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 to 8
Texture—silt loam, sandy loam, loam, or clay loam

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 to 8
Texture—sandy loam, loam, or silt loam

Camden Series

Depth class: Moderately deep over sand and gravel
Drainage class: Well drained
Permeability: Moderate
Landform: Stream terraces
Landscape position: Shoulders and convex back slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Slope range: 2 to 10 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Camden silt loam, 5 to 10 percent slopes, eroded, 1,650 feet north and 1,350 feet east of the southwest corner of sec. 17, T. 25 N., R. 2 E.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

BE—7 to 10 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; very few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bt1—10 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt3—32 to 41 inches; yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt4—41 to 48 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2C—48 to 60 inches; yellowish brown (10YR 5/4 and 5/6) sandy loam; thin strata of very fine sandy loam; massive; very friable; common fine stains and concretions of iron and manganese oxide; medium acid.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the loess: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam and silty clay loam
Content of clay—27 to 35 percent in the control section

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—sandy loam, loam, or silt loam; noticeable sand

2C horizon:
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—stratified sandy loam, loam, or silt loam; thin strata of loamy sand

Catlin Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till

Slope range: 1 to 10 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Catlin soils in map units 171B2 and 171C2 have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Catlin silt loam, 1 to 4 percent slopes, 330 feet east and 70 feet south of the northwest corner of sec. 11, T. 23 N., R. 1 E.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; friable; neutral; clear smooth boundary.

AB—11 to 16 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—16 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine and medium angular blocky structure; friable; common distinct dark yellowish brown (10YR 3/4) clay films on faces of peds; few fine stains of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt2—26 to 41 inches; dark yellowish brown (10YR 4/6) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; friable; common distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine stains of iron and manganese oxide; neutral; clear smooth boundary.

2Bt3—41 to 46 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; very few faint very dark grayish brown (10YR 3/2) clay films in root channels; few fine stains of iron and manganese oxide; 2 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.

2C—46 to 60 inches; light olive brown (2.5Y 5/4) clay loam; few medium prominent yellowish brown (10YR 5/6) and common fine and medium prominent grayish brown (10YR 5/2) mottles; massive; firm; few fine stains of iron and manganese oxide and masses of calcium carbonate; 2 percent fine gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 60 inches
Thickness of the mollic epipedon: 10 to 15 inches
Thickness of the loess: 40 to 60 inches
Other features: Some pedons do not have a 2C horizon.

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam
Content of clay—averages 27 to 35 percent in the control section

2Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 5
Texture—loam, clay loam, or silt loam; noticeable sand

2C horizon:
Hue—10YR or 2.5Y
Value—5
Chroma—4
Texture—silt loam, loam, or clay loam

Chenoa Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves and foot slopes
Parent material: Loess 20 to 40 inches thick and the underlying silty glacial till
Slope range: 1 to 3 percent
Taxonomic class: Fine, illitic, mesic Aquic Argiudolls

Typical Pedon

Chenoa silt loam, 1 to 3 percent slopes, 900 feet west and 200 feet north of the southeast corner of sec. 12, T. 25 N., R. 5 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine angular blocky structure; friable; medium acid; abrupt smooth boundary.

A—7 to 12 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; slightly acid; clear smooth boundary.

BA—12 to 16 inches; dark yellowish brown (10YR 4/4)

silty clay loam; moderate fine subangular blocky structure; friable; many distinct very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Bt1—16 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine prominent dark grayish brown (2.5Y 4/2) mottles; moderate fine and medium subangular blocky structure; firm; few faint very dark gray (10YR 3/1) clay films and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt2—23 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine prominent light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Bt3—30 to 36 inches; olive brown (2.5Y 4/4) silty clay loam; common fine distinct light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few faint very dark gray (10YR 3/1) and common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 2 percent fine gravel; neutral; clear smooth boundary.

2BC—36 to 42 inches; olive brown (2.5Y 4/4) silty clay loam; common fine distinct light olive brown (2.5Y 5/6) and common medium prominent light gray (5Y 6/1) mottles; weak medium prismatic structure; firm; few faint very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) clay films on faces of peds; 2 to 4 percent fine gravel; slight effervescence; neutral; clear smooth boundary.

2C—42 to 60 inches; olive brown (2.5Y 4/4) silt loam; few fine distinct light olive brown (2.5Y 5/6) and common medium prominent light gray (5Y 6/1) mottles; massive; very firm; 2 to 4 percent fine gravel; strong effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the mollic epipedon: 10 to 20 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silty clay
Content of clay—35 to 40 percent in the control section

2Bt horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam or clay loam

2C horizon:
Hue—2.5Y or 5Y
Value—2 to 5
Chroma—2 to 4
Texture—silt loam that contains more than 24 percent clay or silty clay loam

Dana Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Slope range: 2 to 10 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Dana soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Dana silt loam, 2 to 5 percent slopes, eroded, 152 feet east and 924 feet south of the northwest corner of sec. 9, T. 21 N., R. 2 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam mixed with dark yellowish brown (10YR 4/4) subsoil material; weak medium subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

Bt1—7 to 11 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay

films on faces of peds; slightly acid; clear smooth boundary.

Bt2—11 to 19 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) and brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—19 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8), grayish brown (10YR 5/2), and brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

2Bt4—34 to 44 inches; light olive brown (2.5Y 5/4) clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; weak medium prismatic structure parting to weak medium and coarse subangular blocky; friable; few fine brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 4 percent fine gravel; neutral; clear smooth boundary.

2BC—44 to 53 inches; light olive brown (2.5Y 5/4) clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; weak medium prismatic structure parting to weak coarse subangular blocky; friable; few fine stains and concretions of iron and manganese oxide; 2 to 4 percent fine gravel; slight effervescence; mildly alkaline; gradual smooth boundary.

2C—53 to 60 inches; light olive brown (2.5Y 5/4) loam; few fine prominent yellowish brown (10YR 5/8) and common fine and medium distinct grayish brown (2.5Y 5/2) mottles; massive; firm; few fine stains and concretions of iron and manganese oxide; 4 percent fine gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 60 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—clay loam or loam

Darroch Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately rapid in the underlying material
Landform: Stream terraces and outwash plains
Landscape position: Interfluves and foot slopes
Parent material: Loess less than 20 inches thick and the underlying loamy material
Slope range: 0 to 2 percent
Taxonomic class: Fine-loamy, mixed, mesic Aquic Argiudolls

Typical Pedon

Darroch loam, 340 feet north and 1,790 feet east of the southwest corner of sec. 17, R. 5 E., T. 23 N.

Ap—0 to 7 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

A—7 to 16 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; neutral; clear smooth boundary.

Bt1—16 to 22 inches; olive brown (2.5Y 4/4) clay loam; few fine distinct yellowish brown (10YR 5/4) and dark grayish brown (2.5Y 4/2) mottles; moderate medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 percent fine gravel; neutral; clear smooth boundary.

Bt2—22 to 32 inches; olive brown (2.5Y 4/4) sandy loam; common fine distinct yellowish brown (10YR 5/4) and few fine distinct dark grayish brown (2.5Y 4/2) mottles; weak medium subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; common medium stains and concretions of iron and manganese oxide; about 14 percent fine gravel; neutral; clear smooth boundary.

BC—32 to 38 inches; olive brown (2.5Y 4/4) sandy loam; common medium distinct yellowish brown (10YR 4/4) and dark grayish brown (2.5Y 4/2) mottles; weak medium subangular blocky structure;

friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; many medium stains and concretions of iron and manganese oxide; about 14 percent fine gravel; mildly alkaline; clear smooth boundary.

C—38 to 60 inches; light olive brown (2.5Y 5/6) sandy loam; common medium prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles and common medium distinct dark grayish brown (2.5Y 4/2) mottles; single grain; loose; many medium stains and concretions of iron and manganese oxide; about 14 percent fine gravel; slight effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 24 to 40 inches
Thickness of the mollic epipedon: 10 to 16 inches
Thickness of the loess: Less than 20 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silt loam, clay loam, or loam in the upper part; loam, sandy loam, fine sandy loam, or clay loam in the lower part

C horizon:
Hue—10YR or 2.5Y
Value—5 to 7
Chroma—2 to 6
Texture—sandy loam, loam, or silt loam; strata ranging from sandy loam to clay loam
Content of gravel—0 to 15 percent

Drummer Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Uplands, till plains, terraces, outwash plains
Landscape position: Broad interfluves and shallow depressions
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Haplaquolls

Typical Pedon

Drummer silty clay loam, 900 feet north and 1,000 feet east of the center of sec. 24, T. 26 N., R. 3 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; slightly acid; clear smooth boundary.

AB—10 to 13 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; few fine prominent olive gray (5Y 5/2) mottles; moderate fine subangular blocky structure; friable; common faint black (10YR 2/1) clay films on faces of peds; neutral; clear smooth boundary.

Bg1—13 to 21 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct light yellowish brown (2.5Y 6/4) mottles; weak fine prismatic structure parting to weak medium subangular blocky; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg2—21 to 28 inches; olive gray (5Y 5/2) silty clay loam; common medium prominent light olive brown (2.5Y 5/4) and light yellowish brown (2.5Y 6/4) mottles; moderate fine prismatic structure; friable; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; many medium stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg3—28 to 36 inches; olive gray (5Y 5/2) silty clay loam; many fine and medium prominent olive yellow (2.5Y 6/6) mottles; weak medium prismatic structure; friable; common distinct light brownish gray (2.5Y 6/2) clay films on faces of peds; common fine and medium stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg4—36 to 41 inches; light olive gray (5Y 6/2) silty clay loam; many fine and medium prominent olive yellow (2.5Y 6/6) mottles; weak medium prismatic structure; friable; common distinct light brownish gray (2.5Y 6/2) clay films on faces of peds; common fine and medium stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

2Bg5—41 to 47 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent olive yellow (2.5Y 6/6) mottles; very weak coarse prismatic structure; friable; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; 2 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.

2C—47 to 60 inches; yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8), stratified silt loam and loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; massive; friable; 2 to 4

percent fine gravel; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 60 inches
Thickness of the mollic epipedon: 12 to 24 inches
Thickness of the loess: 40 to 60 inches

A horizon:
Hue—10YR, 2.5Y, or neutral
Value—2 or 3
Chroma—0 or 1

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay loam or clay loam
Content of clay—27 to 35 percent in the control section

2C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 to 8
Texture—silt loam, clay loam, sandy loam, or loam

Edgington Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landform: Terraces, outwash plains
Landscape position: Broad interfluves and shallow closed depressions
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Argiaquic Argialbolls

Typical Pedon

Edgington silt loam, 2,500 feet south and 30 feet east of the northwest corner of sec. 8, T. 21 N., R. 6 E.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam; weak fine and medium subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

Eg—11 to 21 inches; dark grayish brown (2.5Y 4/2) silt loam; few fine distinct olive brown (2.5Y 4/4) mottles; moderate medium and thick platy structure; friable; few faint very dark gray (10YR 3/1) clay films lining root channels; few fine stains and concretions of iron and manganese oxide; medium acid; abrupt smooth boundary.

Btg1—21 to 31 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine and medium distinct olive brown (2.5Y 4/4) and common medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint very dark gray (10YR 3/1) clay films and few faint light gray (2.5Y 7/2) silt coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear wavy boundary.

Btg2—31 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine and medium distinct olive brown (2.5Y 4/4) and few fine and medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; friable; few faint very dark gray (10YR 3/1) clay films and few faint light gray (2.5Y 7/2) silt coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear wavy boundary.

BCg—38 to 53 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine and medium distinct olive brown (2.5Y 4/4) and few fine and medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; few faint dark gray (N 4/0) clay films on faces of peds; many fine and medium stains and concretions of iron oxide; few black krotovinas; neutral; clear wavy boundary.

Cg—53 to 60 inches; grayish brown (2.5Y 5/2) silt loam; few fine and medium distinct olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6) mottles; massive; friable; many fine and medium stains and concretions of iron oxide; few black krotovinas; slight effervescence; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 10 to 22 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

E horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6

Chroma—1 or 2
Texture—silt loam

Elburn Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Stream terraces and outwash plains
Landscape position: Broad interfluves and foot slopes
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Elburn silt loam, 1,300 feet west and 700 feet south of the northeast corner of sec. 32, T. 26 N., R. 4 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

A—8 to 14 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; friable; neutral; clear smooth boundary.

BA—14 to 20 inches; olive brown (2.5Y 4/4) silty clay loam; few fine distinct brown (10YR 5/3) and dark grayish brown (2.5Y 4/2) mottles; moderate fine subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) and dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt1—20 to 33 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine prominent olive gray (5Y 5/2) and yellowish brown (10YR 5/6) mottles; moderate fine and medium angular blocky structure; firm; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; many thick krotovinas; neutral; clear smooth boundary.

Bt2—33 to 42 inches; light olive brown (2.5Y 5/4) silt loam; many fine prominent gray (5Y 5/1) and common fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few faint olive gray (5Y 5/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; many thick krotovinas; mildly alkaline; abrupt smooth boundary.

2Bt3—42 to 46 inches; olive gray (5Y 5/2) loam and fine sandy loam; many fine distinct light gray (5Y 6/1) and common fine prominent brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; very friable; common fine stains and concretions of iron and manganese oxide; many thick krotovinas; very slight effervescence; mildly alkaline; clear smooth boundary.

2C—46 to 60 inches; olive gray (5Y 5/2), stratified loam, fine sandy loam, and sandy loam; many fine distinct light gray (5Y 6/1) and many fine prominent brownish yellow (10YR 6/8) mottles; very friable; common fine stains and concretions of iron and manganese oxide; many thick krotovinas; very slight effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 45 to 60 inches
Thickness of the mollic epipedon: 12 to 18 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

2BC horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 5
Texture—sandy loam, clay loam, silt loam, or loam

2C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 6
Texture—sandy loam or loam; strata of material as coarse as fine sand and medium sand

Elkhart Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Uplands, loess plains
Landscape position: Shoulders and side slopes
Parent material: Loess more than 60 inches thick
Slope range: 0 to 5 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Elkhart soil in map unit 567B2 has a thinner dark surface layer than is defined as the range for the series. This soil is classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Elkhart silt loam, 0 to 2 percent slopes, 528 feet west and 726 feet north of the southeast corner of sec. 20, T. 22 N., R. 3 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; medium acid; abrupt smooth boundary.

A—8 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium angular blocky structure; friable; medium acid; abrupt smooth boundary.

BA—14 to 18 inches; brown (10YR 4/3) silty clay loam; moderate medium angular blocky structure; friable; medium acid; clear smooth boundary.

Bt1—18 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—25 to 30 inches; brown (10YR 5/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and prominent yellowish brown (10YR 5/8) mottles; moderate fine prismatic structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—30 to 35 inches; brown (10YR 5/3) silt loam; common fine and medium faint grayish brown (10YR 5/2) and prominent yellowish brown (10YR 5/8) mottles; weak fine and medium prismatic structure; friable; few faint dark grayish brown (10YR 3/2) clay films occurring as linings in root channels; few fine stains and concretions of iron and manganese oxide and few fine concretions of calcium carbonate; slight effervescence; mildly alkaline; clear smooth boundary.

C—35 to 60 inches; yellowish brown (10YR 5/4) silt loam; common fine and medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; massive; friable; few fine stains and concretions of iron and manganese oxide and common fine concretions of calcium carbonate; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the mollic epipedon: 10 to 15 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR
Value—3 to 5
Chroma—3 to 6
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—4 to 6
Texture—silt loam

Fincastle Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves and foot slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Aeric Ochraqualfs

Typical Pedon

Fincastle silt loam, 2,112 feet north and 1,551 feet west of the southeast corner of sec. 31, T. 25 N., R. 5 E.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine and medium subangular blocky structure; friable; neutral; clear smooth boundary.

E—6 to 11 inches; grayish brown (10YR 5/2) silt loam; weak moderately thick platy structure parting to weak fine and medium subangular blocky; friable; neutral; clear smooth boundary.

Bt1—11 to 17 inches; olive brown (2.5Y 4/4) silty clay loam; few fine and medium distinct grayish brown (2.5Y 5/2) mottles; moderate fine and medium subangular blocky structure; firm; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine stains of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt2—17 to 27 inches; olive brown (2.5Y 4/4) silty clay loam; few fine prominent yellowish brown (10YR 5/6) and common fine and medium distinct grayish brown (2.5Y 5/2) mottles; weak medium and coarse prismatic structure parting to weak medium angular blocky; firm; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine

stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—27 to 36 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine and medium prominent yellowish brown (10YR 5/6) and common fine and medium distinct grayish brown (2.5Y 5/2) mottles; weak medium and coarse prismatic structure parting to weak medium angular blocky; friable; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few distinct very dark grayish brown (2.5Y 3/2) organic coatings lining root channels; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Bt4—36 to 42 inches; light olive brown (2.5Y 5/4) clay loam; common medium prominent yellowish brown (10YR 5/6) and common fine and medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium and coarse subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) clay films lining root channels; common fine stains and concretions of iron and manganese oxide; 2 percent fine gravel; slight effervescence; mildly alkaline; gradual wavy boundary.

2C—42 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium prominent yellowish brown (10YR 5/8) and common medium distinct light brownish gray (2.5Y 6/2) mottles; massive; friable; common fine stains and concretions of iron and manganese oxide; few fine concretions of calcium carbonate; 2 to 5 percent fine gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 35 inches
Thickness of the loess: 30 to 40 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

E horizon:
Hue—10YR
Value—5 or 6
Chroma—2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam
Content of clay—23 to 35 percent in the control section

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam, clay loam, or loam

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—loam

Flanagan Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Slope range: 0 to 2 percent
Taxonomic class: Fine, montmorillonitic, mesic Aquic Argiudolls

Typical Pedon

Flanagan silt loam, 2,300 feet east and 2,050 feet north of the southwest corner of sec. 30, T. 23 N., R. 4 E.

Ap—0 to 12 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

AB—12 to 15 inches; very dark grayish brown (10YR 3/2) silt loam mixed with streaks of dark yellowish brown (10YR 4/4) subsoil material; grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; common fine very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

Bt1—15 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and brownish yellow (10YR 6/6) mottles; strong fine and medium angular blocky structure; firm; many prominent dark grayish brown (10YR 4/2) and common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt2—25 to 33 inches; brown (10YR 5/3) silty clay loam; common fine faint light brownish gray (10YR 6/2) and common fine distinct brownish yellow (10YR 6/6) mottles; strong medium prismatic structure parting to moderate medium angular blocky; firm; many prominent dark grayish brown (10YR 4/2) clay

films on faces of peds; common fine concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bt3—33 to 47 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine distinct light brownish gray (2.5Y 6/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

2Bt4—47 to 55 inches; light olive brown (2.5Y 5/4) clay loam; common fine distinct light brownish gray (2.5Y 6/2) and many fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint grayish brown (10YR 5/2) clay films on faces of peds; common fine concretions of iron and manganese oxide; 2 to 5 percent fine gravel; mildly alkaline; clear smooth boundary.

2BC—55 to 60 inches; grayish brown (2.5Y 5/2) loam; many fine faint light brownish gray (2.5Y 6/2), few fine distinct light gray (N 6/0), and many fine prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; very few fine grayish brown (10YR 5/2) clay films on faces of peds; common fine concretions of iron and manganese oxide; 5 percent fine gravel; slight effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 44 to 55 inches
Thickness of the mollic epipedon: 12 to 16 inches
Thickness of the loess: 40 to 60 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam
Content of clay—35 to 42 percent in the control section

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—clay loam or loam

Fox Series

Depth class: Moderately deep over sand and gravel
Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Landform: Stream terraces
Landscape position: Summits, shoulders, and side slopes
Parent material: Less than 24 inches of loess and the underlying sand and gravel
Slope range: 2 to 10 percent
Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs

Typical Pedon

Fox silt loam, 2 to 5 percent slopes, eroded, 264 feet north and 2,475 feet west of the southeast corner of sec. 25, T. 25 N., R. 4 E.

Ap—0 to 6 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) dry; weak thin platy structure parting to weak fine subangular blocky; friable; slightly acid; abrupt smooth boundary.

BE—6 to 10 inches; yellowish brown (10YR 5/4) silt loam; moderate moderately thick platy structure parting to weak fine subangular blocky; friable; few faint dark brown (10YR 3/3) organic coatings on faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—10 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium and coarse angular blocky structure; friable; few faint dark brown (10YR 3/3) organic coatings on faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Bt2—21 to 31 inches; brown (7.5YR 4/4) clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium angular blocky structure; firm; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; common distinct dark yellowish brown (10YR 3/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; medium acid; clear smooth boundary.

2Bt3—31 to 37 inches; brown (10YR 5/3) and dark brown (7.5YR 4/4) sandy clay loam; few fine prominent yellowish brown (10YR 5/8) and distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; common

distinct brown (10YR 4/3) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 10 to 15 percent fine and medium gravel; neutral; clear smooth boundary.
2C—37 to 60 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4), stratified sand and gravel; massive; loose; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 35 to 40 inches
Thickness of the loamy material: Less than 20 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam, loam, or sandy loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—4 or 5
Texture—loam, clay loam, or silty clay loam
Content of clay—18 to 35 percent in the control section
Content of sand—15 to 45 percent

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—clay loam, loam, or sandy loam or the gravelly analogs of these textures

2C horizon:
Texture—stratified sand and gravel

Graymont Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Parent material: Loess 20 to 40 inches thick and the underlying silty glacial till
Slope range: 2 to 5 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Graymont soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Graymont silt loam, 2 to 5 percent slopes, eroded, 83 feet north and 9 feet east of the southwest corner of sec. 14, T. 26 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; neutral; abrupt wavy boundary.
Bt1—8 to 15 inches; brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; common faint very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear wavy boundary.
Bt2—15 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and grayish brown (10YR 4/2) mottles; weak medium prismatic structure parting to moderate fine and medium angular blocky; friable; few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear wavy boundary.
2Bt3—27 to 34 inches; light olive brown (2.5Y 5/4) silty clay loam (10 to 15 percent sand); few fine distinct light olive brown (2.5Y 5/6) and dark gray (N 4/0) mottles; weak medium and coarse prismatic structure; firm; few distinct dark brown (10YR 3/3) clay films on faces of peds; 2 to 4 percent fine gravel; neutral; gradual wavy boundary.
2BC—34 to 39 inches; light olive brown (2.5Y 5/4) silt loam (10 to 15 percent sand); few fine distinct light olive brown (2.5Y 5/6) and dark gray (N 4/0) mottles; weak coarse prismatic structure; firm; few faint dark brown (10YR 3/3) clay films lining root channels; few medium stains and concretions of iron oxide; 2 to 4 percent fine gravel; strong effervescence; mildly alkaline; gradual wavy boundary.
2C—39 to 60 inches; light olive brown (2.5Y 5/4) silt loam; few fine distinct light olive brown (2.5Y 5/6) mottles; massive; very firm; 2 to 4 percent fine gravel; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6

Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam

2C horizon:
Hue—2.5Y
Value—4 or 5
Chroma—3 to 5
Texture—silty clay loam or silt loam

Harco Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Uplands, loess plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Harco silt loam, 1,350 feet east and 650 feet south of the northwest corner of sec. 18, T. 22 N., R. 5 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; very friable; neutral; abrupt smooth boundary.

A—8 to 12 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—12 to 17 inches; brown (10YR 5/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt2—17 to 23 inches; olive brown (2.5Y 4/4) silty clay loam; common fine distinct grayish brown (2.5Y 5/2) and common fine prominent yellowish brown (10YR 5/8) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt3—23 to 30 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine distinct grayish brown (2.5Y 5/2) and many fine prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic stricture parting to moderate medium subangular blocky; friable; few fine faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; mildly alkaline; abrupt smooth boundary.

BC—30 to 39 inches; light olive brown (2.5Y 5/4) silt loam; many fine distinct light brownish gray (2.5Y 6/2) and many fine and medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; very few faint dark grayish brown (2.5Y 4/2) clay films lining pores; few fine concretions of iron and manganese oxide and few medium concretions of calcium carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

C—39 to 60 inches; light olive brown (2.5Y 5/4) silt loam; many fine distinct light brownish gray (2.5Y 6/2) and many medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few fine concretions of iron and manganese oxide and few medium concretions of calcium carbonate; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to 40 inches
Thickness of the mollic epipedon: 10 to 15 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silt loam or silty clay loam

C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silt loam

Harpster Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate

Landform: Uplands, till plains, terraces, outwash plains
Landscape position: Shallow closed depressions and shallow drainageways
Parent material: Loess more than 60 inches thick
Slope range: 0 to 1 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Calciaquolls

Typical Pedon

Harpster silty clay loam, 700 feet north and 300 feet west of the southeast corner of sec. 7, T. 23 N., R. 2 E.

Akp—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; violent effervescence; moderately alkaline; abrupt smooth boundary.

Ak—7 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine angular blocky structure parting to weak fine granular; friable; strong effervescence; moderately alkaline; clear smooth boundary.

AB—12 to 20 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; common medium distinct gray (10YR 5/1) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium angular blocky; friable; few distinct dark gray (10YR 4/1) clay films on faces of peds; strong effervescence; moderately alkaline; clear smooth boundary.

Bg—20 to 28 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent light olive brown (2.5Y 5/6) and common medium prominent gray (10YR 5/1) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine concretions of calcium carbonate; slight effervescence; mildly alkaline; clear smooth boundary.

BCg—28 to 33 inches; gray (5Y 5/1) silt loam; common fine prominent light olive brown (2.5Y 5/6) mottles; weak medium subangular blocky structure; friable; few fine dark gray (10YR 4/1) clay films on faces of peds; common fine concretions of calcium carbonate; few black krotovinas; strong effervescence; moderately alkaline; gradual wavy boundary.

