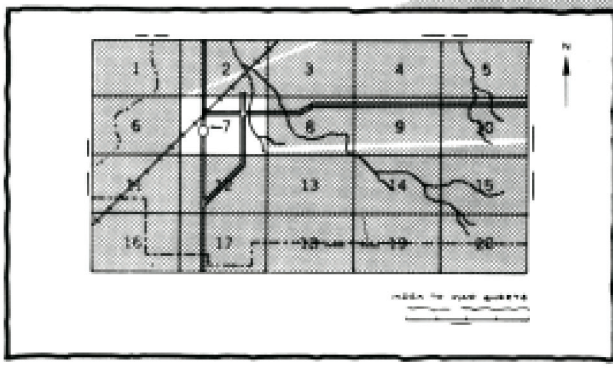
SOIL SURVEY OF

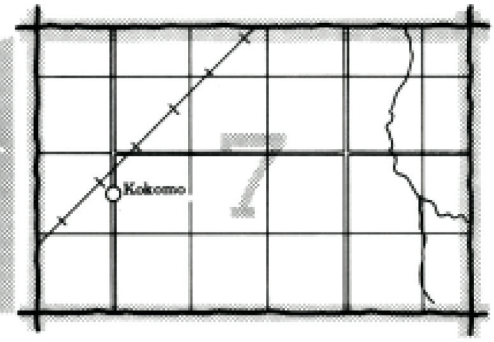
DU PAGE AND PART OF COOK COUNTIES, ILLINOIS

UNITED STATES DEPARTMENT OF AGRICULTURE,
SOIL CONSERVATION SERVICE,
in cooperation with
ILLINOIS AGRICULTURAL EXPERIMENT STATION

HOW TO USE

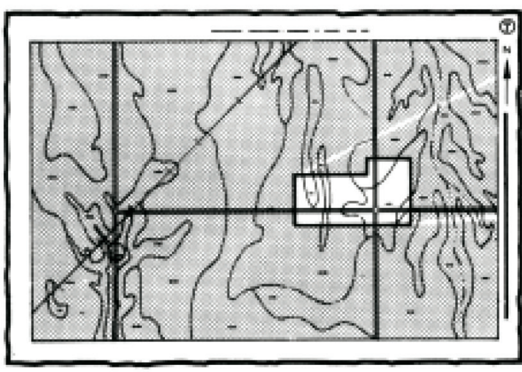
1. Locate your area of interest on the "Index to Map Sheets"

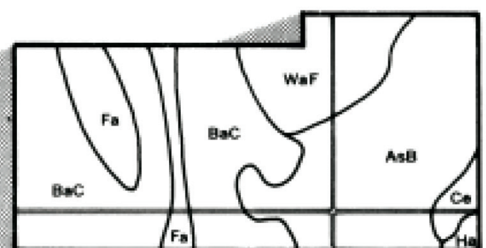




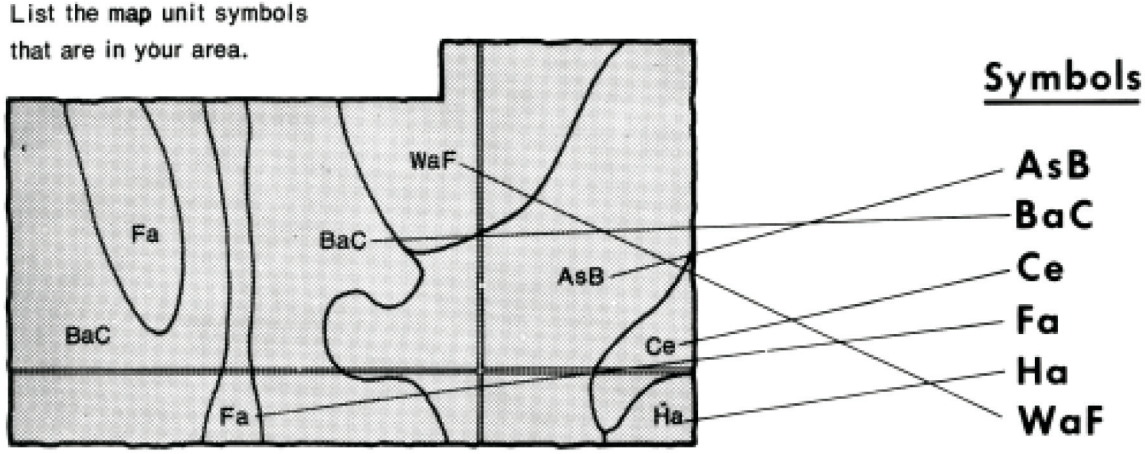
2. Note the number of the map sheet and turn to that sheet.