Cg—33 to 60 inches; gray (5Y 5/1) silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; friable; many coarse concretions of calcium carbonate; few black krotovinas; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: Calcareous throughout
Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: More than 60 inches

Akp horizon:
Hue—10YR, 2.5Y, or neutral
Value—2 or 3
Chroma—0 or 1

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—3 to 6
Chroma—0 to 2

Cg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—1 to 4

Hartsburg Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Uplands, loess plains
Landscape position: Broad interfluves, shallow depressions, and shallow drainageways
Parent material: Loess more than 60 inches thick
Slope range: 0 to 1 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Haplaquolls

Typical Pedon

Hartsburg silty clay loam, 230 feet south and 1,020 feet east of the northwest corner of sec. 14, T. 23 N., R. 4 E.

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A—6 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate subangular blocky structure parting to weak fine granular; friable; neutral; clear smooth boundary.

Btg1—12 to 19 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

Btg2—19 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

Btg3—23 to 29 inches; grayish brown (2.5Y 5/2) silty

clay loam; common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine masses of calcium carbonate; slight effervescence; mildly alkaline; clear smooth boundary.

Btkg—29 to 36 inches; grayish brown (2.5Y 5/2) silt loam; common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak medium subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common medium masses of calcium carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

Cg—36 to 60 inches; grayish brown (2.5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable; common medium masses of calcium carbonate; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 15 to 35 inches
Thickness of the mollic epipedon: 10 to 20 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5
Chroma—1 or 2
Texture—silty clay loam or silt loam
Content of clay—25 to 35 percent in the control section

Cg horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2

Huntsville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Flood plains, first bottom
Landscape position: Natural levees and splays
Parent material: Silty alluvium more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Cumulic Hapludolls

Typical Pedon

Huntsville silt loam, occasionally flooded, 2,574 feet west and 2,607 feet south of the northeast corner of sec. 4, T. 25 N., R. 3 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to weak fine granular; friable; neutral; clear smooth boundary.

A1—10 to 22 inches; very dark grayish brown (10YR 3/2) silt loam (crushed), grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; neutral; clear smooth boundary.

A2—22 to 33 inches; very dark grayish brown (10YR 3/2) silt loam (crushed), grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

AC—33 to 49 inches; dark yellowish brown (10YR 4/4) silt loam; some thin strata of loam; weak medium and coarse subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

C—49 to 60 inches; dark yellowish brown (10YR 4/4), stratified silt loam, loam, and sandy loam; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles in the lower 6 inches; massive; friable; few faint black (10YR 2/1) organic coatings lining root channels; few fine stains and concretions of iron oxide; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 24 to 40 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

AC horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam; some strata of loam and very fine sandy loam

C horizon:
Hue—10YR
Value—3 to 5
Chroma—3 or 4
Texture—stratified silt loam, loam, and very fine sandy loam

Ipava Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Uplands, loess plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine, montmorillonitic, mesic Aquic Argiudolls

Typical Pedon

Ipava silt loam, 1,125 feet west and 2,550 feet south of the northeast corner of sec. 24, T. 25 N., R. 1 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

A—7 to 11 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium subangular blocky structure parting to weak medium granular; friable; neutral; clear smooth boundary.

Bt1—11 to 14 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure parting to weak medium granular; friable; common distinct very dark gray (10YR 3/1) organic coatings and few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few medium concretions of manganese oxide; slightly acid; abrupt smooth boundary.

Bt2—14 to 20 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and olive brown (2.5Y 4/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common distinct very dark gray (10YR 3/1) organic coatings and few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common medium concretions of manganese oxide; medium acid; clear smooth boundary.

Btg1—20 to 28 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct olive brown (2.5Y 4/4) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; friable; common medium concretions of manganese oxide; slightly acid; clear smooth boundary.

Btg2—28 to 40 inches; dark grayish brown (2.5Y 4/2) silt loam; few fine distinct olive brown (2.5Y 4/4) and few medium prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; friable; few faint grayish brown (10YR 5/2) clay films on faces of peds; few medium concretions of manganese oxide; mildly alkaline; clear smooth boundary.

BCg—40 to 52 inches; dark grayish brown (2.5Y 4/2) silt loam; common medium distinct olive brown (2.5Y 4/4) and common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; slight effervescence; moderately alkaline; clear smooth boundary.

Cg—52 to 60 inches; dark grayish brown (2.5Y 4/2) silt loam; common medium distinct olive brown (2.5Y 4/4) and common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the mollic epipedon: 10 to 20 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam, silty clay, or silt loam
Content of clay—averages between 35 and 43 percent in the control section

C horizon:
Hue —10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4

Jasper Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Stream terraces and outwash plains
Landscape position: Shoulders, summits, side slopes, and terrace breaks
Parent material: Loess less than 20 inches thick and the underlying stratified loamy sediments
Slope range: 2 to 10 percent
Taxonomic class: Fine-loamy, mixed, mesic Typic Argiudolls
Taxadjunct features: The Jasper soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-loamy, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Jasper loam, 2 to 5 percent slopes, eroded, 275 feet south and 750 feet east of the northwest corner of sec. 15, T. 22 N., R. 6 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) and very dark brown (10YR 2/2) loam mixed with dark yellowish brown (10YR 4/4) subsoil material; dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; neutral; abrupt smooth boundary.

BA—8 to 15 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt1—15 to 30 inches; dark yellowish brown (10YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; common faint dark yellowish brown (10YR 3/4) clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—30 to 44 inches; dark yellowish brown (10YR 4/6) sandy loam; weak coarse subangular blocky structure; very friable; few faint dark yellowish brown (10YR 3/6) clay films on faces of peds; neutral; clear smooth boundary.

BC—44 to 53 inches; yellowish brown (10YR 5/4) very fine sandy loam; few fine distinct grayish brown (10YR 5/2) mottles in the lower part; weak medium subangular blocky structure; friable; very few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

C—53 to 60 inches; yellowish brown (10YR 5/6) silt loam and very fine sandy loam; common fine distinct light brownish gray (10YR 6/2) and common fine prominent reddish yellow (7.5YR 6/8) mottles; massive; friable; few fine stains and concretions of iron and manganese oxide; strong effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the loess: Less than 20 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam, sandy clay loam, loam, or sandy loam

C horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—stratified loam, clay loam, silt loam, or sandy loam

Keomah Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Uplands, loess plains
Landscape position: Broad interfluves, foot slopes, and shallow depressions
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine, montmorillonitic, mesic Aeric Ochraqualfs

Typical Pedon

Keomah silt loam, 800 feet east and 2,310 feet north of the southwest corner of sec. 8, T. 25 N., R. 2 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; medium acid; clear smooth boundary.

E—6 to 10 inches; grayish brown (10YR 5/2) silt loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate thick platy structure; friable; few faint dark gray (10YR 4/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bt1—10 to 13 inches; brown (10YR 4/3) silty clay loam; moderate fine angular blocky structure; friable; common faint light brownish gray (10YR 6/2) silt coatings on faces of peds and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; strongly acid; abrupt smooth boundary.

Bt2—13 to 29 inches; olive brown (2.5Y 4/4) silty clay loam; few fine prominent gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; moderate fine and medium angular blocky structure; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—29 to 41 inches; olive brown (2.5Y 4/4) silty clay loam; common fine and medium distinct grayish

brown (2.5Y 5/2) and common fine and medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; few distinct grayish brown (10YR 5/2) clay films on faces of peds; neutral; clear smooth boundary.

BC—41 to 46 inches; olive brown (2.5Y 4/4) silt loam; many fine and medium distinct light brownish gray (2.5Y 6/2) and many fine and medium prominent yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable; common fine stains and concretions of iron and manganese oxide; slight effervescence; mildly alkaline; clear smooth boundary.

C—46 to 60 inches; light olive brown (2.5Y 5/4) silt loam; common fine and medium distinct light brownish gray (2.5Y 6/2) and common medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; common fine stains and concretions of iron and manganese oxide; slight effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

Bt horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 to 4
Texture—silty clay loam or silty clay
Content of clay—35 to 42 percent in the control section

C horizon:
Hue—2.5Y or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

La Rose Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess less than 10 inches thick and the underlying loamy glacial till
Slope range: 2 to 15 percent
Taxonomic class: Fine-loamy, mixed, mesic Typic Argiudolls
Taxadjunct features: The La Rose soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-loamy, mixed, mesic Mollic Hapludalfs.

Typical Pedon

La Rose silt loam, 5 to 10 percent slopes, eroded, 1,386 feet east and 60 feet south of the northwest corner of sec. 11, T. 23 N., R. 1 E.

Ap—0 to 7 inches; dark brown (10YR 3/3) and dark yellowish brown (10YR 4/4) silt loam, brown (10YR 5/3) dry; moderate fine and medium angular blocky structure; friable; few fine stains and concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Bt1—7 to 12 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common distinct dark brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; neutral; clear smooth boundary.

Bt2—12 to 16 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; firm; few prominent dark brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.

BC—16 to 22 inches; yellowish brown (10YR 5/4) loam; medium and coarse subangular blocky structure; firm; few fine stains and concretions of iron and manganese oxide; 5 to 8 percent fine gravel; strong effervescence; mildly alkaline; clear smooth boundary.

C—22 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few fine stains and concretions of iron and manganese oxide; 5 to 10 percent fine and medium gravel; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 10 to 20 inches
Thickness of the loess: Less than 10 inches

Ap horizon:
Hue—10YR
Value—2 or 3

Chroma—1 to 3
Texture—silt loam or loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam (more than 15 percent sand), clay loam, or loam

C horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—3 or 4
Texture—loam

Lawson Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Flood plains, first bottom
Landscape position: Meanderbelts
Parent material: Silty alluvium more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Cumulic Hapludolls

Typical Pedon

Lawson silt loam, occasionally flooded, 1,100 feet east and 625 feet north of the southwest corner of sec. 35, T. 23 N., R. 4 E.

A1—0 to 16 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; neutral; clear smooth boundary.

A2—16 to 26 inches; very dark grayish brown (10YR 3/2) silt loam (crushed), grayish brown (10YR 5/2) dry; weak fine prismatic structure parting to weak fine and medium subangular blocky; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A3—26 to 34 inches; very dark grayish brown (10YR 3/2) silt loam (crushed), grayish brown (10YR 5/2) dry; weak medium prismatic structure parting to weak medium subangular blocky; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

C1—34 to 47 inches; dark grayish brown (2.5Y 4/2) silt loam; a few strata of loam; few fine distinct light brownish gray (10YR 6/2) and olive brown (2.5Y 4/4) mottles; weak medium and coarse subangular blocky structure; friable; few faint very dark gray (10YR 3/1) organic coatings lining root channels; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

C2—47 to 60 inches; dark grayish brown (2.5Y 4/2), stratified loam, silt loam, and sandy loam; few fine faint grayish brown (2.5Y 5/2) and common fine distinct light olive brown (2.5Y 5/6) mottles; massive; friable; few fine stains and concretions of iron and manganese oxide; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 24 to 36 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—thin strata of silty clay loam, silt loam, and loam
Content of clay—18 to 28 percent in the control section

C horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—1 to 3
Texture—silt loam; loam and sandy loam below a depth of 40 inches

Lisbon Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves and foot slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Lisbon silt loam, 1,557 feet north and 550 feet west of the southeast corner of sec. 19, T. 24 N., R. 6 E.

Ap—0 to 11 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

BA—11 to 14 inches; very dark grayish brown (10YR 3/2) and brown (10YR 4/3) silty clay loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—14 to 22 inches; yellowish brown (10YR 5/4) silty

clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure parting to moderate fine subangular; firm; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Bt2—22 to 25 inches; brown (10YR 5/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and few fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

2Bt3—25 to 32 inches; light olive brown (2.5Y 5/4) clay loam; common fine distinct light brownish gray (2.5Y 6/2) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; mildly alkaline; abrupt smooth boundary.

2C—32 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium prominent light gray (N 6/0) and common medium faint light yellowish brown (2.5Y 6/4) mottles; massive; firm; few medium stains and concretions of iron and manganese oxide; 5 to 8 percent fine gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the mollic epipedon: 10 to 16 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silt loam or silty clay loam
Content of clay—25 to 35 percent in the control section

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—loam

Lorenzo Series

Depth class: Shallow over sand and gravel
Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the lower part
Landform: Stream terraces and outwash plains
Landscape position: Terrace divides, terrace breaks, and side slopes
Parent material: Loamy material 12 to 20 inches thick and the underlying sand and gravel
Slope range: 2 to 5 percent
Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls

Typical Pedon

Lorenzo silt loam, 2 to 5 percent slopes, eroded, 1,056 feet north and 495 feet west of the southeast corner of sec. 23, T. 22 N., R. 1 W.

Ap—0 to 7 inches; mixed dark brown (10YR 3/3) and strong brown (7.5YR 4/6) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to weak fine granular; friable; slightly acid; abrupt smooth boundary.

2Bt1—7 to 14 inches; strong brown (7.5YR 4/6) clay loam; weak medium subangular blocky structure; friable; common distinct dark brown (7.5YR 3/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 5 to 10 percent fine gravel; medium acid; clear smooth boundary.

2Bt2—14 to 22 inches; brown (7.5YR 4/4) sandy clay loam; weak medium and coarse subangular blocky structure; friable; few distinct dark brown (7.5YR 3/4) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 10 to 15 percent fine and medium gravel; slightly acid; clear smooth boundary.

2C—22 to 60 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) gravel; single grain; loose; slight effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 16 to 24 inches
Thickness of the mollic epipedon: 6 to 9 inches
Thickness of the loamy material: Less than 15 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam and loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5

Chroma—3 to 6
Texture—clay loam, loam, or sandy clay loam

2C horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—stratified sand and gravel

Martinsville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Stream terraces
Landscape position: Shoulders and side slopes
Parent material: Loamy material more than 60 inches thick
Slope range: 8 to 18 percent
Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Martinsville silt loam, 8 to 18 percent slopes, eroded, 1,860 feet north and 1,360 feet east of the southwest corner of sec. 5, T. 22 N., R. 3 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam mixed with streaks and pockets of brown (10YR 4/3) subsoil material; light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; abrupt smooth boundary.

BE—6 to 10 inches; brown (10YR 4/3) silt loam; mostly moderate medium subangular blocky structure, some weak moderately thick platy structure in the lower part; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt1—10 to 18 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—18 to 28 inches; yellowish brown (10YR 5/6) clay loam; few fine faint dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—28 to 41 inches; dark yellowish brown (10YR 4/6) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; friable; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt4—41 to 60 inches; dark yellowish brown (10YR 4/4) sandy clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the loess: Less than 20 inches
Other features: Some pedons have a C horizon.

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 to 4
Texture—silt loam, loam, or fine sandy loam

BE horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4

Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—loam, clay loam, or sandy clay loam

Mayville Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess 20 to 30 inches thick and the underlying loamy glacial till
Slope range: 2 to 15 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Mayville silt loam, 5 to 10 percent slopes, eroded, 1,650 feet west and 1,683 feet south of the northeast corner of sec. 7, T. 25 N., R. 5 E.

Ap—0 to 6 inches; dark brown (10YR 3/3) and brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; mixed with some streaks and pockets of dark yellowish brown (10YR 4/4) silty clay loam subsoil material; weak fine and medium subangular blocky structure parting to weak medium granular; friable; neutral; abrupt smooth boundary.

Bt1—6 to 10 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few distinct dark yellowish brown (10YR 3/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—10 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium angular blocky structure; friable; very few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds and many distinct dark yellowish brown (10YR 3/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—17 to 24 inches; dark yellowish brown (10YR 4/4 and 4/6) silty clay loam; few fine distinct grayish brown (10YR 6/2) and yellowish brown (10YR 5/6) mottles in the lower 3 inches; moderate medium angular blocky structure; friable; common distinct brown (10YR 4/3) and dark yellowish brown (10YR 3/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; abrupt smooth boundary.

2Bt4—24 to 29 inches; yellowish brown (10YR 5/4 and 5/6) clay loam; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable; very few faint very dark grayish brown (10YR 3/2) clay films occurring as linings of root channels and few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; neutral; clear smooth boundary.

2Bt5—29 to 34 inches; brown (10YR 4/3 and 5/3) loam; few fine and medium faint grayish brown (10YR 5/2) and distinct yellowish brown (10YR 5/6) mottles; very weak coarse subangular blocky structure; firm; very few distinct very dark grayish brown (10YR 3/2) clay films occurring as linings in root channels and dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 5 to 10 percent fine gravel; slight effervescence; mildly alkaline; gradual smooth boundary.

2C—34 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium distinct grayish brown (2.5Y 5/2) mottles; massive; firm; common fine stains and concretions of iron and manganese oxide; 5 to 10 percent fine and medium gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to 40 inches
Thickness of the loess: 20 to 36 inches
Other features: An E horizon in some pedons

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 4
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—4 to 6
Texture—clay loam or loam
Content of clay—25 to 35 percent in the control section

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—3 or 4
Texture—clay loam or loam

Miami Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Slope range: 2 to 30 percent
Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Miami loam, 10 to 15 percent slopes, eroded, 1,500 feet north and 1,400 feet east of the southwest corner of sec. 26, T. 23 N., R. 4 E.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) loam mixed with dark grayish brown (10YR 4/2) subsurface material; pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—4 to 12 inches; brown (10YR 5/3) silty clay loam; weak fine and medium subangular blocky structure; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear wavy boundary.

Bt2—12 to 20 inches; brown (10YR 5/3) clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium subangular blocky structure; friable; few faint brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; medium acid; clear wavy boundary.

Bt3—20 to 28 inches; brown (10YR 5/3) clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium angular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; slight effervescence at a depth of 26 inches; neutral; clear wavy boundary.

Bt4—28 to 33 inches; light olive brown (2.5Y 5/4) clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; strong effervescence; mildly alkaline; gradual wavy boundary.

C—33 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium distinct grayish brown (2.5Y 5/2) mottles; massive; friable; common fine and medium stains and concretions of iron and manganese oxide; 5 to 10 percent fine and medium gravel; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the loess: Less than 18 inches
Other features: An E horizon in some pedons

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam or loam

Bt horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—clay loam, silty clay loam, or loam
Content of clay—27 to 35 percent in the control section
Content of sand—15 to 45 percent

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—3 or 4
Texture—loam or clay loam

Muscatine Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Uplands, loess plains; terraces, outwash plains
Landscape position: Broad interfluves and foot slopes
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Aquic Hapludolls

Typical Pedon

Muscatine silt loam, 1,221 feet east and 2,541 feet north of the southwest corner of sec. 6, T. 22 N., R. 5 E.

Ap—0 to 12 inches; dark brown (10YR 3/3) silt loam, gray (10YR 5/1) dry; weak fine and medium subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

Bt1—12 to 17 inches; brown (10YR 4/3) silt loam; few fine faint grayish brown (10YR 5/2) mottles; weak fine angular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt2—17 to 23 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; moderate fine angular blocky structure; friable; common distinct brown (10YR 5/3) and grayish brown (10YR 5/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—23 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine and medium distinct grayish brown (10YR 5/2) mottles; moderate fine and medium angular blocky structure; friable; common distinct brown (10YR 5/3 and 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt4—32 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) and few fine and medium distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few distinct very dark gray (10YR 3/1) clay films occurring as linings in root channels and brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

C—44 to 60 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) silt loam; common fine and medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; massive; friable;

few fine stains and concretions of iron and manganese oxide; neutral.

Range in Characteristics

Depth to carbonates: More than 48 inches
Thickness of the mollic epipedon: 10 to 16 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silt loam or silty clay loam

C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silt loam

Normal Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Terraces, outwash plains
Landscape position: Broad interfluves, shallow drainageways, and shallow depressions
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Argiaquic Argialbolls

Typical Pedon

Normal silt loam, 1,650 feet south and 2,310 feet east of the northwest corner of sec. 32, T. 42 N., R. 1 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

E—11 to 20 inches; grayish brown (10YR 5/2) silt loam; common fine faint brown (10YR 4/3) mottles; moderate thin and moderately thick platy structure; friable; common medium concretions of iron and manganese oxide; strongly acid; clear wavy boundary.

Bt1—20 to 28 inches; brown (10YR 4/3) and yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—28 to 37 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; weak medium and coarse prismatic structure parting to moderate medium subangular blocky; friable; many distinct grayish brown (10YR 5/2) and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine and medium concretions of iron and manganese oxide; medium acid; gradual wavy boundary.

Bt3—37 to 52 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure; friable; few distinct dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) organic coatings lining root channels; many fine and medium concretions of iron and manganese oxide; few black krotovinas; medium acid; gradual wavy boundary.

C—52 to 60 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; massive; friable; few distinct brown (10YR 4/3) organic coatings lining root channels; many fine and medium concretions of iron and manganese oxide; few black krotovinas; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 10 to 16 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

E horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 3

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or silty clay loam
Content of clay—27 to 32 percent in the control section

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silt loam

Orion Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Flood plains, alluvial fans
Landscape position: Foot slopes
Parent material: Silty colluvium 20 to 40 inches thick and an underlying older buried soil
Slope range: 0 to 2 percent
Taxonomic class: Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Taxonomic features: The Orion soils in this survey area have more clay in the control section than is defined as the range for the series. These soils are classified as fine-silty, mixed, nonacid, mesic Aquic Udifluvents.

Typical Pedon

Orion silt loam, occasionally flooded, 780 feet north and 590 feet east of the southwest corner of sec. 23, T. 22 N., R. 2 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; mostly weak fine subangular blocky structure, some weak thin platy structure in the lower part; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt smooth boundary.

C—8 to 22 inches; dark grayish brown (10YR 4/2), stratified silt loam and silty clay loam; common medium faint brown (10YR 5/3) mottles; mostly moderate medium subangular blocky structure, some weak thin platy structure; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Ab1—22 to 34 inches; black (10YR 2/1) silt loam; few medium distinct brown (10YR 4/3) mottles; moderate coarse subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

Ab2—34 to 41 inches; very dark grayish brown (10YR 3/2) silty clay loam; few medium faint brown (10YR 5/3) mottles; moderate coarse subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few medium stains and concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Cgb1—41 to 46 inches; dark grayish brown (2.5Y 4/2) silty clay loam; many medium prominent yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few medium stains and concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Cgb2—46 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; friable; common medium stains and concretions of iron and manganese oxide; mildly alkaline.

Range in Characteristics

Depth to carbonates: More than 60 inches
Depth to the buried soil: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

C horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam or silty clay loam
Content of clay—18 to 26 percent in the control section (when mixed)

Ab horizon:
Hue—10YR or 2.5Y
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam; some loamy strata

Cgb horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silty clay loam

Parr Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess less than 18 inches thick and the underlying loamy glacial till
Slope range: 2 to 10 percent

Taxonomic class: Fine-loamy, mixed, mesic Typic Argiudolls

Taxadjunct features: The Parr soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-loamy, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Parr silt loam, 5 to 10 percent slopes, eroded, 143 feet west and 2,057 feet south of the northeast corner of sec. 23, T. 23 N., R. 6 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam mixed with some streaks and pockets of brown (10YR 4/3) subsoil material; grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

Bt1—8 to 16 inches; brown (7.5YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—16 to 25 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm; few faint brown (10YR 4/3) clay films on faces of peds; few medium stains and concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bt3—25 to 31 inches; yellowish brown (10YR 5/4) loam; weak medium and coarse subangular blocky structure; firm; very few distinct dark brown (7.5YR 3/2) clay films occurring as linings in pores and root channels; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.

C—31 to 60 inches; brown (10YR 5/3) loam; massive; firm; few fine stains and concretions of iron and manganese oxide; 5 to 8 percent fine and medium gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the loess: Less than 18 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—silt loam or silty clay loam

Bt horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 or 5
Chroma—4 or 5
Texture—clay loam or loam

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—3 or 4
Texture—loam or clay loam

Peotone Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow
Landform: Uplands, till plains, and loess plains
Landscape position: Shallow closed depressions
Parent material: Colluvial sediments more than 60 inches thick
Slope range: 0 to 1 percent
Taxonomic class: Fine, montmorillonitic, mesic Cumulic Haplaquolls

Typical Pedon

Peotone silty clay loam, 825 feet north and 300 feet east of the southwest corner of sec. 7, T. 23 N., R. 3 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; firm; neutral; abrupt smooth boundary.

A—7 to 12 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure parting to moderate fine granular; firm; neutral; abrupt smooth boundary.

AB—12 to 15 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; firm; neutral; abrupt smooth boundary.

Bg1—15 to 21 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct yellowish brown (10YR 5/4) mottles; moderate fine and medium subangular blocky structure; firm; many distinct black (10YR 2/1) clay films on faces of peds; neutral; abrupt smooth boundary.

Bg2—21 to 30 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct yellowish brown (10YR 5/4) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; many distinct black (10YR 2/1) clay films on faces of peds; neutral; abrupt smooth boundary.

Bg3—30 to 46 inches; very dark gray (N 3/0) silty clay loam, gray (N 5/0) dry; very few fine prominent light olive gray (5Y 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few faint olive gray (5Y 4/2)

clay films on faces of peds; neutral; gradual smooth boundary.

Cg—46 to 60 inches; olive gray (5Y 5/2) silt loam; common faint prominent yellowish brown (10YR 5/6) mottles; massive; firm; few distinct olive gray (5Y 4/2) clay films occurring as linings in root channels; mildly alkaline.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 24 to 36 inches

Ap horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 or 1

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—2 to 6
Chroma—0 to 2
Texture—silty clay loam or silty clay
Content of clay—35 to 42 percent in the control section

Cg horizon:
Hue—2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silt loam or silty clay loam

Plano Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Outwash plains and stream terraces
Landscape position: Broad interfluves and side slopes
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Slope range: 0 to 5 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls

Typical Pedon

Plano silt loam, 0 to 2 percent slopes, 834 feet north and 690 feet west of the southeast corner of sec. 29, T. 26 N., R. 4 E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

A—9 to 18 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; friable; common faint very dark gray (10YR 3/1) clay films on faces of peds; neutral; abrupt smooth boundary.

Bt1—18 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common faint very dark gray (10YR 3/1) and dark brown (10YR 3/3) clay films on faces of peds; neutral; abrupt smooth boundary.

Bt2—27 to 37 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds and very dark gray (10YR 3/1) clay films in root channels; few fine stains and concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Bt3—37 to 52 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct light gray (10YR 7/2) mottles in the lower 2 inches; moderate coarse subangular blocky structure; friable; common faint brown (10YR 4/3) and few fine very dark gray (10YR 3/1) clay films on faces of peds and occurring as linings in root channels; few fine stains and concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

2Bt4—52 to 60 inches; yellowish brown (10YR 5/4), stratified sandy loam and clay loam; very weak medium and coarse subangular blocky structure; friable; few faint brown (10YR 5/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 10 to 20 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam
Content of clay—27 to 35 percent in the control section

2Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—sandy loam, loam, clay loam, or silt loam

Proctor Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Stream terraces and outwash plains
Landscape position: Broad interfluves, side slopes, and foot slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy outwash
Slope range: 0 to 10 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Proctor soil in map unit 148C2 has a thinner dark surface layer than is defined as the range for the series. This soil is classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Proctor silt loam, 5 to 10 percent slopes, eroded, 1,910 feet east and 90 feet north of the southwest corner of sec. 17, T. 23 N., R. 5 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam mixed with some streaks of dark yellowish brown (10YR 4/6) subsoil material; grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

Bt1—9 to 17 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—17 to 30 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—30 to 35 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt4—35 to 47 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; few medium stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2C—47 to 60 inches; dark yellowish brown (10YR 4/4) sandy loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; loose; common medium stains and concretions of iron and manganese oxide; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 10 to 16 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Hue—10YR
Value—3 or 4
Chroma—3 to 6
Texture—silty clay loam or silt loam
Content of clay—27 to 32 percent in the control section

2Bt horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 or 5
Chroma—4 to 6
Texture—sandy loam, loam, clay loam, or silt loam

Radford Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Flood plains, first bottom
Landscape position: Meanderbelts and shallow drainageways
Parent material: Silty alluvium 20 to 40 inches thick and the underlying older buried soil
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Fluvaquentic Hapludolls

Typical Pedon

Radford silt loam, occasionally flooded, 1,000 feet east and 300 feet south of the northwest corner of sec. 3, T. 24 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

AC—8 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure parting to weak medium granular; friable; slightly acid; clear smooth boundary.

C—16 to 27 inches; brown (10YR 4/3) silt loam;

common medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; few very thin grayish brown (10YR 5/2) strata; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Ab1—27 to 34 inches; black (N 2/0) silt loam; few medium prominent brown (10YR 4/3) mottles; moderate medium subangular blocky structure; firm; neutral; clear smooth boundary.

Ab2—34 to 46 inches; black (N 2/0) silty clay loam; few fine prominent dark grayish brown (10YR 4/2) mottles; moderate medium angular blocky structure; firm; neutral; clear smooth boundary.

Ab3—46 to 60 inches; dark gray (5Y 4/1) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 10 to 20 inches
Thickness of the silt loam layer over the buried soil: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

C horizon:
Hue—10YR
Value—3 to 5
Chroma—1 or 2
Texture—silt loam

Ab horizon:
Hue—5Y, 2.5Y, 10YR, or neutral
Value—2 to 4
Chroma—0 or 1
Texture—silty clay loam, clay loam, or silt loam

Raub Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Parent material: Loess 22 to 40 inches thick and the underlying loamy glacial till
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Raub silt loam, 80 feet south and 890 feet east of the northwest corner of sec. 15, T. 23 N., R. 5 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A—7 to 18 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; neutral; clear smooth boundary.

Bt1—18 to 24 inches; brown (10YR 4/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine prominent light olive brown (2.5Y 5/6) mottles; moderate fine subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt2—24 to 33 inches; olive brown (2.5Y 4/4) silty clay loam; few fine distinct light olive brown (2.5Y 5/6) and grayish brown (2.5Y 5/2) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Bt3—33 to 39 inches; olive brown (2.5Y 4/4) silty clay loam (15 to 20 percent sand); few fine distinct light olive brown (2.5Y 5/6) and grayish brown (2.5Y 5/2) mottles; moderate medium subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; neutral; clear smooth boundary.

2Bt4—39 to 45 inches; olive brown (2.5Y 4/4) loam; few fine distinct light olive brown (2.5Y 5/6) and grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.

2C—45 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium distinct light olive brown (2.5Y 5/6) and grayish brown (2.5Y 5/2) mottles; massive; friable; common medium stains and concretions of iron and manganese oxide; 5 to 8 percent fine gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 60 inches
Thickness of the mollic epipedon: 12 to 20 inches
Thickness of the loess: 22 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam
Content of clay—27 to 35 percent in the control section

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam, clay loam, or loam

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 to 4
Texture—loam or clay loam

Ross Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Flood plains, first bottom
Landscape position: Natural levees
Parent material: Loamy alluvium more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-loamy, mixed, mesic Cumulic Hapludolls

Typical Pedon

Ross loam, occasionally flooded, 680 feet north and 2,365 feet east of the southwest corner of sec. 34, T. 25 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; mildly alkaline; abrupt smooth boundary.

A1—8 to 16 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak medium granular; friable; mildly alkaline; clear smooth boundary.

A2—16 to 27 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak coarse subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

A3—27 to 32 inches; very dark grayish brown (10YR 3/2) loam, light brownish gray (10YR 6/2) dry; weak coarse subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

Bw—32 to 39 inches; brown (10YR 4/3) silt loam; few fine faint dark yellowish brown (10YR 4/4) mottles; moderate coarse subangular blocky structure; friable; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; 1 percent fine gravel; mildly alkaline; clear smooth boundary.

C—39 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the mollic epipedon: 24 to 36 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam, loam, or fine sandy loam

B horizon:
Hue—10YR
Value—3 or 4
Chroma—2 to 4
Texture—silt loam, loam, or sandy loam

C horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—2 to 4
Texture—sandy loam, loam, or silt loam

Rozetta Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Uplands, loess plains
Landscape position: Shoulders and side slopes
Parent material: Loess more than 60 inches thick
Slope range: 1 to 5 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Rozetta silt loam, 2 to 5 percent slopes, eroded, 1,815 feet east and 2,376 feet south of the northwest corner of sec. 27, T. 23 N., R. 3 E.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam mixed with streaks and pockets of dark yellowish brown (10YR 4/4) subsoil material; pale brown (10YR 6/3) dry; weak fine granular structure; friable; medium

acid; abrupt smooth boundary.
Bt1—6 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine angular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.
Bt2—25 to 40 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium angular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.
Bt3—40 to 53 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) and common fine and medium distinct yellowish brown (10YR 5/8) mottles; weak medium angular blocky structure; friable; few faint brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.
C—53 to 60 inches; yellowish brown (10YR 5/4) silt loam; common fine and medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; massive; friable; few fine stains and concretions of iron and manganese oxide; mildly alkaline.

Range in Characteristics

Depth to carbonates: More than 50 inches
Thickness of the loess: More than 60 inches
Other features: An E horizon in some pedons

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam or silty clay loam
Content of clay—27 to 35 percent in the control section

C horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4

Russell Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Slope range: 2 to 10 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Russell silt loam, 5 to 10 percent slopes, eroded, 2,490 feet north and 2,100 feet west of the southeast corner of sec. 34, T. 22 N., R. 2 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam mixed with dark yellowish brown (10YR 4/4) subsoil material; light brownish gray (10YR 6/2) dry; weak medium granular structure; friable; medium acid; abrupt smooth boundary.
Bt1—5 to 11 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; many distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.
Bt2—11 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine prismatic structure parting to weak medium subangular blocky; friable; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.
Bt3—21 to 33 inches; dark yellowish brown (10YR 4/6) silty clay loam; few fine faint yellowish brown (10YR 5/4 and 5/6) mottles; moderate coarse subangular blocky structure; friable; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.
2Bt4—33 to 38 inches; dark yellowish brown (10YR 4/6) clay loam; few fine faint yellowish brown (10YR 5/4 and 5/6) mottles; weak coarse subangular blocky structure; friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few medium stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; slightly acid; clear smooth boundary.
2Bt5—38 to 42 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint yellowish brown (10YR 5/4 and 5/6) mottles; weak coarse subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; common medium stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; neutral; clear smooth boundary.
2C—42 to 60 inches; olive brown (2.5Y 4/4) loam; few fine prominent dark grayish brown (10YR 4/2) and

dark yellowish brown (10YR 4/4 and 4/6) mottles; massive; friable; common medium stains and concretions of iron and manganese oxide; 5 to 8 percent fine and medium gravel; strong effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—clay loam, loam, or silty clay loam
Content of clay—25 to 33 percent in the control section

2C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—loam

Sabina Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Uplands, till plains
Landscape position: Broad interfluves, foot slopes, and shallow drainageways
Parent material: Loess 40 to 60 inches thick and the underlying loamy glacial till
Slope range: 0 to 2 percent
Taxonomic class: Fine, montmorillonitic, mesic Aeric Ochraqualfs

Typical Pedon

Sabina silt loam, 1,452 feet east and 231 feet north of the southwest corner of sec. 34, T. 23 N., R. 4 E.

Ap—0 to 7 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam mixed with pockets of grayish brown (10YR 5/2) material from the subsurface layer; mostly weak fine and medium subangular blocky structure, some thin platy structure in the lower part; friable; slightly acid; abrupt smooth boundary.

E—7 to 14 inches; grayish brown (10YR 5/2) silt loam; moderate moderately thick platy structure; friable; very few distinct light gray (10YR 7/1) and grayish brown (10YR 5/2) silt coatings; common fine stains and concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

BE—14 to 18 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint gray (10YR 5/1) and common distinct yellowish brown (10YR 5/6) mottles; moderate fine angular blocky and weak moderately thick platy structure; friable; few fine dark brown (10YR 3/3) and dark grayish brown (10YR 4/2) clay films on faces of peds; few fine light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt1—18 to 30 inches; brown (10YR 4/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; common distinct brown (10YR 5/3) and grayish brown (10YR 5/2) clay films on faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; gradual wavy boundary.

Bt2—30 to 35 inches; brown (10YR 4/3) silty clay loam; common fine and medium faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; gradual wavy boundary.

Bt3—35 to 45 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) silt loam; common fine and medium faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few distinct dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) clay films on faces of peds and in root channels; common fine stains and concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

2Bt4—45 to 51 inches; olive brown (2.5Y 4/4) loam; few fine and medium prominent grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; firm; few faint dark grayish brown (10YR 4/2) clay films and light brownish gray (10YR 6/2) silt coatings lining root channels and pores; few fine masses of calcium carbonate; strong effervescence; mildly alkaline; clear smooth boundary.

2C—51 to 60 inches; olive brown (2.5Y 4/4) loam; few medium prominent grayish brown (10YR 5/2)

mottles; massive; firm; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 35 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silty clay
Content of clay—36 to 42 percent in the control section

2C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—clay loam or loam

Sable Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Uplands, loess plains
Landscape position: Broad interfluves, shallow drainageways, and shallow depressions
Parent material: Loess more than 60 inches thick
Slope range: 0 to 2 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Haplaquolls

Typical Pedon

Sable silty clay loam, 2,000 feet west and 300 feet south of the northeast corner of sec. 33, T. 24 N., R. 3 E.

Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

A—7 to 12 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; friable; neutral; abrupt smooth boundary.

BA—12 to 22 inches; very dark gray (N 3/0) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few faint light gray (N 6/0) clay films on faces of peds and occurring as linings in pores; few fine stains of iron and manganese oxide; few black krotovinas; neutral; clear smooth boundary.

Bg—22 to 37 inches; gray (N 5/0) silty clay loam; few fine prominent light gray (5Y 6/1) and common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few faint light gray (N 6/0) clay films on faces of peds and occurring as linings in pores; few fine stains of iron and manganese oxide; few black krotovinas; neutral; abrupt smooth boundary.

BCg—37 to 54 inches; light gray (5Y 6/1) silt loam; few fine distinct light gray (N 6/0) and common fine prominent yellowish brown (10YR 5/8) mottles; very weak medium prismatic structure; firm; few faint light gray (N 6/0) clay films on faces of peds and occurring as linings in pores; many fine stains of iron and manganese oxide; few black krotovinas; neutral; abrupt smooth boundary.

Cg—54 to 60 inches; light gray (5Y 6/1) silt loam; common fine distinct light gray (N 6/0) and common fine prominent yellowish brown (10YR 5/8) mottles; massive; firm; many fine stains of iron and manganese oxide; few black krotovinas; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 12 to 24 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 or 1

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

Cg horizon:
Hue—2.5Y, 5Y, or neutral
Value—5 or 6
Chroma—0 to 2
Texture—silt loam or silty clay loam

Sawmill Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Flood plains, first bottom
Landscape position: Backlands and backswamps
Parent material: Silty alluvium more than 60 inches thick
Slope range: 0 to 1 percent
Taxonomic class: Fine-silty, mixed, mesic Cumulic Haplaquolls

Typical Pedon

Sawmill silty clay loam, occasionally flooded, 1,800 feet north and 700 feet west of the southeast corner of sec. 18, T. 23 N., R. 5 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

A—10 to 23 inches; black (5Y 2.5/1) silty clay loam, dark gray (5Y 4/1) dry; weak fine and medium subangular blocky structure; friable; 1 to 2 percent fine gravel; slightly acid; clear smooth boundary.

Bg—23 to 30 inches; very dark gray (5Y 3/1) silty clay loam, gray (5Y 5/1) dry; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; 1 to 2 percent fine gravel; slightly acid; gradual smooth boundary.

Btg1—30 to 42 inches; dark gray (5Y 4/1) silty clay loam; many fine faint olive gray (5Y 5/2) and common fine prominent brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common faint very dark gray (5Y 3/1) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 1 to 2 percent fine gravel; neutral; clear smooth boundary.

Btg2—42 to 50 inches; olive gray (5Y 4/2) clay loam; many fine faint gray (5Y 5/1) and many fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint dark gray (5Y 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; 1 to 2 percent fine gravel; mildly alkaline; clear smooth boundary.

BCg—50 to 60 inches; olive gray (5Y 4/2), stratified loam and sandy loam; many fine faint gray (5Y 5/1) and many fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; very few faint dark gray (5Y 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; 1 to 2 percent fine gravel; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 24 to 32 inches
Thickness of the silty alluvium: More than 60 inches

A horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—silt loam or silty clay loam

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—3 to 5
Chroma—0 to 2
Texture—silty clay loam or clay loam
Content of clay—27 to 35 percent in the control section

Cg horizon:
Texture—typically silty clay loam or clay loam; thin strata containing more sand in some pedons

Saybrook Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess 20 to 40 inches thick and the underlying loamy glacial till
Slope range: 2 to 10 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Saybrook soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-silty, mixed, mesic Typic Argiudolls.

Typical Pedon

Saybrook silt loam, 2 to 5 percent slopes, eroded, 1,160 feet west and 280 feet north of the southeast corner of sec. 33, T. 25 N., R. 2 E.

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam mixed with some streaks and pockets of brown (10YR 4/3) subsoil material; dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—8 to 12 inches; brown (10YR 4/3) and dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry;

weak fine subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—12 to 18 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; common fine brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt3—18 to 29 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

2Bt4—29 to 33 inches; light olive brown (2.5Y 5/6) loam; few fine distinct light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; few faint olive brown (2.5Y 4/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.

2Bt5—33 to 39 inches; olive yellow (2.5Y 6/6) loam; few fine distinct light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable; very few faint olive brown (2.5Y 4/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 2 to 5 percent fine gravel; mildly alkaline; strong effervescence; clear smooth boundary.

2C—39 to 60 inches; light yellowish brown (2.5Y 6/4) loam; few fine distinct light brownish gray (2.5Y 6/2) and few fine prominent brownish yellow (10YR 6/6) mottles; massive; firm; few fine stains and concretions of iron and manganese oxide; 5 to 7 percent fine and medium gravel; violent effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

2Bt horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—3 to 6
Texture—silty clay loam, clay loam, or loam

Selma Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Terraces, outwash plains
Landscape position: Drainageways
Parent material: Loamy material 40 to 60 inches thick and the underlying stratified loamy material
Slope range: 0 to 2 percent
Taxonomic class: Fine-loamy, mixed, mesic Typic Haplaquolls

Typical Pedon

Selma loam, 2,145 feet north and 363 feet west of the southeast corner of sec. 10, T. 26 N., R. 5 E.

Ap—0 to 11 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

A—11 to 21 inches; black (10YR 2/1) and very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) and gray (10YR 5/1) dry; weak fine and medium subangular blocky structure; friable; 1 to 2 percent fine gravel; neutral; clear smooth boundary.

Bg1—21 to 28 inches; dark gray (5Y 4/1) clay loam; few fine prominent brown (10YR 5/3) and yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; few fine black (10YR 2/1) organic coatings on faces of peds; few fine stains and concretions of iron oxide; 1 to 2 percent fine gravel; mildly alkaline; clear smooth boundary.

Bg2—28 to 37 inches; olive gray (5Y 4/2) clay loam; few fine and medium prominent light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure; friable; few faint dark gray (N 4/0) clay films on faces of peds; common black krotovinas; few fine stains of iron oxide; 1 to 2 percent fine gravel; mildly alkaline; clear smooth boundary.

Bg3—37 to 53 inches; olive gray (5Y 5/2) clay loam; few fine and medium prominent light olive brown (2.5Y 5/4) mottles; moderate fine and medium prismatic structure; friable; few fine very dark gray (10YR 3/1) clay films on faces of peds; common

fine and medium stains of iron oxide; 1 to 2 percent fine gravel; mildly alkaline; clear smooth boundary.

Cg—53 to 60 inches; olive (5Y 4/3) and olive gray (5Y 5/2), stratified loam and sandy loam; common fine and medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; common black krotovinas; common fine and medium stains of iron oxide; 1 to 2 percent fine gravel; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: More than 45 inches
Thickness of the mollic epipedon: 10 to 20 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam, clay loam, or silty clay loam

Bg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam, clay loam, or loam

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—loam, clay loam, or sandy loam

St. Charles Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Stream terraces
Landscape position: Interfluves, side slopes, and terrace breaks
Parent material: Loess 40 to 60 inches thick and the underlying loamy outwash
Slope range: 0 to 5 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

St. Charles silt loam, 2 to 5 percent slopes, 3,100 feet north and 2,850 feet east of the southwest corner of sec. 4, T. 25 N., R. 3 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.

E—7 to 11 inches; brown (10YR 4/3) silt loam; weak thin platy structure; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt1—11 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—23 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—31 to 46 inches; dark yellowish brown (10YR 4/6) silty clay loam; few fine prominent dark gray (10YR 4/1) and few fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; few faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt4—46 to 50 inches; dark yellowish brown (10YR 4/6) loam; few fine faint yellowish brown (10YR 5/6) and few fine prominent dark gray (10YR 4/1) mottles; weak medium prismatic structure; friable; few faint brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2C—50 to 60 inches; dark yellowish brown (10YR 4/6) sandy loam; massive; loose; neutral.

Range in Characteristics

Depth to carbonates: More than 50 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 or 3

E horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam
Content of clay—27 to 35 percent in the control section

2Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, loam, or silt loam

2C horizon:
Texture—sandy loam, loam, or silt loam

Strawn Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Parent material: Loamy glacial till
Slope range: 5 to 50 percent
Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Strawn loam, 5 to 10 percent slopes, eroded, 297 feet west and 2,046 feet north of the southeast corner of sec. 7, T. 25 N., R. 2 E.

Ap—0 to 4 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

Bt1—4 to 7 inches; brown (10YR 4/3) clay loam; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—7 to 14 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; 2 percent fine gravel; mildly alkaline; clear smooth boundary.

Bt3—14 to 18 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; 2 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.

BC—18 to 24 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 5 to 10 percent fine and medium gravel; strong effervescence; moderately alkaline; gradual smooth boundary.

C—24 to 60 inches; yellowish brown (10YR 5/6) loam; massive; firm; few fine stains and concretions of iron and manganese oxide; 5 to 10 percent fine and medium gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 14 to 24 inches
Thickness of the loess: Less than 10 inches
Other features: An E horizon in some pedons

A or Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—loam, clay loam, or silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—clay loam or silty clay loam
Content of clay—25 to 35 percent in the control section
Content of sand—15 to 45 percent

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—4 to 6
Texture—clay loam or loam

Swygert Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow in the upper part and very slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Foot slopes and toe slopes
Parent material: Loess less than 30 inches thick and the underlying clayey glacial till
Slope range: 2 to 4 percent
Taxonomic class: Fine, mixed, mesic Aquic Argiudolls
Taxadjunct features: The Swygert soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Swygert silty clay loam, 2 to 4 percent slopes, eroded, 1,089 feet east and 660 feet north of the southwest corner of sec. 9, T. 23 N., R. 6 E.

Ap—0 to 5 inches; dark brown (10YR 3/3) silty clay loam mixed with dark yellowish brown (10YR 4/4) subsoil material; brown (10YR 5/3) dry; weak fine and medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—5 to 9 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

2Bt2—9 to 16 inches; olive (5Y 5/3) and olive gray (5Y 5/2) silty clay; few fine prominent yellowish brown (10YR 5/6) and greenish gray (5GY 6/1) mottles; moderate medium prismatic structure parting to weak medium angular blocky; very firm; common distinct pressure faces on vertical and horizontal planes of peds; mildly alkaline; clear smooth boundary.

2BC—16 to 24 inches; olive (5Y 5/3) and olive gray (5Y 5/2) silty clay; common fine and medium prominent yellowish brown (10YR 5/6) and greenish gray (5GY 6/1) mottles; weak medium prismatic structure; very firm; common distinct pressure faces on vertical and horizontal planes of peds; slight effervescence; mildly alkaline; clear smooth boundary.

2C—24 to 60 inches; olive (5Y 5/3) silty clay; common fine and medium prominent yellowish brown (10YR 5/6) and greenish gray (5GY 6/1) and common fine and medium faint olive gray (5Y 5/2) mottles; massive; very firm; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 15 to 30 inches
Thickness of the loess: Less than 20 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3

2Bt horizon:
Hue—2.5Y or 5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam or silty clay
Content of clay—45 to 50 percent in the control section

2C horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay or silty clay loam

Symerton Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Shoulders and side slopes
Parent material: Loess and loamy sediments 20 to 40 inches thick and the underlying silty glacial till
Slope range: 2 to 5 percent
Taxonomic class: Fine-loamy, mixed, mesic Typic Argiudolls

Typical Pedon

Symerton silt loam, 2 to 5 percent slopes, 2,046 feet east and 891 feet south of the northwest corner of sec. 5, T. 26 N., R. 5 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine and medium subangular blocky structure parting to moderate fine granular; friable; neutral; clear smooth boundary.

A—8 to 13 inches; very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—13 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

2Bt2—23 to 28 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt3—28 to 37 inches; dark yellowish brown (10YR 3/4) sandy clay loam; weak medium and coarse subangular blocky structure; very friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds and occurring as linings in root channels; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Bt4—37 to 49 inches; dark yellowish brown (10YR 4/4) silty clay loam (15 percent sand); common fine distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few prominent brown (10YR 4/3) and very dark grayish brown (10YR 3/2) clay films on faces of peds and occurring as linings in root channels; few fine stains and concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

3BC—49 to 53 inches; olive brown (2.5Y 4/4) silt loam; common fine and medium prominent yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few fine stains and concretions of iron and manganese oxide; 1 to 2 percent fine gravel; slight effervescence; moderately alkaline; clear smooth boundary.

3C—53 to 60 inches; olive brown (2.5Y 4/4) silt loam; common fine and medium prominent grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; massive; firm; few fine stains and concretions of iron and manganese oxide; 4 to 8 percent fine gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to 50 inches
Thickness of the mollic epipedon: 10 to 15 inches
Thickness of the loess: Less than 24 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3

2Bt horizon:
Hue—10YR
Value—3 to 5
Chroma—3 to 6
Texture—clay loam, loam, silty clay loam, or sandy clay loam
Content of clay—27 to 35 percent in the control section
Content of sand—15 to 20 percent in the control section

3C horizon:
Hue—2.5Y
Value—4 to 6
Chroma—3 or 4
Texture—silty clay loam or silt loam (more than 24 percent clay)

Tama Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Uplands, loess plains; terraces, outwash plains
Landscape position: Broad interfluves, shoulders, and side slopes
Parent material: Loess more than 60 inches thick
Slope range: 0 to 5 percent
Taxonomic class: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Tama soil in map unit 36B2 has a thinner dark surface layer than is defined as the range for the series. This soil is classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Tama silt loam, 2 to 5 percent slopes, 87 feet east and 1,386 feet north of the southwest corner of sec. 31, T. 22 N., R. 2 E.

Ap—0 to 12 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; neutral; abrupt smooth boundary.

BA—12 to 16 inches; brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; friable; few faint very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—26 to 34 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine and medium angular blocky; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—34 to 46 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

BC—46 to 60 inches; dark yellowish brown (10YR 4/4 and 4/6) silt loam; few fine and medium distinct grayish brown (10YR 5/2) and common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; very few faint very dark gray (10YR 3/1) clay films occurring as linings in root channels; few fine stains and concretions of iron and manganese oxide; neutral.

Range in Characteristics

Depth to carbonates: More than 48 inches
Thickness of the mollic epipedon: 10 to 15 inches
Thickness of the loess: More than 60 inches
Other features: Some pedons have a C horizon.

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5

Chroma—3 to 6
Texture—silty clay loam
Content of clay—27 to 35 percent in the control section

Varna Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow in the upper part and slow in the underlying material
Landform: Uplands, till plains, and moraines
Landscape position: Summits, shoulders, and side slopes
Parent material: Loess less than 20 inches thick and the underlying silty glacial till
Slope range: 2 to 10 percent
Taxonomic class: Fine, illitic, mesic Typic Argiudolls
Taxadjunct features: The Varna soils in this survey area have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine, illitic, mesic Mollic Hapludalfs.