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



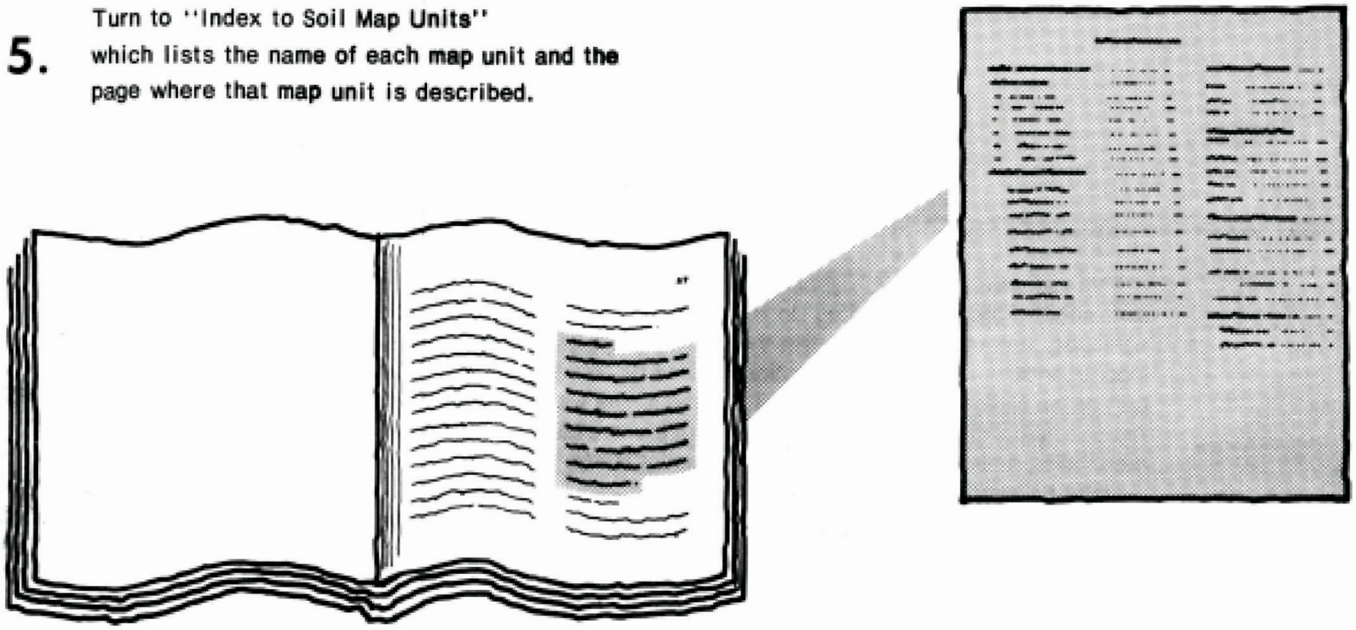


4. List the map unit symbols that are in your area.

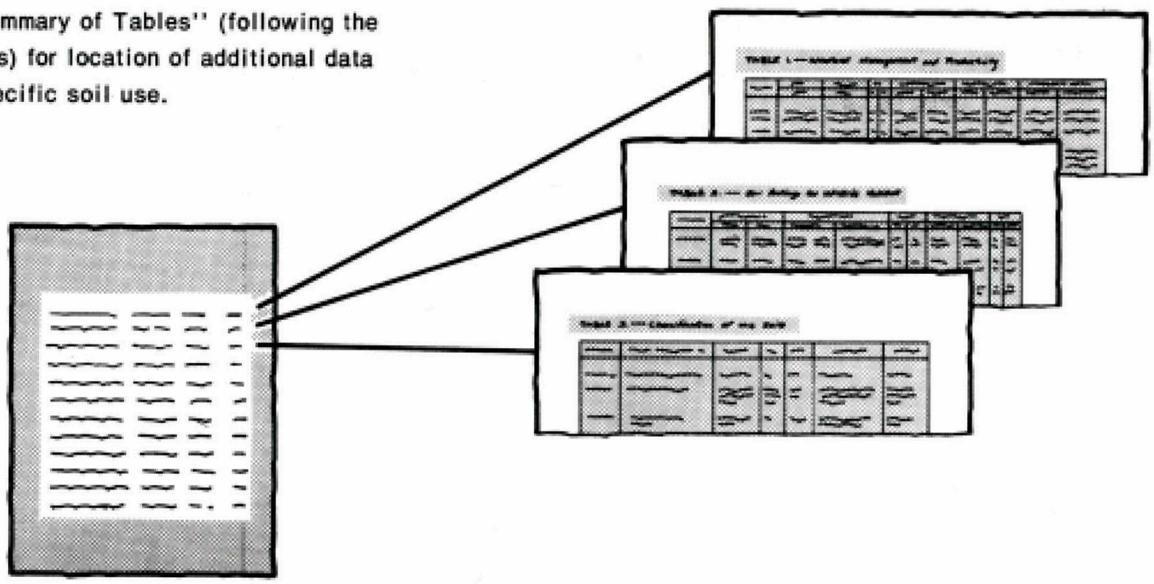


THIS SOIL SURVEY

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



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



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

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

Major fieldwork for this soil survey was completed in the period 1971-1975. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1976. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the North Cook, Will-South Cook and Kane-Du Page Soil and Water Conservation Districts. The cost was shared by the Cook County Board of Commissioners and the Du Page County Board of Supervisors.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale. This soil survey is Illinois Agricultural Experiment Station Report No. 108.

Cover: Aerial view of urban development in Du Page County. Light colored areas in left center are Markham soils and dark colored areas are Ashkum soils.