Typical Pedon

Varna silt loam, 2 to 5 percent slopes, eroded, 2,500 feet west and 1,300 feet south of the northeast corner of sec. 26, T. 26 N., R. 4 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine and fine granular structure; friable; neutral; clear smooth boundary.

BA—8 to 12 inches; brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) and few distinct very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

Bt1—12 to 18 inches; brown (10YR 5/3) silty clay loam; moderate very fine and fine subangular blocky structure; friable; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

2Bt2—18 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine prominent light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm; common distinct grayish brown (10YR 5/2) and dark gray (10YR 4/1) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

2Bt3—26 to 31 inches; light yellowish brown (10YR 6/4) silty clay loam (10 to 15 percent sand); few fine distinct light gray (10YR 7/2) mottles; weak fine and medium prismatic structure; firm; common faint grayish brown (10YR 5/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 5 to 7 percent fine gravel; neutral; clear smooth boundary.

2Bt4—31 to 35 inches; brown (10YR 5/3) silty clay loam (10 to 15 percent sand); weak fine prismatic structure; firm; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; 5 to 7 percent fine gravel; strong effervescence; mildly alkaline; abrupt smooth boundary.

2BC—35 to 41 inches; light olive brown (2.5Y 5/6) silty clay loam; few medium prominent light gray (N 6/0) mottles; weak coarse prismatic structure; firm; few fine stains and concretions of iron and manganese oxide; 7 to 10 percent fine gravel; violent effervescence; moderately alkaline; abrupt smooth boundary.

2C—41 to 60 inches; olive (5Y 5/3) silty clay loam; common medium prominent light gray (N 6/0) mottles; massive; very firm; 7 to 10 percent fine gravel; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the loess: Less than 20 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 or 4
Texture—silty clay loam or silty clay
Content of clay—35 to 42 percent in the control section

2C horizon:
Hue—2.5Y or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silt loam (more than 24 percent clay)

Warsaw Series

Depth class: Moderately deep to sand and gravel
Drainage class: Well drained
Permeability: Moderate in the upper part and very rapid in the lower part

Landform: Stream terraces and outwash plains
Landscape position: Interfluves, side slopes, and terrace breaks
Parent material: Loamy material 20 to 40 inches thick and the underlying sand and gravel
Slope range: 0 to 10 percent
Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Taxadjunct features: The Warsaw soils in map units 290B2 and 290C2 have a thinner dark surface layer than is defined as the range for the series. These soils are classified as fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Warsaw silt loam, 2 to 5 percent slopes, eroded, 3,090 feet south and 1,590 feet east of the northwest corner of sec. 16, T. 23 N., R. 6 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam mixed with brown (7.5YR 4/4) subsoil material; grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; friable; 2 to 5 percent fine gravel; neutral; abrupt smooth boundary.

Bt1—9 to 17 inches; brown (7.5YR 4/4) sandy clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine concretions of iron oxide on faces of peds; 7 to 10 percent fine gravel; medium acid; clear smooth boundary.

Bt2—17 to 28 inches; brown (7.5YR 4/4) sandy clay loam; weak medium subangular blocky structure; friable; few fine brown (10YR 4/3) clay films on faces of peds; common fine stains and concretions of iron oxide; 7 to 10 percent fine and medium gravel; slightly acid; clear smooth boundary.

2Bt3—28 to 35 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak fine subangular blocky structure; friable; very few fine brown (10YR 4/3) clay films on faces of peds; common fine stains and concretions of iron and manganese oxide; 15 to 20 percent fine and medium gravel; slight effervescence; mildly alkaline; clear wavy boundary.

2C—35 to 60 inches; yellowish brown (10YR 5/4) sand and gravel; single grain; friable; few fine stains and concretions of iron and manganese oxide; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to 40 inches
Depth to gravel and sand: 20 to 40 inches
Thickness of the mollic epipedon: 10 to 15 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—clay loam, sandy clay loam, or loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 or 4
Texture—gravelly clay loam, gravelly sandy clay loam, or gravelly sandy loam

2C horizon:
Hue—10YR
Value—5 or 6
Chroma—3 or 4
Texture—very gravelly coarse sand or gravelly coarse sand
Content of gravel—35 to 60 percent

Formation of the Soils

Soil is produced by soil-forming processes acting on materials deposited or accumulated by geologic agencies. The characteristics of the soil are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil formed; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of soil formation have acted on the parent material.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless the effects of the other factors are known. Many of the processes of soil formation are unknown.

Climate and plant and animal life are the active factors of soil formation. These factors act directly on the parent material, either in place or after it has been relocated by water, glaciers, or the wind, and slowly change it to a natural body that has genetically related layers, or horizons. Relief can modify the effects of climate and plant and animal life. In sloping areas, for example, erosion can inhibit the processes of soil formation. Wetness can slow these processes in level or depressional areas. The parent material also affects the kind of soil profile that is formed. Finally, time is needed for changing the parent material into a soil profile that has clearly differentiated horizons.

Parent Material

Parent material is the geologic material from which a soil is formed. The parent materials of the soils in McLean County are mainly associated directly with glaciers and sediments of the Wisconsinan Stage (Willman and Frye, 1970). Although the parent materials are glacial in origin, their properties vary greatly, depending on the method of deposition. The dominant parent materials in McLean County are glacial till; glacial outwash, including sand and gravel; alluvium; and loess.

Glacial till is material laid down directly by glaciers with a minimum of water action. It consists of particles of different sizes mixed together. The small pebbles in glacial till generally have distinct edges and corners, indicating that they have not been subject to intense water action. The glacial till in McLean County was deposited during the Wisconsinan Stage.

Numerous recessional end moraines are evident in the county. The moraines are generally oriented from northwest to southeast, except for the Champaign Moraine, which extends north and south in the Bellflower area. The most notable of these end moraines is the Bloomington Moraine, which runs from Danvers Township in the northwest through Bloomington-Normal and then to Cheneys Grove Township at the edge of the county line. The glacial till is generally loam, clay loam, or silt loam and is calcareous. Colors range from light pink to dark gray, depending on the source area of the till. Soils that formed in this parent material are generally gently sloping to very steep and are on ridgetops and side slopes. Examples are La Rose and Strawn soils.

Loess is deposited directly by the wind. It consists of very uniform, calcareous, silt-sized particles. In McLean County, the major sources of this loess were the Illinois River Valley and many smaller stream valleys. The loess was initially deposited as sediment in rivers swollen with glacial meltwaters. As the rivers dried up, these materials were exposed. The predominantly westerly winds picked up the loess and transported it many miles. The loess covered the glacial till with a layer of variable thickness. Some soils in the county formed entirely in loess. In areas where the deposits were thinner, the soils formed in loess and in the underlying glacial till. Tama, Ipava, Rozetta, and Keomah soils formed entirely in loess. Saybrook, Russell, Catlin, and Birkbeck soils formed in loess and in the underlying glacial till.

Outwash materials, including sand and gravel, are deposited by running water, either from melting glaciers or from streams. These deposits can occur in front of the margins of glacial moraines and in more concentrated areas in stream channels of the major river valleys. The size of the particles that make up outwash material varies, depending on the speed of the

stream that carried them. The coarser particles were deposited first, and the finer particles were carried a greater distance by water that moved more slowly. Soils that formed in loess and in the underlying medium textured outwash deposits are Proctor, Brenton, Elburn, Plano, St. Charles, and Camden soils. These outwash deposits generally consist of layers of sandy loam, loam, and silt loam. In some areas, the deposits are coarser and gravel and coarse sand are more dominant. Examples of soils that formed in these outwash materials are Fox, Warsaw, and Lorenzo soils.

The outwash in McLean County is generally calcareous and varies greatly in its ability to hold water and nutrients available for plants. Some of the coarser deposits of outwash along the major streams serve as good sources for commercial sand and gravel.

Alluvial sediments are materials deposited largely during periods of flooding. This material is generally silty in texture because its source area is the loess-covered glacial till uplands. Alluvial areas occur along major streams throughout the county and also extend back into some upland drainageways. Occasional flooding is still likely in most of these areas. Examples of alluvial soils are Lawson, Huntsville, and Sawmill soils. Orion and Radford soils are common in areas where recent flooding has buried darker soil horizons.

Climate

Climate is important in the formation of soils. The survey area has a temperate, humid, continental climate that is essentially uniform throughout the county. Climate differences are too small to have caused any obvious differences in the soils, except perhaps where the effect of climate is modified locally by runoff. Soils in adjacent areas might receive the same amount of rainfall, but runoff is more rapid in the more sloping areas than in level or nearly level areas. Thus, less moisture is allowed to penetrate the soil in the more sloping areas. In addition, the soil in the more level areas receives additional moisture in the form of runoff from the adjacent sloping areas.

Climate affects soil formation through its effects on weathering, plant and animal life, and erosion. Water from rains and melting snow seeps slowly downward through the soil and causes physical and chemical changes. As the water moves through the profile, clay is transported from the surface layer to the subsoil, where it accumulates. Ipava soils are examples of soils in which this process has taken place. The water also dissolves minerals and moves them downward through the soil. This leaching process has removed calcium carbonate (free lime) from the upper layers of most of the soils in McLean County. Soil temperature is also a factor. If the soil is frozen, rainfall runs off the soil and thus does not facilitate soil formation.

Climate also influences the kind and extent of plant and animal life. The climate in McLean County has favored tall grass prairie and deciduous hardwood forests. It has also favored animal life, which decomposes dead plants and animals and incorporates them into the soil. Many of the processes of soil formation are halted or proceed at a slower rate when the soil is frozen.

Heavy, untimely rains are harmful and destructive when they fall on soils that are exposed by farming activities. Early spring rains can cause extensive erosion if the soil is partially frozen, because the infiltration of water is restricted during these periods.

Plant and Animal Life

Soils are greatly affected by the type of vegetation under which they formed. The chief contribution of the vegetation and biological processes is the addition of organic matter and nitrogen to the soil. The kind of organic material in the soil depends primarily on the kind of plants that grew on the soil. The remains of these plants accumulate in or on the surface, decay, and eventually become soil organic matter, or humus. Roots of the plants provide channels for downward movement of water through the soil and also add organic matter as they decay.

The native vegetation in McLean County consisted mainly of tall prairie grass and deciduous hardwood trees. At the time of early settlement, most of the area supported prairie vegetation. These grasses have many fine, fibrous roots that add large amounts of organic matter to the soil as they die and decay, especially where they are concentrated near the surface. Soils that formed under prairie vegetation, therefore, have a thick, black or dark brown surface layer. In McLean County, prairie soils are generally on the broad upland divides between streams. The thickness of the surface layer varies greatly, depending on landscape position. Soils that formed on ridgetops and shoulders, such as Saybrook, Catlin, Dana, and Tama soils, have a thinner dark surface layer than those in nearly level areas, such as Ipava, Flanagan, Muscatine, Raub, and Lisbon soils. Some soils in depressions have a black surface layer more than 24 inches thick. Peotone soils are examples.

About 6 percent of the county supported timber vegetation at the time of early settlement. The deciduous hardwood forests contributed organic matter to the soil mainly in the form of leaf litter. The root systems of these trees are less fibrous than grasses, and the trees were generally not so densely concentrated near the surface. Therefore, the soils that

formed under trees have a thinner, lighter colored surface layer and subsurface layer than the soils that formed under grasses. The subsurface layer in the soils that formed under forest vegetation is a result of intense leaching of nutrients and clay from the surface layer to lower parts of the profile. This process creates a grayish or whitish layer that can form a crust when dry. The crust can impede the downward movement of water. This light colored subsurface layer and the lower content of organic matter in the surface layer result in the characteristic white appearance of the soils that formed in wooded areas. In general, these soils are on narrow upland divides between streams or on the side slopes bordering streams. Keomah, Rozetta, Mayville, Birkbeck, and Sabina soils formed under timber vegetation.

About 4 percent of the county supported mixed prairie and timber vegetation. Soils on flood plains formed under a mixture of trees and grasses, especially in the larger valleys. Most of these soils are dark because of a high content of organic matter, but the dark colors are related more to the color of the sediments deposited than to the native vegetation. Lawson, Huntsville, and Sawmill soils are examples of soils that formed on flood plains.

Micro-organisms, earthworms, insects, and large burrowing animals that live in or on the soil have also affected soil formation. Bacteria and fungi help to break down and decompose dead plants and animals and change them into humus. Burrowing animals, such as earthworms, crayfish, cicadas, and ground squirrels, help to incorporate the humus into the soil. Humus is very important to the formation of soil structure. It also affects the tilth of the soil. In McLean County, evidence of the burrowing activities of these insects and animals is most noticeable in the wet soils, such as Peotone, Sable, Drummer, Hartsburg, and Harpster soils. In some areas of these soils, "chimneys" of soil material have been constructed on the surface as the tunnels were formed.

Relief

Relief, or local changes in elevation, has had a marked influence on the soils of McLean County through its effect on runoff, water infiltration, erosion, and natural soil drainage. In McLean County, slopes range from 0 to 50 percent. The landscape is changing slowly but constantly. Initially, many of the landforms and features could be attributed directly to their mode of deposition—that is, the glaciers or the glacial meltwater. Once the glaciers began to recede, however, the landscape changed because of water moving across the slopes, wind depositing a blanket of loess on the slopes, and erosion removing soil material. These changes are still taking place today.

To a large extent, relief determines how much water infiltrates into a soil or how much runs off a soil. Runoff is greatest and the rate of water infiltration is lowest on the steeper slopes. These areas, therefore, have less water available to run through the soil profile. In some areas of Strawn soils, for example, soil development extends to a depth of no more than 20 inches. In the lower areas, water is temporarily ponded because of runoff from adjacent slopes. This ponding and the accompanying seasonal high water table can inhibit the removal of weathering products. Peotone soils are examples of soils that formed in low areas. The content of clay in the surface layer of these soils is typically the same as that in the subsoil, indicating that very little leaching has taken place.

Relief also affects the natural drainage of the soil or the depth to the seasonal high water table. Soil drainage in turn, through its effect on aeration of the soil, determines the color of the subsoil. The poorly drained Peotone soils are in depressions. The water table is close to the surface most of the year. The soil pores contain much water, which restricts the circulation of air in the soil. In this setting, naturally occurring iron and manganese compounds are reduced. This reduction results in a subsoil that is dull gray and mottled. In the more sloping, well drained Proctor soils, the water table is lower and much of the rainfall runs off instead of infiltrating into the soil. In this setting, the soil pores contain less water and much more air. The iron and manganese compounds are well oxidized, giving the subsoil a brown, brightly colored appearance.

Local relief also directly determines the intensity of erosion. Some erosion occurs on all sloping soils, but the hazard of erosion increases as slope and runoff increase. Soils subject to increased rates of erosion generally are relatively thin because erosion is removing the weathered, new soil material at nearly the same rate as it is being formed. The steep Miami and Strawn soils are examples.

Time

To a great extent, time determines the degree of profile development in a soil. The influence of time, however, can be modified by erosion, deposition of material, and local relief.

In most of the soils in McLean County, sufficient time has passed for the removal of calcium carbonate from the upper horizons. This process is necessary for removal of other weathering products and for more complete weathering to proceed.

The difference in length of time that the parent

materials have been in place is also reflected in the degree of development of the soil profile. Lawson soils show weak profile development because they are on flood plains that frequently receive alluvial sediments. Birkbeck soils show more evidence of horizonation because the loess and till parent materials have been in place a much longer time.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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 clay.

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

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

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.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

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.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles 2 millimeters to 38 centimeters (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.

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.

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.

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 drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

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.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock 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 35 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.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

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.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon or horizons having high base saturation and pedogenic soil structure. May include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

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).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

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.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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 movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

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:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

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.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

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.

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.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

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 grain* (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.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

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.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

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.

Underlying material. See Substratum.

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.

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.

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 1961-90 at Chenoa, Illinois)

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-----	31.1	13.7	22.4	58	-18	0	1.51	0.57	2.29	3	7.4
February----	35.9	18.1	27.0	62	-11	1	1.32	.64	1.91	3	6.0
March-------	48.7	29.4	39.1	79	4	30	2.88	1.58	4.03	6	3.1
April-------	62.9	39.7	51.3	86	19	136	3.68	1.79	5.31	7	1.1
May---------	74.2	49.7	62.0	92	29	373	3.49	1.98	4.82	7	.0
June--------	83.6	59.3	71.5	97	42	626	3.82	1.66	5.67	6	.0
July--------	85.8	62.9	74.4	98	47	726	3.60	2.08	4.95	6	.0
August------	83.5	60.4	72.0	96	43	663	3.27	1.63	4.69	5	.0
September---	77.7	53.5	65.6	92	32	458	3.67	1.36	5.60	6	.0
October-----	65.6	42.4	54.0	86	19	183	2.44	1.13	3.72	5	.1
November----	50.3	32.0	41.1	74	9	35	2.55	1.36	3.60	5	1.6
December----	35.6	20.0	27.8	63	-11	4	2.62	1.09	3.91	5	5.8
Yearly:											
Average---	61.3	40.1	50.7	---	---	---	---	---	---	---	---
Extreme---	---	---	---	99	-18	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,235	34.83	26.88	40.77	64	25.2

* 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 1961-90 at Chenoa, Illinois)

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. 22	May 3	May 15
2 years in 10 later than--	Apr. 16	Apr. 26	May 9
5 years in 10 later than--	Apr. 5	Apr. 15	Apr. 27
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 12	Oct. 3	Sept. 22
2 years in 10 earlier than--	Oct. 18	Oct. 9	Sept. 28
5 years in 10 earlier than--	Oct. 29	Oct. 21	Oct. 9

TABLE 3.--GROWING SEASON

(Recorded in the period 1961-90 at Chenoa, Illinois)

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	183	166	146
8 years in 10	191	174	153
5 years in 10	207	189	166
2 years in 10	223	204	179
1 year in 10	232	211	186

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
17	Keomah silt loam	2,174	0.3
27B2	Miami loam, 2 to 5 percent slopes, eroded	2,192	0.3
27C2	Miami loam, 5 to 10 percent slopes, eroded	1,187	0.2
27D2	Miami loam, 10 to 15 percent slopes, eroded	1,365	0.2
27E2	Miami silt loam, 15 to 30 percent slopes, eroded	506	0.1
36A	Tama silt loam, 0 to 2 percent slopes	4,558	0.6
36B	Tama silt loam, 2 to 5 percent slopes	25,487	3.4
36B2	Tama silt loam, 2 to 5 percent slopes, eroded	18,889	2.5
41	Muscatine silt loam	6,265	0.8
43	Ipava silt loam	78,466	10.3
56B2	Dana silt loam, 2 to 5 percent slopes, eroded	4,131	0.5
56C2	Dana silt loam, 5 to 10 percent slopes, eroded	2,791	0.4
59	Lisbon silt loam	13,847	1.8
60B2	La Rose silt loam, 2 to 5 percent slopes, eroded	2,944	0.4
60C2	La Rose silt loam, 5 to 10 percent slopes, eroded	4,375	0.6
60C3	La Rose loam, 5 to 10 percent slopes, severely eroded	737	0.1
60D2	La Rose silt loam, 10 to 15 percent slopes, eroded	563	0.1
61	Atterberry silt loam	907	0.1
67	Harpster silty clay loam	5,332	0.7
68	Sable silty clay loam	96,531	12.7
91B2	Swygert silty clay loam, 2 to 4 percent slopes, eroded	165	*
125	Selma loam	1,964	0.3
134B2	Camden silt loam, 2 to 5 percent slopes, eroded	1,014	0.1
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	601	0.1
145B2	Saybrook silt loam, 2 to 5 percent slopes, eroded	44,057	5.8
145C2	Saybrook silt loam, 5 to 10 percent slopes, eroded	5,224	0.7
148A	Proctor silt loam, 0 to 2 percent slopes	1,294	0.2
148B2	Proctor silt loam, 2 to 5 percent slopes, eroded	5,605	0.7
148C2	Proctor silt loam, 5 to 10 percent slopes, eroded	693	0.1
149	Brenton silt loam	4,153	0.5
152	Drummer silty clay loam	73,495	9.7
154	Flanagan silt loam	20,890	2.7
171B	Catlin silt loam, 1 to 4 percent slopes	17,713	2.3
171B2	Catlin silt loam, 2 to 5 percent slopes, eroded	49,245	6.5
171C2	Catlin silt loam, 5 to 10 percent slopes, eroded	3,818	0.5
193B2	Mayville silt loam, 2 to 5 percent slopes, eroded	5,988	0.8
193C2	Mayville silt loam, 5 to 10 percent slopes, eroded	4,513	0.6
193D2	Mayville silt loam, 10 to 15 percent slopes, eroded	511	0.1
198	Elburn silt loam	5,800	0.8
199A	Plano silt loam, 0 to 2 percent slopes	2,503	0.3
199B	Plano silt loam, 2 to 5 percent slopes	5,307	0.7
213	Normal silt loam	3,087	0.4
221B2	Parr silt loam, 2 to 5 percent slopes, eroded	19,769	2.6
221C2	Parr silt loam, 5 to 10 percent slopes, eroded	5,636	0.7
223B2	Varna silt loam, 2 to 5 percent slopes, eroded	14,742	1.9
223C2	Varna silt loam, 5 to 10 percent slopes, eroded	413	0.1
224C2	Strawn loam, 5 to 10 percent slopes, eroded	4,598	0.6
224C3	Strawn clay loam, 5 to 10 percent slopes, severely eroded	347	*
224D2	Strawn silt loam, 10 to 15 percent slopes, eroded	2,384	0.3
224D3	Strawn clay loam, 10 to 15 percent slopes, severely eroded	255	*
224E2	Strawn silt loam, 15 to 30 percent slopes, eroded	2,120	0.3
224G	Strawn loam, 30 to 50 percent slopes	1,239	0.2
232	Ashkum silty clay loam	24,266	3.2
233B	Birkbeck silt loam, 1 to 4 percent slopes	3,658	0.5
233B2	Birkbeck silt loam, 2 to 5 percent slopes, eroded	7,120	0.9
233C2	Birkbeck silt loam, 5 to 10 percent slopes, eroded	1,400	0.2
236	Sabina silt loam	1,780	0.2
243A	St. Charles silt loam, 0 to 2 percent slopes	291	*
243B	St. Charles silt loam, 2 to 5 percent slopes	460	0.1
244	Hartsburg silty clay loam	2,585	0.3
272	Edgington silt loam	1,567	0.2
279B2	Rozetta silt loam, 2 to 5 percent slopes, eroded	3,393	0.4

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
290A	Warsaw silt loam, 0 to 2 percent slopes	336	*
290B2	Warsaw silt loam, 2 to 5 percent slopes, eroded	1,393	0.2
290C2	Warsaw silt loam, 5 to 10 percent slopes, eroded	471	0.1
293	Andres silt loam	1,170	0.2
294B	Symerton silt loam, 2 to 5 percent slopes	1,277	0.2
318B2	Lorenzo silt loam, 2 to 5 percent slopes, eroded	264	*
322B2	Russell silt loam, 2 to 5 percent slopes, eroded	1,735	0.2
322C2	Russell silt loam, 5 to 10 percent slopes, eroded	1,860	0.2
327B2	Fox silt loam, 2 to 5 percent slopes, eroded	432	0.1
327C2	Fox silt loam, 5 to 10 percent slopes, eroded	188	*
330	Peotone silty clay loam	6,730	0.9
440B2	Jasper loam, 2 to 5 percent slopes, eroded	537	0.1
440C2	Jasper loam, 5 to 10 percent slopes, eroded	196	*
481	Raub silt loam	9,705	1.3
484	Harco silt loam	3,822	0.5
496	Fincastle silt loam	372	*
533	Urban land	2,692	0.4
541B2	Graymont silt loam, 2 to 5 percent slopes, eroded	7,578	1.0
567A	Elkhart silt loam, 0 to 2 percent slopes	621	0.1
567B	Elkhart silt loam, 2 to 4 percent slopes	1,744	0.2
567B2	Elkhart silt loam, 2 to 5 percent slopes, eroded	4,737	0.6
570D2	Martinsville silt loam, 8 to 18 percent slopes, eroded	282	*
614B	Chenoa silt loam, 1 to 3 percent slopes	31,464	4.1
740	Darroch loam	387	0.1
801	Orthents, silty	147	*
802	Orthents, loamy	2,140	0.3
865	Pits, gravel	932	0.1
2221C	Parr-Urban land complex, 5 to 10 percent slopes	306	*
2892A	Sawmill-Lawson-Urban land complex, 0 to 2 percent slopes	307	*
2893B	Catlin-Saybrook-Urban land complex, 1 to 5 percent slopes	5,127	0.7
2902A	Ipava-Sable-Urban land complex, 0 to 2 percent slopes	2,250	0.3
8073	Ross loam, occasionally flooded	688	0.1
8074	Radford silt loam, occasionally flooded	11,406	1.5
8077	Huntsville silt loam, occasionally flooded	144	*
8107	Sawmill silty clay loam, occasionally flooded	16,321	2.1
8415	Orion silt loam, occasionally flooded	629	0.1
8451	Lawson silt loam, occasionally flooded	8,096	1.1
	Water	2,399	0.3
	Total	759,795	100.0

* Less than 0.05 percent. The combined extent of the soils assigned an asterisk in the "Percent" column is about 0.2 percent of the survey area.

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
17	Keomah silt loam (where drained)
27B2	Miami loam, 2 to 5 percent slopes, eroded
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes
36B2	Tama silt loam, 2 to 5 percent slopes, eroded
41	Muscatine silt loam
43	Ipava silt loam
56B2	Dana silt loam, 2 to 5 percent slopes, eroded
59	Lisbon silt loam
60B2	La Rose silt loam, 2 to 5 percent slopes, eroded
61	Atterberry silt loam (where drained)
67	Harpster silty clay loam (where drained)
68	Sable silty clay loam (where drained)
91B2	Swygert silty clay loam, 2 to 4 percent slopes, eroded
125	Selma loam (where drained)
134B2	Camden silt loam, 2 to 5 percent slopes, eroded
145B2	Saybrook silt loam, 2 to 5 percent slopes, eroded
148A	Proctor silt loam, 0 to 2 percent slopes
148B2	Proctor silt loam, 2 to 5 percent slopes, eroded
149	Brenton silt loam
152	Drummer silty clay loam (where drained)
154	Flanagan silt loam
171B	Catlin silt loam, 1 to 4 percent slopes
171B2	Catlin silt loam, 2 to 5 percent slopes, eroded
193B2	Mayville silt loam, 2 to 5 percent slopes, eroded
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
213	Normal silt loam (where drained)
221B2	Parr silt loam, 2 to 5 percent slopes, eroded
223B2	Varna silt loam, 2 to 5 percent slopes, eroded
232	Ashkum silty clay loam (where drained)
233B	Birkbeck silt loam, 1 to 4 percent slopes
233B2	Birkbeck silt loam, 2 to 5 percent slopes, eroded
236	Sabina silt loam (where drained)
243A	St. Charles silt loam, 0 to 2 percent slopes
243B	St. Charles silt loam, 2 to 5 percent slopes
244	Hartsburg silty clay loam (where drained)
272	Edgington silt loam (where drained)
279B2	Rozetta silt loam, 2 to 5 percent slopes, eroded
290A	Warsaw silt loam, 0 to 2 percent slopes
290B2	Warsaw silt loam, 2 to 5 percent slopes, eroded
293	Andres silt loam
294B	Symerton silt loam, 2 to 5 percent slopes
318B2	Lorenzo silt loam, 2 to 5 percent slopes, eroded
322B2	Russell silt loam, 2 to 5 percent slopes, eroded
327B2	Fox silt loam, 2 to 5 percent slopes, eroded
330	Peotone silty clay loam (where drained)
440B2	Jasper loam, 2 to 5 percent slopes, eroded
481	Raub silt loam
484	Harco silt loam
496	Fincastle silt loam
541B2	Graymont silt loam, 2 to 5 percent slopes, eroded
567A	Elkhart silt loam, 0 to 2 percent slopes
567B	Elkhart silt loam, 2 to 4 percent slopes
567B2	Elkhart silt loam, 2 to 5 percent slopes, eroded
614B	Chenoa silt loam, 2 to 4 percent slopes
740	Darroch loam (where drained)
8073	Ross loam, occasionally flooded

TABLE 5.--PRIME FARMLAND--Continued

Map symbol	Soil name
8074	Radford silt loam, occasionally flooded
8077	Huntsville silt loam, occasionally flooded
8107	Sawmill silty clay loam, occasionally flooded (where drained)
8415	Orion silt loam, occasionally flooded (where drained)
8451	Lawson silt loam, occasionally flooded (where drained)

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	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
17--- Keomah	IIw	131	44	---	72	---	8.8
27B2--- Miami	IIe	105	37	47	---	3.4	---
27C2--- Miami	IIIe	95	33	43	---	3.1	---
27D2--- Miami	IVe	80	28	36	---	2.6	---
27E2--- Miami	VIe	---	---	---	---	---	---
36A--- Tama	I	155	46	62	89	---	9.8
36B--- Tama	IIe	153	46	61	88	---	9.7
36B2--- Tama	IIe	150	45	60	86	---	8.5
41--- Muscatine	I	170	57	---	102	---	11.4
43--- Ipava	I	163	52	66	91	---	---
56B2--- Dana	IIe	125	44	56	---	---	---
56C2--- Dana	IIIe	115	40	52	---	---	---
59--- Lisbon	I	155	51	63	92	5.9	9.8
60B2--- La Rose	IIe	118	39	50	71	4.6	7.7
60C2--- La Rose	IIIe	116	39	49	70	4.5	7.5
60C3--- La Rose	IVe	107	---	45	64	4.2	7.0
60D2--- La Rose	IIIe	111	37	47	67	4.3	7.2
61--- Atterberry	I	149	44	60	85	5.6	---
67--- Harpster	IIw	136	44	52	74	---	---

See footnote 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	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
68--Sable	IIw	156	51	61	85	---	---
91B2--Swygert	IIe	107	37	48	69	4.2	7.1
125--Selma	IIw	136	44	53	76	---	---
134B2--Camden	IIe	120	37	53	69	4.8	8.0
134C2--Camden	IIIe	117	37	52	68	4.7	7.8
145B2--Saybrook	IIe	133	44	58	81	5.4	8.9
145C2--Saybrook	IIIe	131	43	56	79	5.3	8.7
148A--Proctor	I	144	44	59	88	5.5	9.2
148B2--Proctor	IIe	138	42	57	84	5.3	8.8
148C2--Proctor	IIIe	135	41	55	83	5.2	8.6
149--Brenton	I	160	47	62	91	---	9.8
152--Drummer	IIw	154	51	61	83	---	9.2
154--Flanagan	I	162	52	67	92	6.1	10.2
171B--Catlin	IIe	149	46	60	86	5.7	9.6
171B2--Catlin	IIe	144	44	59	84	5.6	9.3
171C2--Catlin	IIIe	141	43	57	82	5.5	9.1
193B2--Mayville	IIe	130	43	---	80	---	---
193C2--Mayville	IIIe	125	41	---	75	---	---
193D2--Mayville	IVe	120	39	---	70	---	---
198--Elburn	I	161	50	63	94	6.1	10.2

See footnote 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	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
199A---------- Plano	I	151	45	60	90	---	9.7
199B---------- Plano	IIe	150	45	59	89	---	9.6
213---------- Normal	I	149	44	60	85	5.6	---
221B2---------- Parr	IIe	115	40	52	---	3.8	---
221C2---------- Parr	IIIe	105	37	47	---	3.4	---
223B2---------- Varna	IIe	120	40	51	72	4.7	7.8
223C2---------- Varna	IIIe	110	39	50	71	4.5	7.5
224C2---------- Strawn	IIIe	102	30	40	55	3.8	6.3
224C3---------- Strawn	IVe	95	28	37	51	3.5	5.8
224D2---------- Strawn	IIIe	98	29	39	53	3.6	6.0
224D3---------- Strawn	IVe	90	---	36	49	3.3	5.6
224E2---------- Strawn	VIe	---	---	---	---	2.9	4.8
224G---------- Strawn	VIIe	---	---	---	---	---	---
232---------- Ashkum	IIw	130	47	54	79	5.0	8.3
233B---------- Birkbeck	IIe	122	41	54	69	4.9	8.2
233B2---------- Birkbeck	IIe	118	39	53	67	4.8	8.0
233C2---------- Birkbeck	IIIe	116	38	52	66	4.7	7.8
236---------- Sabina	IIw	133	42	56	75	5.2	8.7
243A---------- St. Charles	I	127	40	56	73	---	8.2
243B---------- St. Charles	IIe	126	40	55	72	---	8.1

See footnote 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	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
244---------- Hartsburg	IIw	145	47	56	79	---	---
272---------- Edgington	IIw	122	42	51	68	---	---
279B2---------- Rozetta	IIe	131	40	54	73	5.2	8.7
290A---------- Warsaw	IIs	100	35	50	---	3.3	---
290B2---------- Warsaw	IIe	95	33	48	---	3.1	---
290C2---------- Warsaw	IIIe	85	30	42	---	2.8	---
293---------- Andres	I	135	45	61	88	5.5	9.1
294B---------- Symerton	IIe	135	44	58	82	5.3	8.9
318B2---------- Lorenzo	IIIs	88	29	42	59	3.5	5.8
322B2---------- Russell	IIe	115	40	46	---	3.8	---
322C2---------- Russell	IIIe	110	38	44	---	3.6	---
327B2---------- Fox	IIe	100	33	40	65	---	---
327C2---------- Fox	IIIe	95	31	38	60	---	---
330---------- Peotone	IIw	123	42	43	58	---	---
440B2---------- Jasper	IIe	125	44	50	---	---	---
440C2---------- Jasper	IIIe	115	40	46	---	---	---
481---------- Raub	IIw	140	49	56	---	4.6	---
484---------- Harco	I	154	47	62	87	5.6	9.3
496---------- Fincastle	IIw	130	46	52	---	---	---
533. Urban land							

See footnote 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	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
541B2---------- Graymont	IIe	125	41	55	76	5.1	8.4
567A---------- Elkhart	I	132	39	53	73	5.1	8.4
567B---------- Elkhart	IIe	131	39	52	72	5.0	8.4
567B2---------- Elkhart	IIe	129	38	51	71	5.0	8.3
570D2---------- Martinsville	IVe	90	32	36	---	3.0	---
614B---------- Chenoa	IIe	134	44	60	84	---	9.2
740---------- Darroch	IIw	140	50	56	---	4.6	---
801, 802. Orthents							
865. Pits							
2221C. Parr-Urban land							
2892A. Sawmill-Lawson-Urban land							
2893B. Catlin-Saybrook-Urban land							
2902A. Ipava-Sable-Urban land							
8073---------- Ross	IIw	130	44	50	---	---	---
8074---------- Radford	IIw	114	37	49	67	---	7.4
8077---------- Huntsville	IIw	152	48	64	86	5.8	9.7
8107---------- Sawmill	IIIw	132	42	---	---	---	---
8415---------- Orion	IIw	125	41	---	75	---	---

See footnote 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	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
8451---------- Lawson	IIw	130	43	---	80	---	---

* 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.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
17--- Keomah	3A	Slight	Slight	Slight	Slight	White oak Northern red oak	65 70	3 4	Eastern white pine, white oak, red pine, northern red oak, black walnut, sugar maple.
27B2, 27C2, 27D2--- Miami	5A	Slight	Slight	Slight	Slight	White oak Yellow-poplar Sweetgum	90 98 76	5 7 5	Yellow-poplar, eastern white pine, red pine, white ash, black walnut.
27E2--- Miami	5R	Moderate	Moderate	Slight	Slight	White oak Yellow-poplar Sweetgum	90 98 76	5 7 5	Yellow-poplar, eastern white pine, red pine, white ash, black walnut.
61--- Atterberry	4A	Slight	Slight	Slight	Slight	White oak Northern red oak Green ash Bur oak	70 70 --- ---	4 4 --- ---	Eastern white pine, red pine, Scotch pine, eastern redcedar.
134B2, 134C2--- Camden	7A	Slight	Slight	Slight	Slight	Yellow-poplar White oak Northern red oak Sweetgum Green ash	95 85 85 80 76	7 5 5 6 5	Yellow-poplar, white oak, green ash, black walnut, eastern white pine, red pine, black locust, white ash.
193B2, 193C2, 193D2--- Mayville	4A	Slight	Slight	Slight	Slight	Northern red oak White ash American basswood White oak Silver maple Bitternut hickory Sugar maple	65 --- --- --- --- --- ---	4 --- --- --- --- --- ---	Norway spruce, eastern white pine, white spruce.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
224C2, 224C3, 224D2, 224D3---Strawn	4A	Slight	Slight	Slight	Slight	White oak Northern red oak Yellow-poplar Black walnut	80 80 90 ---	4 4 6 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
224E2---Strawn	4R	Moderate	Moderate	Moderate	Slight	White oak Northern red oak Yellow-poplar Black walnut	80 80 90 ---	4 4 6 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
224G---Strawn	4R	Severe	Severe	Moderate	Slight	White oak Northern red oak Yellow-poplar Black walnut	80 80 90 ---	4 4 6 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
233B, 233B2, 233C2---Birkbeck	5A	Slight	Slight	Slight	Slight	White oak Northern red oak Green ash	86 --- ---	5 --- ---	White oak, northern red oak, green ash, black walnut, eastern white pine, red pine, Scotch pine.
236---Sabina	4A	Slight	Slight	Slight	Slight	White oak Northern red oak Black walnut	80 80 ---	4 4 ---	White oak, northern red oak, black walnut, eastern cottonwood, American sycamore, sugar maple, Scotch pine, eastern white pine.
243A, 243B---St. Charles	7A	Slight	Slight	Slight	Slight	Yellow-poplar White oak Northern red oak Sweetgum Green ash	95 85 85 --- ---	7 5 5 --- ---	White oak, black walnut, sugar maple, eastern white pine, red pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
279B2---------- Rozetta	4A	Slight	Slight	Slight	Slight	White oak----------	80	4	Eastern white pine, northern red oak, green ash, Scotch pine, yellow-poplar.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
322B2, 322C2---- Russell	5A	Slight	Slight	Slight	Slight	White oak----------	90	5	Eastern white pine, white ash, yellow-poplar, black walnut, white oak, northern red oak, green ash, black cherry.
						Northern red oak----	90	5	
						Yellow-poplar-------	96	7	
						Sweetgum-----------	76	5	
327B2, 327C2---- Fox	4A	Slight	Slight	Slight	Slight	Northern red oak----	80	4	Yellow-poplar, white ash, eastern white pine, red pine, black locust.
						White oak----------	---	---	
						Sugar maple---------	---	---	
496---------- Fincastle	4A	Slight	Slight	Slight	Slight	Northern red oak----	75	4	Eastern white pine, baldcypress, white ash, red maple, yellow-poplar, American sycamore.
						White oak----------	75	4	
						Pin oak-------------	85	5	
						Yellow-poplar-------	85	6	
						Sweetgum-----------	80	6	
570D2---------- Martinsville	4A	Slight	Slight	Slight	Slight	White oak----------	80	4	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
						Yellow-poplar-------	98	7	
						Sweetgum-----------	76	5	
8073---------- Ross	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	5	Eastern white pine, black walnut, white ash, Norway spruce, yellow-poplar.
						Yellow-poplar-------	96	7	
						Sugar maple---------	85	4	
						White oak----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash----------	---	---	
8077---------- Huntsville	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	98	7	Eastern cottonwood, American sycamore, green ash, black walnut, red maple, sugar maple, hackberry.
						Eastern cottonwood--	110	11	
						American sycamore---	---	---	
						Cherrybark oak------	---	---	
						Sweetgum-----------	---	---	
						Green ash----------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
8107---------- Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak----------	90	5	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum----------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
8415---------- Orion	2W	Slight	Moderate	Slight	Slight	Silver maple--------	80	2	White spruce, silver maple, white ash, eastern cottonwood.
						Red maple----------	---	---	
						White ash----------	---	---	
8451---------- Lawson	2A	Slight	Slight	Slight	Slight	Silver maple--------	70	2	White spruce, silver maple, white ash.
						White ash----------	---	---	
						Red maple----------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--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--			
	8-15	16-25	26-35	>35
17---------- Keomah	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
27B2, 27C2, 27D2, 27E2---------- Miami	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36A, 36B, 36B2---- Tama	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
41---------- Muscatine	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.
43---------- Ipava	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.
56B2, 56C2-------- Dana	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.
59---------- Lisbon	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.
60B2, 60C2, 60C3, 60D2---------- La Rose	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
61---------- Atterberry	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.
67---------- Harpster	Nannyberry viburnum, Washington hawthorn.	White spruce, northern whitecedar, eastern redcedar, green ash, Osage-orange.	Black willow----------	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
68---------- Sable	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.
91B2---------- Swygert	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak----------	---
125---------- Selma	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.
134B2, 134C2------ Camden	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
145B2, 145C2------ Saybrook	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
148A, 148B2, 148C2---------- Proctor	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
149---------- Brenton	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
152---------- Drummer	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine----	Pin oak.
154---------- Flanagan	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
171B, 171B2, 171C2---------- Catlin	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
193B2, 193C2, 193D2---------- Mayville	Gray dogwood, lilac, Siberian peashrub, redosier dogwood.	Amur maple, blue spruce, northern whitecedar, hackberry, eastern redcedar, Russian-olive.	Eastern white pine, green ash.	---
198---------- Elburn	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, northern whitecedar, Washington hawthorn, blue spruce.	Norway spruce---------	Eastern white pine, pin oak.
199A, 199B-------- Plano	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
221B2, 221C2------ Parr	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.
223B2, 223C2------ Varna	Eastern redcedar, Washington hawthorn, Amur honeysuckle, Amur privet, arrowwood, silky dogwood, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
224C2, 224C3, 224D2, 224D3----- Strawn	Amur privet, silky dogwood, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
232---------- Ashkum	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
233B, 233B2, 233C2---------- Birkbeck	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
236---------- Sabina	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Pin oak, eastern white pine.
243A, 243B-------- St. Charles	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
244---------- Hartsburg	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.
272---------- Edgington	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, Norway spruce, northern whitecedar, blue spruce, Washington hawthorn.	Eastern white pine----	Pin oak.
279B2---------- Rozetta	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
290A, 290B2, 290C2---------- Warsaw	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
293---------- Andres	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce----------	Eastern white pine, pin oak.
294B---------- Symerton	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, white fir, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
318B2---------- Lorenzo	Lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, eastern redcedar, radiant crabapple.	Eastern white pine, jack pine, red pine, Austrian pine.	---	---
322B2, 322C2------ Russell	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.
327B2, 327C2------ Fox	Autumn-olive, Amur honeysuckle, eastern redcedar, radiant crabapple, Washington hawthorn, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
330---------- Peotone	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
440B2, 440C2---- Jasper	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
481---- Raub	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce----	Eastern white pine, pin oak.
484---- Harco	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce----	Pin oak, eastern white pine.
496---- Fincastle	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce----	Eastern white pine, pin oak.
541B2---- Graymont	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Pin oak, Norway spruce, Austrian pine.	Eastern white pine.
567A, 567B, 567B2- Elkhart	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
570D2---- Martinsville	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.
614B---- Chenoa	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	White fir, northern whitecedar, blue spruce, Austrian pine, Washington hawthorn.	Norway spruce----	Eastern white pine.
740---- Darroch	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.
8073---- Ross	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce----	Pin oak, eastern white pine.
8074---- Radford	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.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
8077-------------- Huntsville	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.
8107-------------- Sawmill	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
8415-------------- Orion	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.
8451-------------- Lawson	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.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17--- Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight---	Slight.
27B2--- Miami	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.	Slight.
27C2--- Miami	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
27D2--- Miami	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27E2--- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
36A--- Tama	Slight---	Slight---	Slight---	Slight---	Slight.
36B, 36B2--- Tama	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
41--- Muscatine	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight---	Slight.
43--- Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
56B2--- Dana	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
56C2--- Dana	Slight---	Slight---	Severe: slope.	Slight---	Slight.
59--- Lisbon	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
60B2--- La Rose	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
60C2, 60C3--- La Rose	Slight---	Slight---	Severe: slope.	Slight---	Slight.
60D2--- La Rose	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.
61--- Atterberry	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
67--- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68--- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
91B2--- Swygert	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty.
125--- Selma	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
134B2--- Camden	Slight---	Slight---	Moderate: slope.	Severe: erodes easily.	Slight.
134C2--- Camden	Slight---	Slight---	Severe: slope.	Severe: erodes easily.	Slight.
145B2--- Saybrook	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
145C2--- Saybrook	Slight---	Slight---	Severe: slope.	Slight---	Slight.
148A--- Proctor	Slight---	Slight---	Slight---	Slight---	Slight.
148B2--- Proctor	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
148C2--- Proctor	Slight---	Slight---	Severe: slope.	Slight---	Slight.
149--- Brenton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
152--- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
154--- Flanagan	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
171B, 171B2--- Catlin	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
171C2--- Catlin	Slight---	Slight---	Severe: slope.	Slight---	Slight.
193B2--- Mayville	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Severe: erodes easily.	Slight.
193C2--- Mayville	Moderate: wetness.	Moderate: wetness.	Severe: slope.	Severe: erodes easily.	Slight.
193D2--- Mayville	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
198--- Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
199A--- Plano	Slight---	Slight---	Slight---	Slight---	Slight.
199B--- Plano	Slight---	Slight---	Moderate: slope.	Slight---	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
213--- Normal	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
221B2--- Parr	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight---	Slight.
221C2--- Parr	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight---	Slight.
223B2--- Varna	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight---	Slight.
223C2--- Varna	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight---	Slight.
224C2--- Strawn	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
224C3--- Strawn	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight---	Slight.
224D2--- Strawn	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
224D3--- Strawn	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight---	Moderate: slope.
224E2--- Strawn	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
224G--- Strawn	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
232--- Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
233B, 233B2--- Birkbeck	Slight---	Slight---	Moderate: slope.	Severe: erodes easily.	Slight.
233C2--- Birkbeck	Slight---	Slight---	Severe: slope.	Severe: erodes easily.	Slight.
236--- Sabina	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
243A--- St. Charles	Slight---	Slight---	Slight---	Severe: erodes easily.	Slight.
243B--- St. Charles	Slight---	Slight---	Moderate: slope.	Severe: erodes easily.	Slight.
244--- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
272--- Edgington	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
279B2---------- Rozetta	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
290A---------- Warsaw	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Slight.
290B2---------- Warsaw	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
290C2---------- Warsaw	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
293---------- Andres	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
294B---------- Symerton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
318B2---------- Lorenzo	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
322B2---------- Russell	Slight----------	Slight----------	Moderate: slope.	Severe: erodes easily.	Slight.
322C2---------- Russell	Slight----------	Slight----------	Severe: slope.	Severe: erodes easily.	Slight.
327B2---------- Fox	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
327C2---------- Fox	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
330---------- Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
440B2---------- Jasper	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
440C2---------- Jasper	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
481---------- Raub	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
484---------- Harco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
496---------- Fincastle	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
533. Urban land					
541B2---------- Graymont	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
567A---------- Elkhart	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
567B, 567B2---------- Elkhart	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
570D2---------- Martinsville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
614B---------- Chenoa	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
740---------- Darroch	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
801, 802---------- Orthents	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight----------	Slight.
865. Pits					
2221C: Parr----------	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight----------	Slight.
Urban land.					
2892A: Sawmill----------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Lawson----------	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
2893B: Catlin----------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Saybrook----------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Urban land.					
2902A: Ipava----------	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Sable----------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Urban land.					
8073---------- Ross	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8074---------- Radford	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
8077---------- Huntsville	Severe: flooding.	Slight----------	Slight----------	Slight----------	Moderate: flooding.
8107---------- Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8415---------- Orion	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
8451---------- Lawson	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
17---------- Keomah	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair.
27B2---------- Miami	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
27C2---------- Miami	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
27D2, 27E2---------- Miami	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
36A, 36B, 36B2----- Tama	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
41---------- Muscatine	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
43---------- Ipava	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
56B2---------- Dana	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
56C2---------- Dana	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
59---------- Lisbon	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
60B2---------- La Rose	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
60C2, 60C3, 60D2--- La Rose	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
61---------- Atterberry	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
67---------- Harpster	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
68---------- Sable	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
91B2---------- Swygert	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
125---------- Selma	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
134B2---------- Camden	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
134C2---------- Camden	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
145B2---------- Saybrook	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
145C2---------- Saybrook	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
148A, 148B2, 148C2- Proctor	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
149---------- Brenton	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
152---------- Drummer	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
154---------- Flanagan	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
171B, 171B2-------- Catlin	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
171C2---------- Catlin	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
193B2---------- Mayville	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
193C2, 193D2------- Mayville	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
198---------- Elburn	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A, 199B--------- Plano	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
213---------- Normal	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
221B2---------- Parr	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
221C2---------- Parr	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
223B2---------- Varna	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
223C2---------- Varna	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
224C2, 224C3------- Strawn	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
224D2, 224D3------- Strawn	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
224E2---------- Strawn	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
224G---------- Strawn	Very poor.	Poor	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
232---------- Ashkum	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
233B, 233B2-------- Birkbeck	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
233C2---------- Birkbeck	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
236---------- Sabina	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
243A, 243B--------- St. Charles	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
244---------- Hartsburg	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
272---------- Edgington	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
279B2---------- Rozetta	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
290A, 290B2-------- Warsaw	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
290C2---------- Warsaw	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
293---------- Andres	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
294B---------- Symerton	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
318B2---------- Lorenzo	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
322B2---------- Russell	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
322C2---------- Russell	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
327B2---------- Fox	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
327C2---------- Fox	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
330---------- Peotone	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
440B2---------- Jasper	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
440C2---------- Jasper	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
481---------- Raub	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
484---------- Harco	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
496---------- Fincastle	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
533. Urban land									
541B2---------- Graymont	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
567A, 567B, 567B2-- Elkhart	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
570D2---------- Martinsville	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
614B---------- Chenoa	Good	Good	Good	Good	Fair	Fair	Good	Poor	Fair.
740---------- Darroch	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
801, 802. Orthents									
865. Pits									
2221C: Parr---------- Urban land.	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2892A: Sawmill---------- Lawson---------- Urban land.	Good Good	Good Good	Good Good	Fair Good	Good Fair	Fair Fair	Good Good	Fair Good	Fair. Fair.
2893B: Catlin---------- Saybrook---------- Urban land.	Good Good	Good Good	Good Good	Good Good	Poor Poor	Very poor. Very poor.	Good Good	Good Good	Very poor. Very poor.
2902A: Ipava---------- Sable---------- Urban land.	Good Fair	Good Good	Good Good	Good Fair	Fair Good	Fair Good	Good Good	Good Fair	Fair. Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
8073---------- Ross	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8074---------- Radford	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
8077---------- Huntsville	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
8107---------- Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
8415---------- Orion	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
8451---------- Lawson	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
17---------- Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Slight.
27B2---------- Miami	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
27C2---------- Miami	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
27D2---------- Miami	Moderate: dense layer, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
27E2---------- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
36A, 36B, 36B2---- Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
41---------- Muscatine	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
43---------- Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
56B2---------- Dana	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
56C2---------- Dana	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
59---------- Lisbon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
60B2---------- La Rose	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
60C2, 60C3-------- La Rose	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
60D2---------- La Rose	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, shrink-swell.	Moderate: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
61---------- Atterberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
67---------- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
68---------- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
91B2---------- Swygert	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness, droughty.
125---------- Selma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
134B2---------- Camden	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
134C2---------- Camden	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
145B2---------- Saybrook	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Severe: low strength, frost action.	Slight.
145C2---------- Saybrook	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Severe: low strength, frost action.	Slight.
148A, 148B2------- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
148C2---------- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
149---------- Brenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
152---------- Drummer	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
154---------- Flanagan	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
171B, 171B2---- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
171C2---- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
193B2---- Mayville	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
193C2---- Mayville	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
193D2---- Mayville	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
198---- Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
199A, 199B---- Plano	Slight----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
213---- Normal	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
221B2---- Parr	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
221C2---- Parr	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
223B2---- Varna	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
223C2---- Varna	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
224C2, 224C3---- Strawn	Slight----	Slight----	Slight----	Moderate: slope.	Moderate: low strength, frost action.	Slight.
224D2, 224D3---- Strawn	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
224E2, 224G---- Strawn	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
232---------- Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
233B, 233B2------- Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
233C2---------- Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
236---------- Sabina	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
243A, 243B-------- St. Charles	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
244---------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
272---------- Edgington	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
279B2---------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
290A, 290B2------- Warsaw	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
290C2---------- Warsaw	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
293---------- Andres	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
294B---------- Symerton	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
318B2---------- Lorenzo	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
322B2---------- Russell	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
322C2---------- Russell	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
327B2--- Fox	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.	Slight.
327C2--- Fox	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Slight.
330--- Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
440B2--- Jasper	Severe: cutbanks cave.	Slight---	Slight---	Slight---	Moderate: low strength, frost action.	Slight.
440C2--- Jasper	Severe: cutbanks cave.	Slight---	Slight---	Moderate: slope.	Moderate: low strength, frost action.	Slight.
481--- Raub	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
484--- Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
496--- Fincastle	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
533. Urban land						
541B2--- Graymont	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
567A, 567B, 567B2- Elkhart	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
570D2--- Martinsville	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
614B--- Chenoa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
740--- Darroch	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
801, 802--- Orthents	Slight---	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
865. Pits						