Contents

Contents—continued

Issued May 1979

Index to map units

Summary of Tables

Summary of Tables—Continued

Foreword

The Soil Survey of Du Page and part of Cook Counties, Illinois contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

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

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to 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 kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

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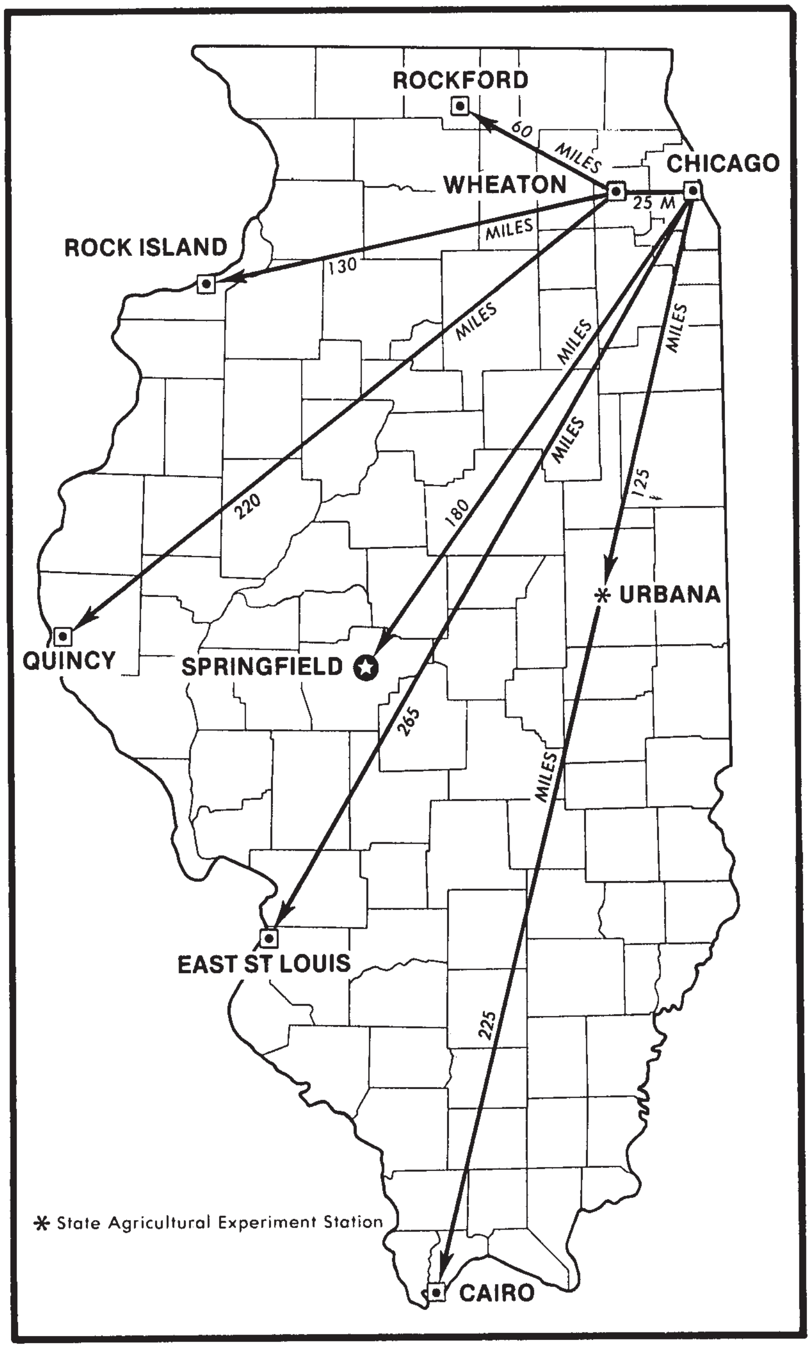

Location of survey area in Illinois.

SOIL SURVEY OF Du PAGE AND PART OF COOK COUNTIES, ILLINOIS

By D. R. Mapes, Soil Conservation Service

Fieldwork by D. R. Mapes, J. L. Alexander, T. M. Goddard, B. G. Stewart, R. W. Windhorn, J. E. Paschke, and D. L. Smith, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with Illinois Agricultural Experiment Station

Du Page and Cook Counties are in the northeastern part of Illinois (see map on facing page). Wheaton is the county seat of Du Page County. Du Page County is bordered on the east by Cook County and on the west by Kane and Will Counties. The county has a total land area of 211,840 acres or 331 square miles, all of which is in the survey area.

Chicago is the county seat of Cook County. Cook County is bordered on the east by Lake Michigan. The county has a total land area of 610,688 acres or 954.2 square miles. This survey covers 315,688 acres of the county. The remaining 295,000 acres are within the city limits of Chicago and in heavily urbanized areas surrounding Chicago. Most soils in that area have been extensively altered or disturbed. The general soil map, however, covers all of Cook County.

The survey area is in the Great Lakes section of the Central Lowlands province (*4*). Three subdivisions of the Great Lakes section occur in the area—The Wheaton Morainal Country, Bloomington Ridged Plain, and Chicago Lake Plain. The Wheaton Morainal Country, occupying most of the survey area, has undulating to rough knob and kettle topography; the Bloomington Ridged Plain, only in western Du Page County, is an area of older glacial drift that is not so rugged and has few lakes; the Chicago Lake Plain, in eastern Cook County, is exceptionally flat and about 45 miles long and 15 miles wide. About 90 percent of the Chicago Lake Plain is occupied by Chicago and its suburbs.

Soils in the survey area formed mainly in glacial material. For the most part they are relatively high in clay.

Elevation in the area ranges from 950 feet in northwestern Cook County and 853 feet on Mount Hoy in Du Page County to 580 feet along the Des Plaines River in the southwestern part of the area.