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2221C:						
Parr	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
Urban land.						
2892A:						
Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: frost action.	Moderate: wetness.
Urban land.						
2893B:						
Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
Saybrook	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: low strength, frost action.	Slight.
Urban land.						
2902A:						
Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Urban land.						
8073--- Ross	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
8074--- Radford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
8077--- Huntsville	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, frost action.	Moderate: flooding.
8107--- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8415---------- Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
8451---------- Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
17---------- Keomah	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
27B2---------- Miami	Severe: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
27C2---------- Miami	Severe: percs slowly.	Severe: slope.	Slight----------	Slight----------	Good.
27D2---------- Miami	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
27E2---------- Miami	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
36A---------- Tama	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
36B, 36B2---------- Tama	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
41---------- Muscatine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
43---------- Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
56B2---------- Dana	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight----------	Fair: too clayey, wetness.
56C2---------- Dana	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, too clayey.	Slight----------	Fair: too clayey, wetness.
59---------- Lisbon	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
60B2---------- La Rose	Severe: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
60C2, 60C3---------- La Rose	Severe: percs slowly.	Severe: slope.	Slight----------	Slight----------	Good.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
60D2---------- La Rose	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
61---------- Atterberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
67---------- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
68---------- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
91B2---------- Swygert	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
125---------- Selma	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
134B2---------- Camden	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: seepage.	Slight----------	Fair: too clayey.
134C2---------- Camden	Moderate: percs slowly.	Severe: slope.	Severe: seepage.	Slight----------	Fair: too clayey.
145B2---------- Saybrook	Severe: percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
145C2---------- Saybrook	Severe: percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
148A, 148B2--------- Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage, too sandy.	Slight----------	Poor: too sandy.
148C2---------- Proctor	Moderate: percs slowly.	Severe: seepage, slope.	Severe: seepage, too sandy.	Slight----------	Poor: too sandy.
149---------- Brenton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
152---------- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
154---------- Flanagan	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
171B, 171B2--------- Catlin	Severe: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
171C2---------- Catlin	Severe: wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
193B2---------- Mayville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: small stones, wetness.
193C2---------- Mayville	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: small stones, wetness.
193D2---------- Mayville	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: small stones, slope, wetness.
198---------- Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199A, 199B---------- Plano	Slight----------	Severe: seepage.	Severe: seepage.	Slight----------	Fair: too clayey.
213---------- Normal	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
221B2---------- Parr	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
221C2---------- Parr	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
223B2---------- Varna	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
223C2---------- Varna	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
224C2, 224C3-------- Strawn	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, small stones.
224D2, 224D3-------- Strawn	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
224E2, 224G--------- Strawn	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
232---------- Ashkum	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, ponding.
233B, 233B2--------- Birkbeck	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
233C2---------- Birkbeck	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
236---------- Sabina	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
243A, 243B---------- St. Charles	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
244---------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
272---------- Edgington	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
279B2---------- Rozetta	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
290A, 290B2--------- Warsaw	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
290C2---------- Warsaw	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
293---------- Andres	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
294B---------- Symerton	Severe: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
318B2---------- Lorenzo	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
322B2---------- Russell	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
322C2---------- Russell	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
327B2---------- Fox	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
327C2---------- Fox	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
330---------- Peotone	Severe: ponding, percs slowly.	Slight----------	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
440B2---------- Jasper	Slight----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, thin layer.
440C2---------- Jasper	Slight----------	Severe: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, thin layer.
481---------- Raub	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
484---------- Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
496---------- Fincastle	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
533. Urban land					
541B2---------- Graymont	Severe: percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Poor: hard to pack.
567A---------- Elkhart	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
567B, 567B2--------- Elkhart	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
570D2---------- Martinsville	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: slope, thin layer.
614B---------- Chenoa	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
740---------- Darroch	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy, wetness.
801, 802---------- Orthents	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
865. Pits					

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2221C:					
Parr	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Urban land.					
2892A:					
Sawmill	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Lawson	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Urban land.					
2893B:					
Catlin	Severe: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
Saybrook	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
Urban land.					
2902A:					
Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
Urban land.					
8073 Ross	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
8074 Radford	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8077 Huntsville	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
8107 Sawmill	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8415 Orion	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8451---------- Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
17--- Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
27B2, 27C2--- Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
27D2--- Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, slope.
27E2--- Miami	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36A, 36B, 36B2--- Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
41--- Muscatine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
43--- Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
56B2, 56C2--- Dana	Good---	Improbable: excess fines.	Improbable: excess fines.	Good.
59--- Lisbon	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
60B2, 60C2, 60C3--- La Rose	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
60D2--- La Rose	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
61--- Atterberry	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
67--- Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68--- Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
91B2--- Swygert	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
125--- Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
134B2, 134C2---------- Camden	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
145B2, 145C2---------- Saybrook	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
148A, 148B2, 148C2---- Proctor	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
149---------- Brenton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
152---------- Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
154---------- Flanagan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
171B, 171B2, 171C2---- Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
193B2, 193C2, 193D2--- Mayville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
198---------- Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
199A, 199B---------- Plano	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
213---------- Normal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
221B2, 221C2---------- Parr	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
223B2, 223C2---------- Varna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
224C2, 224C3, 224D2, 224D3---------- Strawn	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
224E2---------- Strawn	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
224G---------- Strawn	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
232---------- Ashkum	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
233B, 233B2, 233C2---- Birkbeck	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
236--- Sabina	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
243A, 243B--- St. Charles	Good---	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
244--- Hartsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
272--- Edgington	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
279B2--- Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
290A, 290B2, 290C2--- Warsaw	Good---	Probable---	Probable---	Poor: small stones, area reclaim.
293--- Andres	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
294B--- Symerton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
318B2--- Lorenzo	Good---	Probable---	Probable---	Poor: area reclaim, small stones.
322B2, 322C2--- Russell	Good---	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
327B2, 327C2--- Fox	Good---	Probable---	Probable---	Poor: small stones, area reclaim.
330--- Peotone	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
440B2, 440C2--- Jasper	Good---	Improbable: excess fines.	Improbable: excess fines.	Good.
481--- Raub	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
484--- Harco	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
496--- Fincastle	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
533. Urban land				
541B2--- Graymont	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
567A, 567B, 567B2----- Elkhart	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
570D2----- Martinsville	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
614B----- Chenoa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
740----- Darroch	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
801, 802----- Orthents	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
865. Pits				
2221C: Parr-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
Urban land.				
2892A: Sawmill-----	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Lawson-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Urban land.				
2893B: Catlin-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Saybrook-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Urban land.				
2902A: Ipava-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Sable-----	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Urban land.				
8073----- Ross	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
8074---------- Radford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
8077---------- Huntsville	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
8107---------- Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8415---------- Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
8451---------- Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
17---------- Keomah	Slight---------	Moderate: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
27B2, 27C2-------- Miami	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, percs slowly.	Erodes easily	Erodes easily, rooting depth.
27D2, 27E2-------- Miami	Severe: slope.	Severe: piping.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, rooting depth.
36A---------- Tama	Moderate: seepage.	Slight---------	Deep to water	Favorable------	Erodes easily	Erodes easily.
36B, 36B2--------- Tama	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
41---------- Muscatine	Moderate: seepage.	Moderate: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Erodes easily.
43---------- Ipava	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
56B2, 56C2-------- Dana	Moderate: seepage, slope.	Moderate: thin layer.	Deep to water	Slope----------	Erodes easily	Erodes easily.
59---------- Lisbon	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
60B2, 60C2, 60C3-- La Rose	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Favorable------	Favorable.
60D2---------- La Rose	Severe: slope.	Moderate: piping.	Deep to water	Slope----------	Slope----------	Slope.
61---------- Atterberry	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
67---------- Harpster	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
68---------- Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
91B2---------- Swygert	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, frost action, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
125---------- Selma	Severe: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
134B2, 134C2---- Camden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
145B2, 145C2---- Saybrook	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
148A---------- Proctor	Severe: seepage.	Severe: piping.	Deep to water	Favorable------	Erodes easily, too sandy.	Erodes easily.
148B2, 148C2---- Proctor	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Erodes easily, too sandy.	Erodes easily.
149---------- Brenton	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness--------	Wetness--------	Wetness.
152---------- Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
154---------- Flanagan	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Erodes easily.
171B---------- Catlin	Moderate: seepage.	Moderate: piping, wetness.	Deep to water	Favorable------	Erodes easily	Erodes easily.
171B2, 171C2---- Catlin	Moderate: seepage, slope.	Moderate: piping, wetness.	Deep to water	Slope----------	Erodes easily	Erodes easily.
193B2, 193C2---- Mayville	Moderate: seepage, slope.	Severe: piping.	Frost action, slope.	Slope, wetness, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth.
193D2---------- Mayville	Severe: slope.	Severe: piping.	Frost action, slope.	Slope, wetness, rooting depth.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
198---------- Elburn	Severe: seepage.	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
199A---------- Plano	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable------	Erodes easily	Erodes easily.
199B---------- Plano	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
213---------- Normal	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
221B2, 221C2---- Parr	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Favorable------	Rooting depth, percs slowly.
223B2, 223C2---- Varna	Moderate: slope.	Moderate: hard to pack.	Deep to water	Slope, percs slowly.	Favorable------	Favorable.
224C2---------- Strawn	Moderate: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
224C3---------- Strawn	Moderate: slope.	Moderate: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
224D2---------- Strawn	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
224D3---------- Strawn	Severe: slope.	Moderate: piping.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
224E2, 224G------- Strawn	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
232---------- Ashkum	Slight---------	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
233B---------- Birkbeck	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
233B2, 233C2------ Birkbeck	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
236---------- Sabina	Slight---------	Severe: wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
243A---------- St. Charles	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
243B---------- St. Charles	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
244---------- Hartsburg	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
272---------- Edgington	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
279B2---------- Rozetta	Moderate: seepage.	Slight---------	Deep to water	Erodes easily	Erodes easily	Erodes easily.
290A---------- Warsaw	Severe: seepage.	Severe: seepage.	Deep to water	Favorable------	Too sandy------	Favorable.
290B2, 290C2------ Warsaw	Severe: seepage.	Severe: seepage.	Deep to water	Slope----------	Too sandy------	Favorable.
293---------- Andres	Moderate: seepage.	Severe: hard to pack.	Frost action---	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
294B---------- Symerton	Moderate: seepage, slope.	Moderate: wetness.	Deep to water	Slope----------	Erodes easily	Erodes easily.
318B2---------- Lorenzo	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty.	Large stones, too sandy.	Large stones, droughty.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
322B2, 322C2---- Russell	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
327B2, 327C2---- Fox	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope----------	Too sandy------	Favorable.
330---------- Peotone	Slight---------	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
440B2, 440C2---- Jasper	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope----------	Favorable------	Favorable.
481---------- Raub	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
484---------- Harco	Moderate: seepage.	Severe: thin layer, wetness.	Frost action---	Wetness--------	Wetness--------	Wetness.
496---------- Fincastle	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
533. Urban land						
541B2---------- Graymont	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
567A---------- Elkhart	Moderate: seepage.	Slight---------	Deep to water	Favorable------	Erodes easily	Erodes easily.
567B, 567B2------- Elkhart	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
570D2---------- Martinsville	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
614B---------- Chenoa	Moderate: seepage, slope.	Severe: wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
740---------- Darroch	Moderate: seepage.	Severe: piping, wetness.	Frost action, cutbanks cave.	Wetness--------	Erodes easily, wetness, too sandy.	Wetness, erodes easily.
801, 802---------- Orthents	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Favorable------	Favorable.
865. Pits						
2221C: Parr----------	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Favorable------	Rooting depth, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2221C: Urban land.						
2892A:						
Sawmill	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
Lawson	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
Urban land.						
2893B:						
Catlin	Moderate: seepage, slope.	Moderate: piping, wetness.	Deep to water	Slope	Erodes easily	Erodes easily.
Saybrook	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
Urban land.						
2902A:						
Ipava	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
Urban land.						
8073 Ross	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
8074 Radford	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
8077 Huntsville	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Flooding	Favorable	Favorable.
8107 Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
8415 Orion	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
8451 Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
17----------	0-10	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
Keomah	10-41	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
	41-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	35-50	15-30
27B2, 27C2, 27D2----------	0-4	Loam----------	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
Miami	4-28	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	28-33	Loam, clay loam.	CL, SC	A-4, A-6	0-1	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	33-60	Loam, clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0-1	0-3	85-100	85-100	70-90	45-70	20-40	5-20
27E2----------	0-4	Silt loam-----	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
Miami	4-28	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	28-33	Loam, clay loam.	CL, SC	A-4, A-6	0-1	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	33-60	Loam, clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0-1	0-3	85-100	85-100	70-90	45-70	20-40	5-20
36A, 36B------	0-12	Silt loam-----	ML, CL	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
Tama	12-46	Silty clay loam.	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	46-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
36B2----------	0-8	Silt loam-----	ML, CL	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
Tama	8-39	Silty clay loam.	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	39-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
41----------	0-12	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	95-100	25-40	5-15
Muscatine	12-44	Silty clay loam, silt loam.	CL	A-7	0	0	100	100	100	95-100	40-50	20-30
	44-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
43----------	0-11	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
Ipava	11-28	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	28-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
56B2----------	0-7	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-95	30-35	8-12
Dana	7-34	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-98	38-50	20-32
	34-53	Clay loam-----	CL	A-6, A-7	0	0-3	90-100	90-95	80-90	65-75	37-50	17-30
	53-60	Loam----------	CL, ML, CL-ML	A-4, A-6	0-3	0-3	85-95	80-90	75-85	50-65	17-30	2-14
56C2----------	0-16	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-95	30-35	8-12
Dana	16-32	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-98	38-50	20-32
	32-49	Clay loam-----	CL	A-6, A-7	0	0-3	90-100	90-95	80-90	65-75	37-50	17-30
	49-70	Loam----------	CL, ML, CL-ML	A-4, A-6	0-3	0-3	85-95	80-90	75-85	50-65	17-30	2-14
59----------	0-11	Silt loam-----	ML	A-6, A-7	0	0	100	100	95-100	80-95	35-50	10-20
Lisbon	11-25	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	0	100	95-100	95-100	80-98	35-55	15-35
	25-32	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0-1	0-5	90-100	90-100	85-100	70-85	20-45	8-25
	32-60	Loam, silt loam.	CL	A-6, A-4	0-1	0-3	90-100	90-100	85-100	70-85	20-40	8-20
60B2, 60C2----	0-7	Silt loam-----	CL	A-6, A-4	0	0	100	95-100	90-100	60-95	30-40	8-15
La Rose	7-16	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	60-85	30-45	15-25
	16-60	Loam, silt loam.	CL	A-6	0-1	0-5	95-100	90-100	75-100	50-80	25-40	10-20
60C3----------	0-4	Loam----------	CL	A-6, A-4	0	0	100	95-100	90-100	60-95	30-40	8-15
La Rose	4-14	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	60-85	30-45	15-25
	14-60	Loam, silt loam.	CL	A-6	0-1	0-5	95-100	90-100	75-100	50-80	25-40	10-20
60D2----------	0-7	Silt loam-----	CL	A-6, A-4	0	0	100	95-100	90-100	60-95	30-40	8-15
La Rose	7-16	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	60-85	30-45	15-25
	16-60	Loam, silt loam.	CL	A-6	0-1	0-5	95-100	90-100	75-100	50-80	25-40	10-20
61----------	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
Atterberry	7-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	12-30	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	95-100	95-100	35-55	15-30
	30-60	Silt loam, loam.	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
67----------	0-20	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	45-60	20-35
Harpster	20-28	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	85-100	40-60	20-35
	28-60	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	0	100	95-100	95-100	70-100	35-55	20-35

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
68---------- Sable	0-12	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	12-54	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	54-60	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	95-100	40-55	20-35
91B2---------- Swygert	0-5	Silty clay loam.	CL	A-7, A-6	0	0	100	95-100	95-100	85-95	35-50	15-25
	5-9	Silty clay, silty clay loam.	CL, CH	A-6, A-7	0	0	100	95-100	95-100	85-95	35-55	15-30
	9-24	Silty clay, clay.	CH	A-7	0-1	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	24-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0-1	0-5	95-100	95-100	90-100	75-95	40-65	20-40
125---------- Selma	0-21	Loam----------	CL	A-4, A-6	0	0	100	95-100	80-100	55-85	25-35	7-17
	21-53	Sandy loam, loam, silty clay loam.	CL, SC	A-6	0	0	100	95-100	80-95	38-85	24-36	11-19
	53-60	Stratified sand to silt loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	0	0	90-100	85-100	60-90	30-70	15-35	5-20
134B2, 134C2-- Camden	0-10	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	10-32	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	32-48	Clay loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	48-60	Stratified sandy loam to silt loam.	SM, SC, ML, CL	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	<25	3-10
145B2, 145C2-- Saybrook	0-8	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	5-15
	8-29	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	0	95-100	95-100	90-100	85-100	35-55	15-30
	29-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	0	95-100	85-100	80-95	60-85	20-40	8-25
148A, 148B2--- Proctor	0-16	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	16-29	Silty clay loam.	CL	A-7, A-6	0	0	95-100	90-100	85-100	85-100	25-50	10-25
	29-46	Clay loam, sandy loam, loam.	CL, SC, CL-ML, SC-SM	A-6, A-7, A-4, A-2	0	0	90-100	85-100	75-100	30-80	20-45	5-25
	46-60	Stratified loam to sand.	SC, CL, SC-SM, CL-ML	A-2, A-4, A-6	0	0	85-100	80-100	50-100	25-80	20-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
148C2---------- Proctor	0-9	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	9-35	Silty clay loam.	CL	A-7, A-6	0	0	95-100	90-100	85-100	85-100	25-50	10-25
	35-47	Clay loam, sandy loam, loam.	CL, SC, CL-ML, SC-SM	A-6, A-7, A-4, A-2	0	0	90-100	85-100	75-100	30-80	20-45	5-25
	47-60	Stratified loam to sand.	SC, CL, SC-SM, CL-ML	A-2, A-4, A-6	0	0	85-100	80-100	50-100	25-80	20-40	5-20
149---------- Brenton	0-8	Silt loam-----	CL, ML	A-6, A-4	0	0	100	95-100	95-100	85-100	30-40	8-15
	8-33	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	0	100	95-100	95-100	85-100	35-50	10-25
	33-45	Clay loam, loam, silt loam, fine sandy loam.	CL	A-6, A-7	0	0	100	95-100	90-100	75-95	30-45	10-20
	45-60	Stratified loamy sand to silty clay loam.	CL-ML, CL, SC-SM, SC	A-2, A-4, A-6	0	0	95-100	85-100	80-100	30-85	20-35	5-20
152---------- Drummer	0-13	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	13-41	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	41-47	Loam, silt loam, clay loam.	CL	A-6, A-7	0-1	0-5	95-100	90-100	75-95	60-85	30-50	15-30
	47-60	Stratified loamy sand to silty clay loam.	SC, CL	A-4, A-6	0-1	0-5	95-100	85-95	75-95	45-80	20-35	7-20
154---------- Flanagan	0-15	Silt loam-----	CL	A-7, A-6	0	0	100	100	95-100	85-100	35-50	15-30
	15-47	Silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	47-60	Loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	0	85-100	80-100	70-95	50-85	20-45	5-30
171B---------- Catlin	0-11	Silt loam-----	ML, CL, CL-ML	A-6, A-7, A-4	0	0	100	100	95-100	85-100	25-45	5-20
	11-46	Silty clay loam, silt loam.	CL, ML	A-7, A-6	0	0	100	90-100	90-100	80-100	30-50	15-30
	46-60	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20
171B2, 171C2-- Catlin	0-9	Silt loam-----	ML, CL, CL-ML	A-6, A-7, A-4	0	0	100	100	95-100	85-100	25-45	5-20
	9-43	Silty clay loam, silt loam.	CL, ML	A-7, A-6	0	0	100	90-100	90-100	80-100	30-50	15-30
	43-60	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
193B2--------- Mayville	0-8	Silt loam-----	CL	A-6	0	0	100	100	90-100	85-95	30-40	10-20
	8-27	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	90-100	85-95	35-55	15-35
	27-34	Clay loam, sandy clay loam, loam.	CL, SC	A-6, A-7	0-1	0-2	85-98	80-96	50-95	35-75	35-50	15-30
	34-60	Gravelly sandy loam, loam, gravelly loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	0-1	0-5	60-95	55-95	35-95	15-75	15-35	4-15
193C2, 193D2-- Mayville	0-6	Silt loam-----	CL	A-6	0	0	100	100	90-100	85-95	30-40	10-20
	6-24	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	90-100	85-95	35-55	15-35
	24-34	Clay loam, sandy clay loam, loam.	CL, SC	A-6, A-7	0-1	0-2	85-98	80-96	50-95	35-75	35-50	15-30
	34-60	Gravelly sandy loam, loam, gravelly loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	0-1	0-5	60-95	55-95	35-95	15-75	15-35	4-15
198----------	0-14	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
Elburn	14-42	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	75-90	30-50	15-35
	42-60	Loam, sandy loam, clay loam, fine sandy loam.	CL, CL-ML, SC, SC-SM	A-6, A-4, A-2	0	0	90-100	80-100	60-90	25-80	20-40	5-20
199A, 199B---- Plano	0-18	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	95-100	20-30	5-15
	18-52	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	95-100	25-40	10-25
	52-60	Clay loam, loam, sandy loam.	CL, SC, CL-ML, SC-SM	A-6, A-7, A-4	0	0-1	90-100	85-95	60-90	40-75	20-45	5-25
213----------	0-11	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
Normal	11-20	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	20-37	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	95-100	95-100	35-55	15-30
	37-60	Silt loam, loam.	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
221B2, 221C2-- Parr	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	80-100	50-90	15-30	4-15
	8-25	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	0	90-100	90-100	75-100	50-95	25-35	9-15
	25-31	Loam----------	CL	A-6, A-4	0	0	90-100	90-100	75-85	50-65	25-35	8-15
	31-60	Loam----------	CL, ML, CL-ML	A-4	0	0-3	85-95	85-95	75-85	50-65	<25	3-8

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
223B2, 223C2--Varna	0-8	Silt loam-----	CL	A-6, A-4	0	0-5	95-100	95-100	95-100	85-95	25-40	8-20
	8-35	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-1	0-10	95-100	85-100	85-100	80-100	35-56	15-29
	35-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-1	0-10	95-100	85-100	85-100	80-95	30-45	13-26
224C2---------- Strawn	0-4	Loam----------	CL, ML, CL-ML	A-4, A-6	0	0	95-100	95-100	90-100	90-100	20-40	3-20
	4-18	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-25
	18-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-20
224C3---------- Strawn	0-3	Clay loam-----	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	30-45	10-25
	3-7	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-25
	7-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-20
224D2---------- Strawn	0-4	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	95-100	95-100	90-100	90-100	20-40	3-20
	4-18	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-25
	18-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-20
224D3---------- Strawn	0-3	Clay loam-----	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	30-45	10-25
	3-7	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-25
	7-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-20
224E2---------- Strawn	0-4	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	95-100	95-100	90-100	90-100	20-40	3-20
	4-18	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-25
	18-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-20
224G---------- Strawn	0-5	Loam----------	CL, ML, CL-ML	A-4, A-6	0	0	95-100	95-100	90-100	90-100	20-40	3-20
	5-15	Silty clay loam, clay loam.	CL	A-6, A-7	0-1	0-5	90-100	80-100	75-95	50-95	25-45	10-23
	15-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-1	0-5	75-100	70-100	60-95	40-95	20-35	7-18

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
232---------- Ashkum	0-13	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	75-100	40-55	20-30
	13-31	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	90-100	85-100	75-100	45-65	20-35
	31-60	Silty clay loam, silty clay.	CL	A-7, A-6	0-1	0-5	95-100	85-100	80-100	75-95	35-50	15-30
233B---------- Birkbeck	0-3	Silt loam-----	ML	A-4, A-6, A-7	0	0	100	100	95-100	95-100	28-45	5-15
	3-8	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	100	95-100	30-40	7-15
	8-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-100	30-50	10-25
	46-60	Loam, silty clay loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-80	25-40	5-20
233B2, 233C2-- Birkbeck	0-9	Silt loam-----	ML	A-4, A-6, A-7	0	0	100	100	95-100	95-100	28-45	5-15
	9-48	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-100	30-50	10-25
	48-60	Loam, clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-100	70-100	55-80	25-40	5-20
236---------- Sabina	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	8-35	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	20-40
	35-51	Clay loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	95-100	85-100	70-100	55-75	20-50	5-30
	51-60	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	95-100	85-100	70-100	55-75	20-50	5-30
243A, 243B---- St. Charles	0-11	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	95-100	22-35	7-15
	11-46	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	46-50	Sandy loam, silt loam, loam, clay loam.	SC, CL	A-4, A-6	0	0	90-100	75-100	75-90	40-80	20-35	8-20
	50-60	Stratified sandy loam to silt loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0-1	0-5	90-100	75-90	60-90	30-70	15-35	5-15
244---------- Hartsburg	0-12	Silty clay loam.	CL, ML	A-7, A-6	0	0	100	100	100	95-100	35-50	10-25
	12-29	Silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	95-100	40-55	20-30
	29-60	Silt loam, loam.	CL	A-6	0	0	95-100	90-100	90-100	70-100	25-40	11-20
272---------- Edgington	0-11	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	90-100	30-40	9-17
	11-21	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	90-100	25-40	7-16
	21-53	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	35-50	15-25
	53-60	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
279B2----------	0-6	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
Rozetta	6-53	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	35-50	15-30
	53-60	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-100	25-40	7-20
290A----------	0-13	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	85-100	85-100	70-100	50-90	20-30	4-12
Warsaw	13-37	Sandy clay loam, loam, clay loam.	SC, CL, CL-ML, SC-SM	A-6, A-2-6, A-4, A-2-4	0	0-3	90-100	85-100	60-90	30-70	20-35	6-15
	37-40	Gravelly sandy clay loam, gravelly clay loam, gravelly sandy loam.	CL, SC, GC, SC-SM	A-6, A-2-6, A-4, A-2-4	0	0-5	70-90	60-85	55-70	30-60	20-35	6-15
	40-60	Stratified sand to very gravelly coarse sand.	SP, GP, SP-SM, GP-GM	A-1	0	1-5	30-70	22-55	7-20	2-10	<20	NP
290B2, 290C2--	0-9	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	85-100	85-100	70-100	50-90	20-30	4-12
Warsaw	9-28	Sandy clay loam, loam, clay loam.	SC, CL, CL-ML, SC-SM	A-6, A-2-6, A-4, A-2-4	0	0-3	90-100	85-100	60-90	30-70	20-35	6-15
	28-35	Gravelly sandy clay loam, gravelly clay loam, gravelly sandy loam.	CL, SC, GC, SC-SM	A-6, A-2-6, A-4, A-2-4	0	0-5	70-90	60-85	55-70	30-60	20-35	6-15
	35-60	Stratified sand to very gravelly coarse sand.	SP, GP, SP-SM, GP-GM	A-1	0	1-5	30-70	22-55	7-20	2-10	<20	NP
293----------	0-14	Silt loam-----	CL, ML	A-7, A-6, A-4	0	0	95-100	95-100	90-100	80-95	30-48	6-21
Andres	14-36	Clay loam, loam, silty clay loam, sandy clay loam.	CL, ML, MH	A-7, A-6	0	0-5	85-100	80-100	65-100	50-85	35-55	10-27
	36-51	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	0-5	90-100	85-95	80-95	70-95	24-50	7-28
	51-60	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	0-5	90-100	85-95	80-95	70-95	24-50	7-28
294B----------	0-13	Silt loam-----	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20
Symerton	13-49	Clay loam, silt loam, sandy clay loam.	CL	A-7, A-6	0-3	0-10	95-100	80-95	75-90	60-90	35-45	15-25
	49-60	Silt loam, silty clay loam, clay loam.	CL	A-7, A-6	0-1	0-5	95-100	90-100	85-95	80-95	25-45	15-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
318B2--------- Lorenzo	0-7	Silt loam-----	CL	A-6	0-1	0-5	95-100	95-100	85-100	60-95	25-40	10-20
	7-22	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-7	0-3	5-10	85-100	65-100	60-100	40-90	30-50	10-25
	22-60	Sand and gravel.	GM, GP-GM, SM, SP-SM	A-1, A-2, A-3	0-10	5-20	25-80	25-80	10-70	5-35	<30	NP-10
322B2, 322C2-- Russell	0-5	Silt loam-----	CL-ML, CL, ML	A-4	0	0	100	100	90-100	70-90	<25	3-8
	5-33	Silty clay loam.	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	33-42	Clay loam-----	CL	A-6	0	0	95-100	90-95	80-95	60-80	30-35	10-15
	42-60	Loam----------	CL-ML, CL	A-4	0	0-3	85-95	80-90	65-90	50-75	<25	4-8
327B2, 327C2-- Fox	0-10	Silt loam-----	ML, CL, CL-ML	A-4	0	0	95-100	95-100	85-95	65-90	<25	3-8
	10-21	Silty clay loam, silt loam, clay loam.	CL, SC, GC	A-2, A-6, A-7	0-1	0	65-100	55-100	40-100	30-95	22-50	10-25
	21-37	Clay loam, loam, sandy clay loam.	CL, SC, GC	A-2, A-6, A-7	0-1	0-5	65-100	55-100	30-100	15-80	22-45	10-25
	37-60	Sand and gravel, sand, coarse sand.	SP, GP, SP-SM, GP-GM	A-1, A-2, A-3	0-3	0-10	30-100	30-100	10-95	2-10	---	NP
330---------- Peotone	0-15	Silty clay loam.	CH, CL	A-7	0	0	100	95-100	95-100	80-100	40-65	15-35
	15-46	Silty clay loam, silty clay.	CH, CL	A-7	0-1	0-5	100	95-100	90-100	85-100	40-70	15-40
	46-60	Silty clay loam, silt loam, silty clay.	CL, CH, ML, MH	A-7, A-6	0-1	0-5	95-100	95-100	90-100	75-98	30-60	15-30
440B2--------- Jasper	0-8	Loam----------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	8-15	Loam, fine sandy loam, loam.	CL	A-6	0	0	100	100	85-95	60-75	20-35	10-20
	15-30	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	0	100	95-100	80-95	45-85	20-35	10-20
	30-53	Fine sandy loam, loam, sandy clay loam, sandy loam.	SC, SC-SM	A-4, A-2-4	0	0	100	85-100	60-70	30-40	20-30	5-10
	53-60	Stratified silt loam to sand.	SC, CL-ML, CL, SC-SM	A-4	0	0	100	85-100	75-90	35-85	<30	5-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
440C2----------	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
Jasper	8-15	Loam, fine sandy loam, loam.	CL	A-6	0	0	100	100	85-95	60-75	20-35	10-20
	15-30	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	0	100	95-100	80-95	45-85	20-35	10-20
	30-53	Fine sandy loam, loam, sandy clay loam.	SC, SC-SM	A-4, A-2-4	0	0	100	85-100	60-70	30-40	20-30	5-10
	53-60	Stratified silt loam to sand.	SC, CL-ML, CL, SC-SM	A-4	0	0	100	85-100	75-90	35-85	<30	5-10
481----------	0-18	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	75-95	25-35	5-15
Raub	18-33	Silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	95-100	80-95	35-55	20-35
	33-39	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-95	60-85	35-50	15-25
	39-60	Loam, clay loam.	CL, ML, SC, SM	A-4, A-6	0	0-5	85-95	80-90	70-85	40-65	15-30	NP-15
484----------	0-12	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	2-13
Harco	12-39	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	35-50	14-27
	39-60	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	20-35	2-13
496----------	0-11	Silt loam-----	CL, ML, CL-ML	A-4	0	0	100	95-100	90-100	75-93	<25	3-10
Fincastle	11-36	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-15
	36-42	Clay loam, loam, silty clay loam.	CL	A-6	0	0	95-100	90-98	85-95	75-85	30-40	10-15
	42-60	Loam----------	CL	A-4, A-6	0	0-3	88-96	82-90	70-86	50-66	25-30	8-11
533. Urban land												
541B2----------	0-8	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
Graymont	8-34	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	0	100	100	95-100	85-95	35-55	15-30
	34-60	Silty clay loam, silt loam.	CL	A-7, A-6	0-1	0-5	90-100	85-100	80-100	70-95	30-50	11-26
567A----------	0-14	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	95-100	25-35	8-15
Elkhart	14-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	18-30
	30-60	Silt loam, silt.	CL	A-6, A-4	0	0	100	100	95-100	95-100	20-37	8-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
567B, 567B2--- Elkhart	0-8	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	95-100	25-35	8-15
	8-26	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	18-30
	26-60	Silt loam, silt.	CL	A-6, A-4	0	0	100	100	95-100	95-100	20-37	8-20
570D2--------- Martinsville	0-18	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	85-100	75-100	65-90	<25	3-8
	18-41	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-2-4, A-2-6, A-4, A-6	0	0	95-100	85-100	70-100	30-95	25-40	7-15
	41-60	Sandy loam, loam, sandy clay loam.	SC-SM, SC, CL-ML, CL	A-2-4, A-2-6, A-4, A-6	0	0	95-100	85-100	55-95	30-95	20-30	5-11
614B---------- Chenoa	0-12	Silt loam-----	ML, CL-ML, CL	A-6, A-4, A-7-6	0	0	100	100	95-100	90-100	28-45	6-17
	12-30	Silty clay loam, silty clay.	ML, MH	A-6, A-7, A-4	0	0	100	100	95-100	90-100	33-58	8-27
	30-42	Silty clay loam, silt loam.	CL, CH	A-7, A-6, A-4	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27
	42-60	Silty clay loam, silt loam.	CL, CH	A-4, A-6, A-7	0	0-5	90-100	85-95	80-95	70-95	30-53	9-27
740---------- Darroch	0-16	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	55-90	15-30	3-15
	16-22	Silt loam, loam, silty clay loam, clay loam.	CL	A-6, A-4	0	0	95-100	90-100	80-100	65-95	20-40	7-20
	22-60	Clay loam, sandy clay loam, loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-2	0	0	95-100	90-100	70-100	30-80	20-40	5-20
801, 802. Orthents												
865. Pits												
2221C: Parr----------	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	80-100	50-90	15-30	4-15
	8-25	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	0	90-100	90-100	75-100	50-95	25-35	9-15
	25-31	Loam----------	CL	A-6, A-4	0	0	90-100	90-100	75-85	50-65	25-35	8-15
	31-60	Loam----------	CL, ML, CL-ML	A-4	0	0-3	85-95	85-95	75-85	50-65	<25	3-8
Urban land.												

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
2892A:												
Sawmill------	0-23	Silt loam-----	CL	A-6	0	0	100	100	80-100	75-95	25-40	10-20
	23-50	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	0	100	100	85-100	70-95	25-50	8-25
	50-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	0	100	100	75-100	65-95	20-50	8-30
Lawson-------	0-16	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	5-20
	16-34	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	5-10
	34-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	60-100	20-45	10-25
Urban land.												
2893B:												
Catlin-------	0-16	Silt loam-----	ML, CL, CL-ML	A-6, A-7, A-4	0	0	100	100	95-100	85-100	25-45	5-20
	16-41	Silty clay loam, silt loam.	CL, ML	A-7, A-6	0	0	100	90-100	90-100	80-100	30-50	15-30
	41-60	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20
Saybrook-----	0-8	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	5-15
	8-29	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	0	95-100	95-100	90-100	85-100	35-55	15-30
	29-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	0	95-100	85-100	80-95	60-85	20-40	8-25
Urban land.												
2902A:												
Ipava--------	0-11	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	11-28	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	28-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	5-20
Sable--------	0-12	Silt loam-----	CL	A-6, A-7	0	0	100	100	95-100	95-100	30-45	10-20
	12-54	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	54-60	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	95-100	40-55	20-35
Urban land.												

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
8073---------- Ross	0-16	Loam----------	ML, CL-ML, CL	A-4, A-6	0	0	90-100	90-100	80-100	65-95	20-35	NP-12
	16-39	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	0	90-100	85-100	70-100	55-95	22-45	3-20
	39-60	Stratified gravelly sandy loam to silt loam.	CL, ML, SM, GM	A-6, A-4, A-2	0-1	0-5	65-100	45-100	30-100	25-80	<30	NP-12
8074---------- Radford	0-16	Silt loam-----	ML, CL	A-4, A-6	0	0	100	100	95-100	80-100	30-40	5-15
	16-27	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	80-100	25-35	5-15
	27-60	Silt loam, silty clay loam, clay loam.	CL	A-6, A-7	0	0	100	100	95-100	80-95	35-50	15-25
8077---------- Huntsville	0-33	Silt loam-----	CL	A-6	0	0	100	95-100	90-100	85-100	25-40	10-20
	33-49	Silt loam-----	CL	A-6	0	0	100	95-100	90-100	85-100	20-35	10-20
	49-60	Silt loam, loam, very fine sandy loam.	CL-ML, CL, SC-SM, SC	A-4, A-6, A-2	0	0	95-100	90-100	85-95	30-85	20-35	5-20
8107---------- Sawmill	0-23	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	23-50	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	0	100	100	85-100	70-95	25-50	8-25
	50-60	Silty clay loam, clay loam, silt loam, loam.	CL	A-4, A-6, A-7	0	0	100	100	75-100	65-95	20-50	8-30
8415---------- Orion	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	80-100	25-35	4-12
	8-22	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	0	100	100	90-100	70-80	20-30	4-10
	22-41	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	85-100	85-100	20-40	4-18
	41-60	Stratified silt loam to sand.	CL, CL-ML	A-4	0	0	80-100	80-100	80-100	80-100	20-30	4-10
8451---------- Lawson	0-16	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	5-20
	16-34	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	5-10
	34-60	Silty clay loam, silt loam, loam, sandy loam.	CL	A-6, A-7	0	0	100	100	90-100	60-100	20-45	10-25

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "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
17----------	0-10	16-26	1.30-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	3	6	1-3
Keomah	10-41	35-42	1.35-1.45	0.2-0.6	0.18-0.20	4.5-7.3	High---------	0.37			
	41-60	24-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-7.8	Moderate-----	0.37			
27B2, 27C2, 27D2, 27E2----------	0-4	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	4	5	.5-3
Miami	4-28	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate-----	0.37			
	28-33	20-30	1.50-1.70	0.2-0.6	0.14-0.19	6.6-7.8	Low----------	0.37			
	33-60	15-30	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Moderate-----	0.37			
36A, 36B---------	0-12	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
Tama	12-46	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	46-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
36B2----------	0-8	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
Tama	8-39	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	39-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
41----------	0-12	24-27	1.28-1.32	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	4-6
Muscatine	12-44	25-35	1.28-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	44-60	22-30	1.35-1.40	0.6-2.0	0.18-0.20	6.6-7.8	Moderate-----	0.43			
43----------	0-11	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
Ipava	11-28	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.43			
	28-60	20-30	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
56B2----------	0-7	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	5	3-5
Dana	7-34	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	34-53	27-35	1.45-1.65	0.6-2.0	0.15-0.19	6.1-7.8	Moderate-----	0.43			
	53-60	15-22	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low----------	0.43			
56C2----------	0-16	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	5	3-5
Dana	16-32	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	32-49	27-35	1.45-1.65	0.6-2.0	0.15-0.19	6.1-7.8	Moderate-----	0.43			
	49-70	15-22	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low----------	0.43			
59----------	0-11	20-25	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	6	3-5
Lisbon	11-25	25-35	1.15-1.35	0.6-2.0	0.18-0.22	6.1-7.8	Moderate-----	0.43			
	25-32	20-30	1.45-1.55	0.6-2.0	0.15-0.20	6.1-8.4	Low----------	0.43			
	32-60	18-27	1.50-1.60	0.2-0.6	0.07-0.11	7.4-8.4	Low----------	0.43			
60B2, 60C2-------	0-7	18-27	1.10-1.35	0.6-2.0	0.20-0.24	6.6-7.8	Moderate-----	0.32	5	6	2-4
La Rose	7-16	27-35	1.35-1.55	0.6-2.0	0.15-0.20	6.1-7.8	Moderate-----	0.32			
	16-60	18-27	1.50-1.70	0.2-0.6	0.09-0.11	7.4-8.4	Moderate-----	0.32			
60C3----------	0-4	18-27	1.10-1.35	0.6-2.0	0.20-0.24	6.6-7.8	Moderate-----	0.32	5	6	2-4
La Rose	4-14	27-35	1.35-1.55	0.6-2.0	0.15-0.20	6.1-7.8	Moderate-----	0.32			
	14-60	18-27	1.50-1.70	0.2-0.6	0.09-0.11	7.4-8.4	Moderate-----	0.32			
60D2----------	0-7	18-27	1.10-1.35	0.6-2.0	0.20-0.24	6.6-7.8	Moderate-----	0.32	5	6	2-4
La Rose	7-16	27-35	1.35-1.55	0.6-2.0	0.15-0.20	6.1-7.8	Moderate-----	0.32			
	16-60	18-27	1.50-1.70	0.2-0.6	0.09-0.11	7.4-8.4	Moderate-----	0.32			
61----------	0-7	20-26	1.35-1.55	0.6-2.0	0.22-0.25	5.6-7.3	Low----------	0.32	5	6	2-4
Atterberry	7-12	15-26	1.40-1.60	0.6-2.0	0.21-0.24	5.1-7.3	Low----------	0.32			
	12-30	25-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.43			
	30-60	18-27	1.40-1.65	0.6-2.0	0.14-0.24	5.6-7.8	Low----------	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
67----------	0-20	27-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
Harpster	20-28	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.28			
	28-60	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.28			
68----------	0-12	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	7	5-6
Sable	12-54	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.28			
	54-60	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.28			
91B2----------	0-5	27-40	1.25-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.37	3	7	3-5
Swygert	5-9	30-45	1.30-1.55	0.2-0.6	0.08-0.16	5.6-7.3	High----------	0.28			
	9-24	45-50	1.40-1.70	0.06-0.2	0.05-0.12	5.6-8.4	High----------	0.28			
	24-60	38-60	1.40-1.75	<0.06	0.03-0.05	7.4-8.4	High----------	0.28			
125----------	0-21	20-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low-----------	0.28	5	6	4-6
Selma	21-53	18-30	1.40-1.60	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
	53-60	7-18	1.60-1.90	2.0-6.0	0.07-0.19	6.6-8.4	Low-----------	0.28			
134B2, 134C2-----	0-10	14-27	1.35-1.55	0.6-2.0	0.21-0.25	5.1-7.3	Low-----------	0.37	5	6	1-2
Camden	10-32	22-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.37			
	32-48	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low-----------	0.32			
	48-60	5-20	1.40-1.70	0.6-6.0	0.12-0.22	5.6-8.4	Low-----------	0.32			
145B2, 145C2-----	0-8	20-26	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	3-4
Saybrook	8-29	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	29-60	24-35	1.50-1.70	0.2-0.6	0.15-0.21	5.6-8.4	Low-----------	0.37			
148A, 148B2------	0-16	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low-----------	0.32	5	6	2-4
Proctor	16-29	25-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	29-46	22-35	1.30-1.55	0.6-6.0	0.13-0.16	5.6-7.3	Moderate-----	0.32			
	46-60	10-20	1.40-1.70	0.6-6.0	0.07-0.19	6.1-7.8	Low-----------	0.17			
148C2----------	0-9	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low-----------	0.32	5	6	2-4
Proctor	9-35	25-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	35-47	22-35	1.30-1.55	0.6-6.0	0.13-0.16	5.6-7.3	Moderate-----	0.32			
	47-60	10-20	1.40-1.70	0.6-6.0	0.07-0.19	6.1-7.8	Low-----------	0.17			
149----------	0-8	20-27	1.25-1.45	0.6-2.0	0.22-0.26	5.6-7.8	Low-----------	0.28	5	6	3-5
Brenton	8-33	25-35	1.30-1.55	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.28			
	33-45	20-30	1.40-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.28			
	45-60	15-30	1.50-1.70	0.6-2.0	0.11-0.20	5.6-8.4	Low-----------	0.28			
152----------	0-13	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.8	Moderate-----	0.28	5	7	5-7
Drummer	13-41	20-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28			
	41-47	22-33	1.30-1.55	0.6-2.0	0.17-0.20	6.1-8.4	Moderate-----	0.28			
	47-60	15-32	1.40-1.70	0.6-2.0	0.11-0.19	6.6-8.4	Low-----------	0.28			
154----------	0-15	20-30	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	4-5
Flanagan	15-47	35-42	1.25-1.45	0.6-2.0	0.15-0.22	5.6-7.3	High----------	0.43			
	47-60	20-30	1.45-1.70	0.2-0.6	0.15-0.22	6.1-8.4	Low-----------	0.37			
171B----------	0-11	18-27	1.25-1.45	0.6-2.0	0.23-0.26	5.1-7.3	Low-----------	0.32	5	6	3-4
Catlin	11-46	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	46-60	20-30	1.40-1.70	0.2-0.6	0.07-0.11	6.1-8.4	Low-----------	0.43			
171B2, 171C2-----	0-9	18-27	1.25-1.45	0.6-2.0	0.23-0.26	5.1-7.3	Low-----------	0.32	5	6	3-4
Catlin	9-43	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	43-60	20-30	1.40-1.70	0.2-0.6	0.07-0.11	6.1-8.4	Low-----------	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
193B2----------	0-8	18-27	1.45-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Low----------	0.43	5	5	1-3
Mayville	8-27	25-32	1.55-1.65	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	27-34	25-32	1.55-1.65	0.6-2.0	0.16-0.19	5.1-6.5	Moderate-----	0.32			
	34-60	10-25	1.35-1.80	0.6-2.0	0.07-0.20	7.4-8.4	Low----------	0.20			
193C2, 193D2-----	0-6	18-27	1.45-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Low----------	0.43	5	5	1-3
Mayville	6-24	25-32	1.55-1.65	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	24-34	25-32	1.55-1.65	0.6-2.0	0.16-0.19	5.1-6.5	Moderate-----	0.32			
	34-60	10-25	1.35-1.80	0.6-2.0	0.07-0.20	7.4-8.4	Low----------	0.20			
198----------	0-14	22-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	4-5
Elburn	14-42	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	42-60	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low----------	0.43			
199A, 199B-------	0-18	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	3-5
Plano	18-52	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	52-60	15-32	1.30-1.55	0.6-6.0	0.09-0.16	5.6-7.3	Low----------	0.37			
213----------	0-11	20-26	1.35-1.55	0.6-2.0	0.22-0.25	5.6-7.3	Low----------	0.32	5	6	2-4
Normal	11-20	15-26	1.40-1.60	0.6-2.0	0.21-0.24	5.1-7.3	Low----------	0.32			
	20-37	25-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.43			
	37-60	18-27	1.40-1.65	0.6-2.0	0.14-0.24	5.6-7.8	Low----------	0.43			
221B2, 221C2-----	0-8	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	4	5	2-4
Parr	8-25	22-32	1.40-1.55	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.32			
	25-31	20-25	1.55-1.65	0.6-2.0	0.15-0.17	6.6-8.4	Moderate-----	0.32			
	31-60	10-20	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Low----------	0.32			
223B2, 223C2-----	0-8	20-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	3-4
Varna	8-35	35-48	1.30-1.60	0.2-0.6	0.09-0.19	5.6-7.8	Moderate-----	0.32			
	35-60	27-40	1.50-1.70	0.06-0.6	0.12-0.18	6.6-8.4	Low----------	0.37			
224C2----------	0-4	18-27	1.15-1.45	0.6-2.0	0.20-0.24	6.1-7.3	Low----------	0.37	5	6	1-3
Strawn	4-18	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	18-60	22-30	1.50-1.70	0.2-0.6	0.08-0.12	7.4-8.4	Low----------	0.32			
224C3----------	0-3	27-30	1.35-1.55	0.6-2.0	0.17-0.19	5.6-7.3	Moderate-----	0.32	4	6	1-2
Strawn	3-7	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	7-60	22-30	1.50-1.70	0.2-0.6	0.08-0.12	7.4-8.4	Low----------	0.32			
224D2----------	0-4	18-27	1.15-1.45	0.6-2.0	0.20-0.24	6.1-7.3	Low----------	0.37	5	6	1-3
Strawn	4-18	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	18-60	22-30	1.50-1.70	0.2-0.6	0.08-0.12	7.4-8.4	Low----------	0.32			
224D3----------	0-3	27-30	1.35-1.55	0.6-2.0	0.17-0.19	5.6-7.3	Moderate-----	0.32	4	6	1-2
Strawn	3-7	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	7-60	22-30	1.50-1.70	0.2-0.6	0.08-0.12	7.4-8.4	Low----------	0.32			
224E2----------	0-4	18-27	1.15-1.45	0.6-2.0	0.20-0.24	6.1-7.3	Low----------	0.37	5	6	1-3
Strawn	4-18	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	18-60	22-30	1.50-1.70	0.2-0.6	0.08-0.12	7.4-8.4	Low----------	0.32			
224G----------	0-5	18-27	1.15-1.45	0.6-2.0	0.20-0.24	6.1-7.3	Low----------	0.37	5	6	1-3
Strawn	5-15	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	15-60	22-30	1.50-1.70	0.2-0.6	0.08-0.12	7.4-8.4	Low----------	0.32			
232----------	0-13	35-40	1.15-1.35	0.2-0.6	0.15-0.20	5.6-7.8	High---------	0.28	5	4	3-7
Ashkum	13-31	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High---------	0.28			
	31-60	24-40	1.30-1.60	0.2-0.6	0.18-0.20	6.1-8.4	Moderate-----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
233B----------	0-3	15-27	1.30-1.50	0.6-2.0	0.22-0.25	5.1-7.3	Low----------	0.37	5	6	1-3
Birkbeck	3-8	15-27	1.35-1.55	0.6-2.0	0.21-0.24	4.5-7.3	Low----------	0.37			
	8-46	25-35	1.35-1.55	0.6-2.0	0.14-0.24	4.5-7.3	Moderate-----	0.37			
	46-60	20-30	1.35-1.60	0.2-0.6	0.10-0.18	5.6-8.4	Low----------	0.37			
233B2, 233C2-----	0-9	15-27	1.30-1.50	0.6-2.0	0.22-0.25	5.1-7.3	Low----------	0.37	5	6	1-3
Birkbeck	9-48	25-35	1.35-1.55	0.6-2.0	0.14-0.24	4.5-7.3	Moderate-----	0.37			
	48-60	20-30	1.35-1.60	0.2-0.6	0.10-0.18	5.6-7.8	Low----------	0.37			
236----------	0-8	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
Sabina	8-35	35-42	1.35-1.55	0.2-0.6	0.11-0.20	5.6-7.3	High---------	0.37			
	35-51	20-35	1.50-1.75	0.2-0.6	0.11-0.18	6.6-7.8	Low----------	0.32			
	51-60	15-32	1.50-1.80	0.2-0.6	0.11-0.18	7.4-8.4	Low----------	0.37			
243A, 243B-------	0-11	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low----------	0.37	5	6	1-3
St. Charles	11-46	25-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	46-50	15-30	1.30-1.50	0.6-2.0	0.11-0.16	5.1-7.3	Low----------	0.24			
	50-60	10-25	1.55-1.75	0.6-2.0	0.11-0.16	5.6-8.4	Low----------	0.24			
244----------	0-12	27-33	1.15-1.35	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.28	5	7	3-5
Hartsburg	12-29	27-35	1.20-1.50	0.6-2.0	0.18-0.20	6.6-8.4	Moderate-----	0.28			
	29-60	20-27	1.30-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.28			
272----------	0-11	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.32	4	6	3-4
Edgington	11-21	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-6.0	Low----------	0.32			
	21-53	27-35	1.35-1.55	0.2-0.6	0.18-0.20	5.1-7.3	Moderate-----	0.32			
	53-60	18-27	1.50-1.70	0.2-0.6	0.20-0.22	5.6-7.3	Low----------	0.32			
279B2----------	0-6	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
Rozetta	6-53	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	53-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
290A----------	0-13	15-25	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	4-3	5	2-5
Warsaw	13-37	17-30	1.35-1.60	0.6-2.0	0.16-0.19	5.1-6.5	Low----------	0.28			
	37-40	18-30	1.40-1.65	0.6-2.0	0.13-0.16	6.1-8.4	Low----------	0.28			
	40-60	2-8	1.40-1.65	>20	0.02-0.04	7.9-8.4	Low----------	0.10			
290B2, 290C2-----	0-9	15-25	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	4-3	5	2-5
Warsaw	9-28	17-30	1.35-1.60	0.6-2.0	0.16-0.19	5.1-6.5	Low----------	0.28			
	28-35	18-30	1.40-1.65	0.6-2.0	0.13-0.16	6.1-8.4	Low----------	0.28			
	35-60	2-8	1.40-1.65	>20	0.02-0.04	7.9-8.4	Low----------	0.10			
293----------	0-14	21-27	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.3	Low----------	0.28	5	6	3-5
Andres	14-36	22-35	1.35-1.50	0.6-2.0	0.16-0.20	5.6-7.8	Moderate-----	0.28			
	36-51	27-35	1.45-1.55	0.2-0.6	0.18-0.20	6.1-8.4	Moderate-----	0.37			
	51-60	22-35	1.50-1.75	0.2-0.6	0.13-0.18	7.4-8.4	Moderate-----	0.37			
294B----------	0-13	20-27	1.15-1.30	0.6-2.0	0.21-0.24	5.6-7.3	Low----------	0.32	5	6	3-4
Symerton	13-49	27-35	1.35-1.60	0.6-2.0	0.12-0.18	5.6-7.8	Moderate-----	0.24			
	49-60	20-35	1.45-1.70	0.2-0.6	0.09-0.10	6.6-8.4	Moderate-----	0.43			
318B2----------	0-7	18-27	1.25-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.28	3	6	2-4
Lorenzo	7-22	20-35	1.60-1.70	2.0-6.0	0.15-0.19	5.6-7.3	Low----------	0.28			
	22-60	1-5	1.75-1.95	>6.0	0.02-0.07	7.4-8.4	Low----------	0.10			
322B2, 322C2-----	0-5	10-20	1.30-1.45	0.6-2.0	0.22-0.24	6.1-6.5	Low----------	0.37	5	5	.5-2
Russell	5-33	27-35	1.35-1.50	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	33-42	27-32	1.40-1.60	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.37			
	42-60	12-20	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Low----------	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
327B2, 327C2-----	0-10	10-17	1.35-1.55	0.6-2.0	0.17-0.24	5.1-7.3	Low----------	0.37	4	5	1-3
Fox	10-21	18-35	1.55-1.65	0.6-2.0	0.10-0.22	5.1-7.3	Moderate-----	0.43			
	21-37	18-35	1.55-1.65	0.6-2.0	0.10-0.19	5.1-8.4	Moderate-----	0.32			
	37-60	0-2	1.30-1.70	>6.0	0.02-0.07	7.4-8.4	Low----------	0.10			
330----------	0-15	33-40	1.20-1.40	0.2-0.6	0.21-0.23	5.6-7.8	High---------	0.28	5	4	5-7
Peotone	15-46	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High---------	0.28			
	46-60	25-42	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High---------	0.28			
440B2, 440C2-----	0-8	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.28	5	5	3-5
Jasper	8-15	18-25	1.35-1.50	0.6-2.0	0.17-0.19	5.1-6.5	Low----------	0.28			
	15-30	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-7.3	Low----------	0.28			
	30-53	12-20	1.40-1.60	0.6-2.0	0.14-0.16	5.6-7.8	Low----------	0.28			
	53-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.28			
481----------	0-18	20-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	6	2-4
Raub	18-39	27-35	1.50-1.70	0.2-0.6	0.18-0.20	5.1-6.5	Moderate-----	0.37			
	39-45	27-35	1.50-1.70	0.2-0.6	0.15-0.19	6.1-7.3	Moderate-----	0.37			
	45-60	20-32	1.50-1.70	0.2-0.6	0.05-0.19	7.4-8.4	Low----------	0.37			
484----------	0-12	20-30	1.20-1.35	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	3-5
Harco	12-39	24-35	1.25-1.45	0.6-2.0	0.18-0.20	6.1-8.4	Moderate-----	0.32			
	39-60	20-27	1.30-1.50	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.32			
496----------	0-11	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	5	1-3
Fincastle	11-36	23-35	1.45-1.65	0.6-2.0	0.18-0.20	4.5-6.5	Moderate-----	0.37			
	36-42	24-32	1.45-1.65	0.6-2.0	0.15-0.19	5.1-7.8	Moderate-----	0.37			
	42-60	20-26	1.55-1.90	0.2-0.6	0.05-0.19	7.4-8.4	Low----------	0.37			
533. Urban land											
541B2----------	0-8	15-30	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	3-4
Graymont	8-34	23-35	1.30-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.32			
	34-60	25-35	1.45-1.70	0.2-0.6	0.14-0.20	7.4-8.4	Moderate-----	0.32			
567A----------	0-14	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.32	5	6	2-4
Elkhart	14-30	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-8.4	Moderate-----	0.43			
	30-60	20-27	1.35-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
567B, 567B2------	0-8	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.32	5	6	2-4
Elkhart	8-26	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-8.4	Moderate-----	0.43			
	26-60	20-27	1.35-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
570D2----------	0-18	12-20	1.35-1.45	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	5	5	.5-2
Martinsville	18-41	20-33	1.40-1.60	0.6-2.0	0.16-0.20	5.1-6.5	Moderate-----	0.37			
	41-60	15-25	1.40-1.60	0.6-2.0	0.12-0.17	5.1-6.5	Low----------	0.24			
614B----------	0-12	22-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	6	4-5
Chenoa	12-30	27-45	1.25-1.45	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	30-42	25-40	1.50-1.75	0.2-0.6	0.12-0.20	6.1-7.8	Moderate-----	0.28			
	42-60	25-40	1.50-1.75	0.2-0.6	0.14-0.20	7.4-8.4	Moderate-----	0.28			
740----------	0-16	10-27	1.30-1.40	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	5	5	2-4
Darroch	16-22	18-35	1.45-1.60	0.6-2.0	0.18-0.22	5.6-7.3	Low----------	0.43			
	22-60	18-35	1.40-1.60	2.0-6.0	0.15-0.19	5.6-7.3	Moderate-----	0.32			
801, 802. Orthents											
865. Pits											