The drainage systems in most of the survey area are poorly defined, and many large areas are undrained.

Most of Cook County is drained by the Des Plaines, Calumet, and Chicago Rivers. The flow of the Chicago and Calumet Rivers has been changed through engineering (*4*). Instead of outletting in Lake Michigan, these rivers are connected to the Des Plaines River by two canals, the Chicago Sanitary and Ship Canal and the Calumet-Sag Channel. The flow of the three rivers now is westward. A small area in the northern part of Cook County along Lake Michigan drains directly into Lake Michigan.

Du Page County is drained by the West and East Branches of the Du Page River. The southeastern corner of Du Page County is drained by the Des Plaines River. The northwestern and southwestern corners of the county drain into the Fox River.

General nature of the survey area

This section gives general information concerning Du Page and part of Cook Counties. It discusses climate, vegetation, natural resources and water supply, settlement and development, transportation and industry, and farming.

Climate

The survey area is cold and snowy in winter and warm in summer. In summer, areas nearest the lake are cooler than the rest.

Precipitation is well distributed during the year and generally is adequate for most crops on most soils, but low available water capacity in some gravelly and sandy soils results in droughty conditions for brief periods nearly every year. Some truck crops and other plants on these soils need supplemental water, particularly late in autumn.

From late in fall through winter, snow squalls are frequent and total snowfall is normally heavy. In some years a single prolonged storm can produce more than 2 feet of snow, and strong winds can create deep drifts.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Chicago for the period 1958 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 25 degrees F, and the average daily minimum temperature is 17 degrees. The lowest temperature on record, which occurred at Chicago on January 29, 1966, is -20 degrees. In summer the average temperature is 71 degrees, and the average daily maximum temperature is 81 degrees. The highest recorded temperature, which occurred on September 7, 1960, is 99 degrees.

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

Of the total annual precipitation, 22 inches, or 67 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 4.25 inches at Chicago on October 10, 1969. Thunderstorms occur on about 37 days each year, and most occur in summer.

Average seasonal snowfall is 39 inches. The greatest snow depth at any one time during the period of record was 27 inches. On the average, 32 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon in spring is less than 15 percent; during the rest of the year it is about 61 percent. Humidity is higher at night, and the average at dawn is about 80 percent.

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

Vegetation

The survey area was originally rolling woodland and relatively flat prairies, and scattered marshes in low lying areas.

The dominant vegetation in woodland was various species of oak, hickory, maple, elm, and ash. Hackberry, linden, and walnut trees were also present. Hop hornbeam and American hornbeam were understory, and willow and poplar trees were along streams. Common woodland wildflowers were spring beauty, hepatica, mandrake, wild geranium, bloodroot, false-solomons-seal, and wakerobin.

Various grasses and wildflowers were prevelant throughout the broad prairies (fig. 1). A few of the grasses were big bluestem, Indian grass, and prairie dropseed. In the drier areas little bluestem and porcupinegrass were prevalent, and in wetter areas switchgrass and prairie cordgrass were common.

Bluejoint reedgrass and various reeds and sedges were in the marshes.

As man began to till the soil these various grasses and wildflowers decreased in numbers. Native plants were not able to compete with tillage and the plants that were introduced by settlers.

Natural resources and water supply

The survey area has large deposits of building materials—stone, gravel, sand, and clay (*28*). Production by the mineral industry, based on these resources, is economically significant (*6*). About a third of the production is crushed stone, a fifth is sand and gravel, a fifth is clay products, and the rest is other mineral products.

Racine dolomite is quarried at LaGrange, Hillside, Elmhurst, and Chicago and on approximately 600 acres at Thornton.

Large quantities of sand and gravel are mined for road building, concrete, mortar, plaster, and many other purposes. A very large gravel pit is near Elgin. Other large gravel pits are throughout the survey area, generally in gravel deposits on outwash plains, valley trains, and kames.

The glacial till and clayey lake deposits of the Lake Chicagc Plain have been used for many years in the manufacture of common brick. Large quantities of brick are produced at plants near Dolton, Blue Island, and Stickney.

Deposits of peat, humus, and organic silts (muck) are widely spread in the area. At present they are used mostly for horticultural purposes. Peat is mainly mined near Orland Park in Cook County.

Water is a major resource, and enormous quantities are used from both ground water and surface water sources. Lake Michigan supplies water for 66 surburban communities and to the City of Chicago. Although the supply of water is almost unlimited, the distribution of water and protection of Lake Michigan from pollution are concerns of this metropolitan water system (*12*).

Ground water supplies are obtained from wells penetrating sand and gravel aquifers, the shallow dolomite bedrock aquifer system, or the deeper Cambrian and Ordovician sandstones. In 1970 approximately 4 percent of the total ground water pumped was from sand and gravel wells, 37 percent from shallow dolomite wells, and 59 percent from deep sandstone wells. Average water levels have declined considerably in the last 10 years (*14*).

Settlement and development

When Marquette and Joliet explored the survey area in 1673, the Potawatomi Indians were the main inhabitants.

Other inhabitants were small bands of Illinois and Ottawa Indians.

The first settlers began to arrive in the early 1800's. In 1831 Chicago became the county seat in Cook County. A few years later Chicago was incorporated as a town with a population of 200 people. In the 1970 census, the population of Chicago was 3,366,957 people, a decline from the 1960 census which was 3,550,404 people. This decline in population reflects suburban growth in Du Page and Cook Counties.

In 1834 Baily Hobson established a mill near Du Page County. Du Page County was established in 1839. The first county seat was Naperville. In 1867 the county seat was moved to Wheaton because Wheaton represented a more central location in the county. Wheaton was incorporated as a town in 1890 and had a population of 30,910 in 1970.

Transportation and industry

Many major highways and railways provide transportation in the survey area. All transportation routes are connected to Chicago, and from that point the rest of the survey area is readily accessible.

Facilities for ship and barge traffic are available. The Chicago Sanitary and Ship Canal joins the Illinois River system and Lake Michigan. The Calumet Sag Channel also serves as a route for barge traffic from the Chicago Sanitary and Ship Canal to Lake Michigan. Lake Michigan gives the Chicago area a direct link, via the St. Lawrence Seaway, to ocean-traveling ships carrying raw material and manufactured goods. Chicago and Lake Calumet contain the main harbor facilities.

Three major airports and several smaller airports provide air service to the area.

The eastern part of Cook County is densely populated and is a prime industrial center of the Midwest. Steel mills, refineries, and many kinds of manufacturing facilities are in this area. Du Page County and suburban Cook County are becoming increasingly important for light industry.

The industry of the area is quite varied and helps support a balanced economy. Major industries are manufacturing, food processing, services, wholesale and retail trades, and farming. Services are increasing as a part of the economy. Farming represents less than 1 percent of the economy.

Farming

The total acreage used for farming in the survey area has been decreasing because of urban development. Total acreage in farms in Cook County is 67,849 acres and in Du Page County is 49,203 acres (*22*).

The main row crops are corn and soybeans. The combined acreage of each crop is 36,769 acres in Cook County and is 32,894 acres in Du Page County.

Oats and wheat are the main small grain. In Cook County oats are grown on 2,672 acres, and in Du Page County oats are grown in 1,909 acres. In Cook County wheat is grown on 1,047 acres, and in Du Page County wheat is grown on 1,342 acres (*11*).

Livestock raised are cattle for beef and some dairy, swine, sheep, poultry, and horses. Except for horses, livestock numbers are decreasing.

A number of tree nurseries and truck farms are in the survey area. Wooded areas managed as commercial forest are rare.

How this survey was made

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

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

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

Generally, the soils in rural areas have not been greatly disturbed by man, except for cultivation, and their boundaries could be plotted in detail with greater accuracy than boundaries of the soils in cities and towns. Within cities and towns where little open space remains and where hills have been leveled, low areas filled in, and the natural soils greatly disturbed, soil boundaries cannot be recognized or plotted easily. For this reason, an arbitrary boundary was drawn around the city of Chicago and its environs. Within this boundary a soil survey was not feasible, and that area was excluded from the soil survey. However, the General Soil Map in the back of this publication, provides a basis for comparing the potential of large areas for general kinds of land use.

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

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

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, home-buyers, and those seeking recreation.

General soil map for broad land-use planning

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

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

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

The map units shown on the general soil map have been placed in four major groups for broad interpretative purposes. The groups are separated by texture of the surface layer and by landscape position. Each of the major groups and their included soils are described on the following pages.

Silty and clayey soils on uplands and lake plains

This group consists of five map units, and it makes up about 2 percent of the survey area. The major soils in this group are the Markham, Ashkum, Morley, Frankfort, Bryce, and Milford soils. Most areas of these soils are undulating to gently rolling, but areas range from very steep to nearly level. These soils are on uplands and lake plains. They have a clayey or silty surface layer and a clayey or silty subsoil. They are poorly drained to well drained and are moderately slowly permeable or slowly permeable.

More than half of the map units in this group consist of heavily built-up, expanding, metropolitan, and rural-urban areas. Many areas of soils have been cut, graded, and filled and are covered with dwellings, shopping centers, industrial sites, office buildings, pavement, and other works and structures.

Most soils in this group were used for crops or pasture at one time. Some areas are still used for crops, mainly corn and soybeans. A few areas, however, are in vegetable farms. Woodland remains in some places, especially along the major streams and drainageways.

About one-third of the soils in this group have fair potential for most urban uses, and the rest have poor potential. The main concern in management is poor drainage in the low lying areas. Generally, the soils are poorly suited to septic tank filter fields. In the low lying areas, dwellings with basements are poorly suited.

1. Frankfort-Bryce

Deep, gently rolling to nearly level, somewhat poorly drained and poorly drained soils that have a clayey subsoil; formed in glacial till

This map unit consists of gently rolling and nearly level soils on glacial moraines and till plains in the northern and southern parts of Cook County.

This unit makes up about 2 percent of the survey area. It is about 55 percent Frankfort soils, 20 percent Bryce soils, and 25 percent soils of minor extent.

The Frankfort soils in most places are at a slightly higher elevation than the Bryce soils. Frankfort soils are somewhat poorly drained, and Bryce soils are poorly drained. Frankfort soils have a surface layer of silty clay loam or silty clay, and Bryce soils have a surface layer of silty clay. Both soils have low strength when wet.

The minor soils in this unit are the very poorly drained Muskego and Houghton soils, the somewhat poorly drained Nappanee and Swygert soils, and the strongly sloping Chatsworth soils. The very poorly drained Muskego and Houghton soils are unstable organic soils.