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2221C:											
Parr	0-8	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.32	4	5	2-4
	8-25	22-32	1.40-1.55	0.6-2.0	0.15-0.19	5.6-7.3	Moderate	0.32			
	25-31	20-25	1.55-1.65	0.6-2.0	0.15-0.17	6.6-8.4	Moderate	0.32			
	31-60	10-20	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Low	0.32			
Urban land.											
2892A:											
Sawmill	0-23	18-27	1.25-1.40	0.6-2.0	0.22-0.24	6.1-7.8	Low	0.28	5	6	4-5
	23-50	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate	0.28			
	50-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate	0.28			
Lawson	0-16	10-27	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low	0.28	5	5	3-7
	16-34	10-30	1.20-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low	0.28			
	34-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate	0.43			
Urban land.											
2893B:											
Catlin	0-16	18-27	1.25-1.45	0.6-2.0	0.23-0.26	5.1-7.3	Low	0.32	5	6	3-4
	16-41	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.43			
	41-60	20-30	1.40-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low	0.43			
Saybrook	0-8	20-26	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	5	6	3-4
	8-29	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43			
	29-60	24-35	1.50-1.70	0.6-2.0	0.15-0.21	5.6-8.4	Low	0.37			
Urban land.											
2902A:											
Ipava	0-11	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate	0.28	5	6	4-5
	11-28	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High	0.43			
	28-60	20-30	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	0.43			
Sable	0-12	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.28	5	6	2-4
	12-54	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.28			
	54-60	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate	0.28			
Urban land.											
8073	0-16	15-27	1.20-1.45	0.6-2.0	0.19-0.24	6.1-7.8	Low	0.32	5	5	3-5
Ross	16-39	18-32	1.20-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Low	0.32			
	39-60	5-25	1.35-1.60	0.6-6.0	0.05-0.18	6.1-8.4	Low	0.32			
8074	0-16	18-27	1.40-1.60	0.6-2.0	0.22-0.24	5.6-7.8	Low	0.28	5	6	2-4
Radford	16-27	18-27	1.40-1.60	0.6-2.0	0.20-0.22	6.1-7.8	Low	0.28			
	27-60	24-35	1.35-1.55	0.6-2.0	0.18-0.20	6.6-7.8	Moderate	0.28			
8077	0-33	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Moderate	0.28	5	6	3-4
Huntsville	33-49	18-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Moderate	0.28			
	49-60	10-25	1.20-1.50	0.6-2.0	0.17-0.21	5.6-7.8	Low	0.28			
8107	0-23	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate	0.28	5	7	4-5
Sawmill	23-50	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate	0.28			
	50-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate	0.28			
8415	0-8	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low	0.37	5	5	1-3
Orion	8-22	10-18	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low	0.37			
	22-41	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low	0.37			
	41-60	10-30	1.20-1.40	0.6-2.0	0.18-0.22	5.6-7.8	Low	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
8451----------	0-16	10-27	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	5	5	3-7
Lawson	16-34	10-30	1.20-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low----------	0.28			
	34-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
17--- Keomah	C	None---	---	---	2.0-4.0	Apparent	Nov-Jul	High---	High---	Moderate.
27B2, 27C2, 27D2, 27E2--- Miami	B	None---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
36A, 36B, 36B2--- Tama	B	None---	---	---	4.0-6.0	Apparent	Nov-Jun	High---	Moderate	Moderate.
41--- Muscatine	B	None---	---	---	2.0-4.0	Apparent	Nov-Jul	High---	High---	Moderate.
43--- Ipava	B	None---	---	---	1.0-3.0	Apparent	Mar-Jun	High---	High---	Moderate.
56B2, 56C2--- Dana	B	None---	---	---	3.0-6.0	Perched	Mar-Apr	High---	Moderate	Moderate.
59--- Lisbon	B	None---	---	---	1.0-3.0	Apparent	Nov-May	High---	High---	Moderate.
60B2, 60C2, 60C3, 60D2--- La Rose	B	None---	---	---	>6.0	---	---	Moderate	Moderate	Low.
61--- Atterberry	B	None---	---	---	1.0-3.0	Apparent	Mar-Jun	High---	High---	Moderate.
67--- Harpster	B/D	None---	---	---	+.5-2.0	Apparent	Feb-Jun	High---	High---	Low.
68--- Sable	B/D	None---	---	---	+.5-2.0	Apparent	Mar-Jun	High---	High---	Low.
91B2--- Swygert	C	None---	---	---	1.0-3.0	Perched	Feb-May	High---	High---	Low.
125--- Selma	B/D	None---	---	---	+.5-2.0	Apparent	Mar-Jun	High---	High---	Low.
134B2, 134C2--- Camden	B	None---	---	---	>6.0	---	---	High---	Low---	Moderate.
145B2, 145C2--- Saybrook	B	None---	---	---	4.0-6.0	Apparent	Mar-Jun	High---	High---	Moderate.
148A, 148B2, 148C2--- Proctor	B	None---	---	---	>6.0	---	---	High---	Moderate	Moderate.
149--- Brenton	B	None---	---	---	1.0-3.0	Apparent	Mar-Jun	High---	High---	Moderate.
152--- Drummer	B/D	None---	---	---	+.5-2.0	Apparent	Mar-Jun	High---	High---	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
154---------- Flanagan	B	None--------	---	---	1.5-3.5	Apparent	Mar-Jun	High-----	High-----	Moderate.
171B, 171B2, 171C2---------- Catlin	B	None--------	---	---	3.5-6.0	Apparent	Feb-May	High-----	High-----	Moderate.
193B2, 193C2, 193D2---------- Mayville	B	None--------	---	---	2.0-6.0	Apparent	Nov-Apr	High-----	Moderate	Moderate.
198---------- Elburn	B	None--------	---	---	1.0-3.0	Apparent	Jan-May	High-----	High-----	Moderate.
199A, 199B-------- Plano	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Low.
213---------- Normal	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
221B2, 221C2------ Parr	B	None--------	---	---	>6.0	---	---	Moderate	High-----	Moderate.
223B2, 223C2------ Varna	C	None--------	---	---	3.0-6.0	Perched	Mar-May	High-----	Moderate	Moderate.
224C2, 224C3, 224D2, 224D3, 224E2, 224G------ Strawn	B	None--------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
232---------- Ashkum	B/D	None--------	---	---	+1-2.0	Apparent	Apr-Jun	High-----	High-----	Moderate.
233B, 233B2, 233C2---------- Birkbeck	B	None--------	---	---	3.0-6.0	Apparent	Mar-May	High-----	High-----	Moderate.
236---------- Sabina	C	None--------	---	---	1.5-3.5	Apparent	Mar-Jun	High-----	High-----	Moderate.
243A, 243B-------- St. Charles	B	None--------	---	---	3.0-6.0	Apparent	Feb-Jun	High-----	Moderate	Moderate.
244---------- Hartsburg	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
272---------- Edgington	C/D	None--------	---	---	+.5-2.0	Apparent	Feb-Jun	High-----	High-----	Moderate.
279B2---------- Rozetta	B	None--------	---	---	4.0-6.0	Apparent	Mar-Jun	High-----	Moderate	Moderate.
290A, 290B2, 290C2---------- Warsaw	B	None--------	---	---	>6.0	---	---	Moderate	Low------	Moderate.
293---------- Andres	C	None--------	---	---	1.0-3.0	Perched	Mar-Jun	High-----	High-----	Low.
294B---------- Symerton	B	None--------	---	---	3.5-6.0	Apparent	Mar-May	Moderate	High-----	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
318B2---------- Lorenzo	B	None--------	---	---	>6.0	---	---	Low------	Moderate	Moderate.
322B2, 322C2------ Russell	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
327B2, 327C2------ Fox	B	None--------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
330---------- Peotone	B/D	None--------	---	---	+.5-1.0	Apparent	Feb-Jul	High-----	High-----	Moderate.
440B2, 440C2------ Jasper	B	None--------	---	---	>6.0	---	---	Moderate	Moderate	High.
481---------- Raub	C	None--------	---	---	1.0-3.0	Apparent	Jan-Apr	High-----	High-----	Moderate.
484---------- Harco	B	None--------	---	---	1.0-3.0	Apparent	Feb-Apr	High-----	High-----	Low.
496---------- Fincastle	C	None--------	---	---	1.0-3.0	Apparent	Jan-Apr	High-----	High-----	Moderate.
533. Urban land										
541B2---------- Graymont	B	None--------	---	---	4.0-6.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
567A, 567B, 567B2- Elkhart	B	None--------	---	---	4.0-6.0	Apparent	Mar-May	High-----	Moderate	Moderate.
570D2---------- Martinsville	B	None--------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
614B---------- Chenoa	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
740---------- Darroch	B	None--------	---	---	1.0-3.0	Apparent	Dec-May	High-----	High-----	Moderate.
801, 802---------- Orthents	---	None--------	---	---	>6.0	---	---	---	---	---
865. Pits										
2221C: Parr----------	B	None--------	---	---	>6.0	---	---	Moderate	High-----	Moderate.
Urban land.										
2892A: Sawmill----------	B/D	Rare--------	---	---	0-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
Lawson----------	C	Rare--------	---	---	1.0-3.0	Apparent	Nov-May	High-----	Moderate	Low.
Urban land.										

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
2893B:										
Catlin	B	None	---	---	3.5-6.0	Apparent	Feb-May	High	High	Moderate.
Saybrook	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	High	High	Moderate.
Urban land.										
2902A:										
Ipava	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
Sable	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	High	High	Low.
Urban land.										
8073 Ross	B	Occasional	Brief	Mar-Jun	4.0-6.0	Apparent	Feb-Apr	Moderate	Low	Low.
8074 Radford	B	Occasional	Brief	Mar-Jun	1.0-3.0	Apparent	Mar-Jun	High	High	Low.
8077 Huntsville	B	Occasional	Brief	Mar-Jun	>6.0	---	---	High	Low	Low.
8107 Sawmill	B/D	Occasional	Brief	Mar-Jun	0-2.0	Apparent	Mar-Jun	High	High	Low.
8415 Orion	C	Occasional	Very brief	Mar-Jun	1.0-3.0	Apparent	Nov-May	High	High	Low.
8451 Lawson	C	Occasional	Brief	Mar-Jun	1.0-3.0	Apparent	Nov-May	High	Moderate	Low.

TABLE 18.--ENGINEERING INDEX TEST DATA

(MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name and location	Sample number	Horizon	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ cu ft	Pct					Pct			
Catlin silt loam:													
330 feet east and 70 feet south of the northwest corner of sec. 11, T. 23 N., R. 1 E.	86IL-113-53-1	Ap	0-11	105	18	100	100	99	98	36	13	A-6	CL
	86IL-113-53-3	Bt1	16-26	101	19	100	100	100	99	41	17	A-7-6	CL
	86IL-113-53-6	2C	45-60	121	14	98	95	91	78	27	12	A-6	CL
Chenoa silt loam:													
2,409 feet west and 75 feet north of the southeast corner of sec. 14, T. 26 N., R. 5 E.	87IL-113-6-1	Ap	0-12	104	19	100	99	96	90	35	13	A-6	CL
	87IL-113-6-3	Bt1	17-24	100	21	99	98	98	93	49	28	A-7-6	CL
	87IL-113-6-5	2BC	31-40	112	16	99	98	96	88	31	13	A-6	CL
	87IL-113-6-6	2C	40-60	133	14	96	95	92	85	29	11	A-6	CL
Elkhart silt loam:													
726 feet north and 528 feet west of the southeast corner of sec. 20, T. 22 N., R. 3 E.	89IL-113-36-1	Ap	0-8	101	20	100	100	99	96	38	14	A-6	CL
	89IL-113-36-4	Bt1	18-25	102	20	100	100	100	99	46	24	A-7-6	CL
	89IL-113-36-7	C	35-60	114	15	99	98	98	97	28	7	A-4	CL
Harco silt loam:													
1,200 feet south and 25 feet west of the northeast corner of sec. 20, T. 22 N., R. 5 E.	89IL-113-63-1	Ap	0-11	101	20	100	100	99	97	39	16	A-6	CL
	89IL-113-63-3	Bt1	14-21	101	21	100	100	100	98	53	29	A-7-6	CH
	89IL-113-63-6	C	33-60	114	15	100	100	100	99	28	5	A-4	ML
La Rose silt loam:													
1,386 feet east and 60 feet south of the northwest corner of sec. 11, T. 23 N., R. 1 E.	86IL-113-54-1	Ap	0-7	105	18	100	100	99	96	36	14	A-6	CL
	86IL-113-54-2	Bt1	7-12	108	18	99	99	97	88	39	17	A-6	CL
	86IL-113-54-5	C	22-60	122	10	95	92	88	64	18	1	A-4	ML
Lorenzo silt loam:													
990 feet south and 330 feet east of the northwest corner of sec. 34, T. 23 N., R. 3 E.	91IL-113-8-1	Ap	0-5	108	17	92	90	85	69	35	14	A-6	CL
	91IL-113-8-2	Bt1	5-14	118	13	91	84	74	48	30	16	A-6	SC
	91IL-113-8-5	C	24-60	132	10	97	92	83	53	16	3	A-4	ML

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name and location	Sample number	Horizon	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ cu ft	Pct					Pct			
Normal silt loam:													
1,650 feet south and 2,310 feet east of the northwest corner of sec. 32, T. 24 N., R. 1 W.	90IL-113-138-1	Ap	0-11	103	19	100	99	98	96	32	23	A-6	CL
	90IL-113-138-2	E	11-20	108	16	100	99	96	94	29	21	A-6	CL
	90IL-113-138-4	Bt2	28-37	103	20	100	100	99	96	41	20	A-7-6	CL
	90IL-113-138-6	C	52-60	116	18	100	100	99	97	35	19	A-6	CL
Orion silt loam:													
660 feet south and 198 feet east of the northwest corner of sec. 34, T. 23 N., R. 3 E.	91IL-113-7-1	Ap	0-8	112	16	100	99	97	90	32	10	A-4	CL
	91IL-113-7-3	C1	13-24	107	18	100	100	98	94	31	10	A-4	CL
	91IL-113-7-5	Ab	36-60	89	27	100	100	100	99	54	28	A-7-6	CH
Strawn loam:													
297 feet west and 2,046 feet north of the southeast corner of sec. 7, T. 25 N., R. 2 E.	87IL-113-27-1	Ap	0-4	106	17	94	90	86	67	39	15	A-6	CL
	87IL-113-27-3	Bt2	7-14	107	18	98	96	91	79	41	21	A-7-6	CL
	87IL-113-27-6	C	24-60	127	12	95	89	83	69	24	8	A-4	CL

TABLE 19.--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
Andres	Fine-loamy, mixed, mesic Aquic Argiudolls
Ashkum	Fine, mixed, mesic Typic Haplaquolls
Atterberry	Fine-silty, mixed, mesic Udollic Ochraqualfs
Birkbeck	Fine-silty, mixed, mesic Typic Hapludalfs
Brenton	Fine-silty, mixed, mesic Aquic Argiudolls
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Catlin	Fine-silty, mixed, mesic Typic Argiudolls
Chenoa	Fine, illitic, mesic Aquic Argiudolls
*Dana	Fine-silty, mixed, mesic Typic Argiudolls
Darroch	Fine-loamy, mixed, mesic Aquic Argiudolls
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Edgington	Fine-silty, mixed, mesic Argiaquic Argialbolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Elkhart	Fine-silty, mixed, mesic Typic Argiudolls
Fincastle	Fine-silty, mixed, mesic Aeric Ochraqualfs
Flanagan	Fine, montmorillonitic, mesic Aquic Argiudolls
Fox	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
*Graymont	Fine-silty, mixed, mesic Typic Argiudolls
Harco	Fine-silty, mixed, mesic Aquic Argiudolls
Harpster	Fine-silty, mesic Typic Calciaquolls
Hartsburg	Fine-silty, mixed, mesic Typic Haplaquolls
Huntsville	Fine-silty, mixed, mesic Cumulic Hapludolls
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
*Jasper	Fine-loamy, mixed, mesic Typic Argiudolls
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
*La Rose	Fine-loamy, mixed, mesic Typic Argiudolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Lisbon	Fine-silty, mixed, mesic Aquic Argiudolls
Lorenzo	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Martinsville	Fine-loamy, mixed, mesic Typic Hapludalfs
Mayville	Fine-silty, mixed, mesic Typic Hapludalfs
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Muscatine	Fine-silty, mixed, mesic Aquic Hapludolls
Normal	Fine-silty, mixed, mesic Argiaquic Argialbolls
*Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Orthents
*Parr	Fine-loamy, mixed, mesic Typic Argiudolls
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Plano	Fine-silty, mixed, mesic Typic Argiudolls
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Radford	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Raub	Fine-silty, mixed, mesic Aquic Argiudolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Russell	Fine-silty, mixed, mesic Typic Hapludalfs
Sabina	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
*Saybrook	Fine-silty, mixed, mesic Typic Argiudolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Strawn	Fine-loamy, mixed, mesic Typic Hapludalfs
*Swygert	Fine, mixed, mesic Aquic Argiudolls
Symerton	Fine-loamy, mixed, mesic Typic Argiudolls
Tama	Fine-silty, mixed, mesic Typic Argiudolls
*Varna	Fine, illitic, mesic Typic Argiudolls
Warsaw	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls

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To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by mail to U.S. Department of Agriculture; Director, Office of Adjudication; 1400 Independence Avenue, S.W.; Washington, D.C. 20250-9419; by fax to (202) 690-7442; or by email to program.intake@usda.gov.

Persons with Disabilities

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).