Areas of this unit are used mainly for farming, for private estates, or for homes with relatively large lots. A large percentage of the areas is in idle farmland, vacant land, or forest preserves. Wetness and the high content of clay are the main limitations to urban development and to most other uses. Occasional flooding is a limitation in low lying areas. Erosion is a limitation in some of the more rolling areas. Severely eroded areas are difficult to vegetate.

Wetness and the high content of clay are severe limitations that are difficult to overcome. Hence, the potential for most urban uses is poor. Even when the soils are drained, potential for farming is only fair. Low lying areas have good potential for development of wetland wildlife habitat.

2. Morley-Ashkum

Deep, very steep to nearly level, well drained and poorly drained soils that have a clayey and silty subsoil; formed in glacial till

This map unit consists of very steep to nearly level soils. Commonly, the gently rolling to nearly level soils are on till plains or moraines and are mainly along the major watercourses throughout the county. The moderately sloping to very steep soils are mostly in deep ravines and on escarpments along Lake Michigan, the Des Plaines River, and the Calumet-Sag Channel.

This unit makes up about 12 percent of the survey area. It is about 50 percent Morley soils, 20 percent Ashkum soils, and 30 percent soils of minor extent.

The Morley soils are at a higher elevation than the Ashkum soils. Morley soils are well drained, and Ashkum soils are poorly drained. Morley soils have a surface layer of silt loam, except for the severely eroded areas. Ashkum soils have a surface layer of silty clay loam or silty clay. Both soils have fair to poor strength when wet.

The minor soils in this unit are the very poorly drained, unstable Muskego and Houghton soils, the somewhat poorly drained Beecher and Blount soils, and the moderately well drained Markham soils.

The pattern of land use in this map unit is mixed. Areas are in tracts of idle land, farmland, and small estates. A relatively high percentage of the areas is in trees and forest preserves. Some areas of the minor soils are swampy and undrained. The clayey subsoil and wetness are the main limitations for urban development and for most other uses. Slope is a limitation on steep areas.

The Morley soils in this unit have fair potential for most urban uses. The very steep areas have poor potential for most uses because of slope. The low lying areas have poor potential for urban development because of wetness. The potential for development of wetland wildlife habitat is good.

3. Markham-Ashkum

Deep, gently rolling to nearly level, moderately well drained and poorly drained soils that have a clayey and silty subsoil; formed in glacial till

This map unit consists of soils on till plains and moraines. These soils commonly are throughout the survey area, except in the extreme western part and on the lake plain bordering Lake Michigan.

This unit makes up about 15 percent of the survey area. It is about 50 percent Markham soils, 25 percent Ashkum soils, and 25 percent soils of minor extent.

The Markham soils are at a higher elevation than the Ashkum soils. Markham soils are moderately well drained, and Ashkum soils are poorly drained. Markham soils have a surface layer of silt loam and are susceptible to erosion. Ashkum soils have a surface layer of silty clay loam or silty clay. Both soils have fair to poor strength when wet.

The minor soils in this unit are the very poorly drained, unstable Muskego and Houghton soils, the somewhat poorly drained Elliott and Beecher soils, and the well drained Varna soils.

The pattern of land use in this map unit is mixed. Many areas are in farms, and many areas of farmland are idle. Areas are also in small rural estates, homesites with relatively large lots, and forest preserves. A few areas are swampy and undrained. The relatively high clay content and wetness are the main limitations to urban development and to most other uses. Occasional brief flooding is a hazard on some low lying areas.

The Markham soils have fair potential for urban development. They are subject to severe erosion if left without plant cover for a considerable period. Wetness is a severe limitation on Ashkum soils and is difficult to overcome. Hence, the potential for most urban development is poor. The potential for development of wetland wildlife habitat is good.

4. Milford-Martinton

Deep, nearly level, poorly drained and somewhat poorly drained soils that have a silty and clayey subsoil; formed in glacial lake sediment

This map unit consists of nearly level soils that are on lake plains and are generally lower than the surrounding soils. Most areas of this map unit are next to Lake Michigan and are not built up. Smaller areas are scattered throughout the survey area.

This unit makes up about 2 percent of the survey area. It is about 60 percent Milford soils, 25 percent Martinton soils, and 15 percent soils of minor extent.

The Milford soils in most places are at a slightly lower elevation than the Martinton soils. Milford soils are poorly drained, and Martinton soils are somewhat poorly drained. Milford soils have a surface layer of silty clay loam, whereas Martinton soils have a surface layer of silt loam. Both soils have medium to low compressibility when wet.

The minor soils in this unit are the somewhat poorly drained Del Rey and Hoopeston soils, the poorly drained Selma and Gilford soils, and the well drained Oakville soils.

Much of the acreage of this unit is farmed. A large area in southeastern Cook County is used for vegetable production. A large acreage of this unit is in idle farmland, small estates, and homesites with relatively large lots. Wetness and the high content of clay are the main limitations for urban development and for most other uses.

Wetness is a severe limitation that is difficult to overcome. Because of wetness the potential for most urban development is poor. The potentials for cultivated farm crops and for development of wetland wildlife habitat are good.

5. Urban land-Frankfort-Bryce

Built-up areas and deep, gently rolling to nearly level, somewhat poorly drained and poorly drained soils that have a clayey subsoil; formed in glacial till

This map unit consists of built-up areas and of gently rolling to nearly level soils on glacial moraines and till plains on uplands. Areas of this unit are in built-up parts of Cook County.

This unit makes up about 3 percent of the survey area. It is about 40 percent Urban land, 30 percent Frankfort soils, 20 percent Bryce soils, and 10 percent soils of minor extent.

The Urban land consists of works and structures that obscure or alter the soils. In most areas the Frankfort soils are at a slightly higher elevation than the Bryce soils. Frankfort soils are somewhat poorly drained and have a surface layer of silty clay loam or silty clay. Bryce soils are poorly drained and have a surface layer of silty clay. Both soils have low strength when wet.

The minor soils in this unit are the altered Orthents, clayey, the very poorly drained Peotone soils, and the somewhat poorly drained Nappanee and Swygert soils.

This unit is predominantly used for urban development. Unaltered soils are in vacant lots or in developments that have relatively large lots. Wetness and the high content of clay are the main limitations to urban development and most other uses. Occasional flooding is a limitation in low areas. Basements are likely to be wet in low areas, and septic tank filter fields are likely to function poorly. Erosion is a limitation in some of the more rolling areas. Severely eroded areas are difficult to vegetate.

6. Urban land-Markham-Ashkum

Built-up areas and deep, gently rolling to nearly level, moderately well drained and poorly drained soils that have a clayey and silty subsoil; formed in glacial till

This map unit consists of built-up areas and of gently rolling to nearly level soils on till plains and moraines on uplands. Most areas of this unit are in the outer suburbs of Chicago.

This unit makes up about 21 percent of the survey area. It is about 40 percent Urban land, 30 percent Markham soils, 15 percent Ashkum soils, and 15 percent soils of minor extent.

The Urban land consists of works and structures that obscure or alter the soils. The Markham soils are at a higher elevation than the Ashkum soils. Markham soils are moderately well drained, and Ashkum soils are poorly drained. Markham soils have a surface layer of silt loam and are susceptible to erosion if plant cover is removed. Ashkum soils have a surface layer of silty clay loam or silty clay and a seasonal high water table. Both soils have fair to poor strength when wet.

The minor soils in this unit are Orthents clayey, the very poorly drained, unstable Muskego and Houghton soils, the somewhat poorly drained Elliott and Beecher soils, and the well drained Morley and Varna soils.

This unit is used predominantly for urban development. A few areas of unaltered soils are in small estates and homesites with relatively large lots. The high content of clay and wetness are the main limitations to urban development and most other uses. Occasional brief flooding is a hazard in some low lying areas. Basements are likely to be wet in low areas. Septic tank filter fields are likely to function poorly in all areas of this unit.

The potential for urban development in areas of the Markham soil is fair. In areas of Ashkum soils, wetness is a severe limitation and is difficult to overcome. Hence, the potential for most urban development is poor. The potential for gardening in this unit is fair to good. Trees to plant generally are those that tolerate wetness.

7. Urban land-Milford

Built-up areas and deep, nearly level, poorly drained soils that have a silty and clayey subsoil; formed in glacial lake sediment

This map unit consists of built-up areas and nearly level soils that generally are flatter and lower than the surrounding land. Areas of this map unit are only in Cook County, mainly on the plain next to Lake Michigan.

This unit makes up about 17 percent of the survey area. It is about 50 percent Urban land, 30 percent Milford soils, and 20 percent soils of minor extent.

The Urban land consists of works and structures that obscure or alter the soils. The Milford soils are poorly drained and have a surface layer of silty clay loam. They have a seasonal high water table and medium to low compressibility when wet.

The minor soils in this unit are the altered Orthents, clayey, the somewhat poorly drained Del Rey and Hoopeston soils, the poorly drained Selma and Gilford soils, and the well drained Oakville soils.

This unit is predominantly used for urban development. Some areas of unaltered soils are in small estates, homesites with relatively large lots, or vacant lots. Wetness and the high content of clay are the main limitations for urban development and most other uses.

Wetness is a severe limitation that is difficult to overcome. Because of this, the potential for most urban development is poor. The potential for gardening is fair to good. Trees generally are those that tolerate wetness.

Silty soils on uplands

This group consists of five map units, and it makes up about 9 percent of the survey area. The major soils in this group are Drummer, Mundelein, Barrington, Lisbon, and Saybrook soils. These soils are on nearly level and undulating plains on uplands. They have a silty surface layer and a silty or loamy subsoil. They are poorly drained to well drained and are moderately permeable.

One map unit in this group contains heavily built up urban areas. Many of the soils have been cut, graded, and filled and are covered with dwellings, shopping centers, industrial sites, office buildings, pavements, and other works and structures.

Most soils in this group are used for crops, mainly corn and soybeans. Some small areas are in woodland, especially along the major streams and drainageways.

The soils in this group have contrasting potentials for most urban uses. Generally, the low lying nearly level soils have poor potential, and the gently sloping soils have good potential. The low lying soils have severe limitations for septic tank filter fields and for dwellings with basements, mainly because of poor drainage.

8. Kidder-Miami

Deep, undulating to rolling, well drained soils that have a loamy and silty subsoil; formed in glacial till

This map unit consists of undulating to rolling soils in the extreme northwestern part of Cook County.

This unit makes up less than 1 percent of the survey area. It is about 40 percent Kidder soils, 15 percent Miami soils, and 45 percent soils of minor extent.

The Kidder soils contain more sand and small stones than the Miami soils. These Kidder and Miami soils are well drained and have a surface layer of silt loam. They are susceptible to erosion if left bare and exposed for a considerable time. They have medium compressibility when wet.

The minor soils in this unit are the poorly drained Drummer soils and the excessively drained, steep Rodman soils.

Areas of this unit are used for farming, for woodland, and for many small rural estates. Many scattered tracts are idle. The main limitation of these soils is the susceptibility to erosion where vegetation is removed. Excessive slope is a limitation in some places.

The potential for most urban development is good to fair. In many areas the potential for cultivated crops is fair to poor. The potential for trees and woodland wildlife habitat is good.

9. Drummer-Lisbon-Saybrook

Deep, nearly level to undulating, poorly drained to moderately well drained soils that have silty or loamy subsoil; formed in glacial till

This map unit consists mainly of soils on glacial till plains. Areas of this unit are only in the western and northernmost parts of the survey area. The largest area is southwest of Naperville in Du Page County.

This unit makes up about 1 percent of the survey area. It is about 30 percent Drummer soils, 25 percent Lisbon soils, 25 percent Saybrook soils, and 20 percent soils of minor extent.

The Drummer soils are in the lowest position of the soils in this map unit. The Saybrook soils are on the highest position, and the Lisbon soils are intermediate in position. Drummer soils are poorly drained; Lisbon soils are somewhat poorly drained; and Saybrook soils are moderately well drained. Drummer soils have a surface layer of silty clay loam. Lisbon and Saybrook soils have a surface layer of silt loam. Both the Drummer and Lisbon soils have a seasonal high water table. Saybrook soils have an erosion hazard. The soils in this unit have medium to low strength when wet.

The minor soils in the unit are the well drained, moderately sloping Griswold and La Rose soils and the poorly drained Harpster and Thorp soils.

This unit is used mainly for cultivated crops. Very few areas are used for urban development. Wetness and occasional brief flooding on low lying areas are the main limitations for farming and most other uses.

This unit has excellent potential for production of crops. The well drained Saybrook soils have fair to good potential for urban development, and Lisbon soils have fair to poor potential. Drummer soils have poor potential for most urban uses, mainly because of wetness, which is difficult to overcome. Drummer soils have good potential for development of wetland wildlife habitat.

10. Drummer-Mundelein-Barrington

Deep, nearly level to undulating, poorly drained, somewhat poorly drained, and well drained soils that have a silty and loamy subsoil; formed in glacial outwash

This map unit consists of silty soils on outwash plains that are more level than most other parts of the survey area. The largest area of this map unit is in the western part of Du Page County. Other small areas are scattered throughout the survey area.

This unit makes up about 2 percent of the survey area. It is about 35 percent Drummer soils, 20 percent Mundelein soils, 10 percent Barrington soils, and 35 percent soils of minor extent.

The Drummer soils are in the lowest positions on the landscape. The Barrington soils are on the highest ridges and knolls, and the Mundelein soils are on the intermediate positions. Drummer soils are poorly drained, Mundelein soils are somewhat poorly drained, and Barrington soils are well drained. Drummer soils have a surface layer of silty clay loam, whereas Mundelein and Barrington soils have a surface layer of silt loam. Drummer and Mundelein soils have a seasonal high water table. Barrington soils have a slight tendency to erode if plant cover is removed. All three soils have fairly low strength when wet.

The minor soils in this unit are the somewhat poorly drained Andres and Wauconda soils and the moderately well drained Grays, Zurich, and Markham soils.

Many areas of this unit are used for cultivated crops, which are better suited than most other uses. Some areas are used for small estates and homesites with large lots. Some tracts are idle, and small areas of trees are in minor soil areas. Wetness and occasional brief flooding in the low lying areas are the main limitations for urban development and most other uses.

This unit has excellent potential for cultivated crops. The Drummer and Mundelein soils have poor potential for many urban uses because of wetness, which is difficult to overcome. The better drained Barrington soils have fair to good potential. The Drummer soils have good potential for development of wetland wildlife habitat.

11. Warsaw-Fox-Will

Moderately deep over gravel, undulating and level, well drained and poorly drained soils that have a loamy and silty subsoil; formed in glacial outwash

This map unit consists of undulating and level soils that are predominantly on outwash plains, but are also on a gravelly, undulating moraine. Areas of this unit are mainly in the northwestern parts of Du Page and Cook Counties.

This unit makes up about 2 percent of the survey area. It is about 30 percent Warsaw soils, 30 percent Fox soils, 15 percent Will soils, and 25 percent soils of minor extent.

The Warsaw soils have a thicker, darker colored surface layer than the Fox soils. Warsaw and Fox soils are at a higher elevation than the Will soils. Warsaw and Fox soils are well drained and have a surface layer of silt loam. Will soils are poorly drained and have a surface layer of silty clay loam. Only the Will soils have a seasonal high water table. All three soils generally have good strength when wet.

The minor soils in this unit are the gently sloping Waupecan soils, the moderately sloping to strongly sloping Lorenzo soils, and the steep Rodman soils.

This unit is used mainly for cultivated crops. Some tracts are used for pasture for horses, some tracts are used for trees, and a substantial acreage of this unit is idle. A few areas are in small estates or homesites with relatively large lots. Several gravel pits are in this unit. Inadequate available water capacity and a tendency to erode when plant cover is removed are slight limitations for farming. Wetness in the Will soils is the main limitation for urban development.

The potential of this unit for cultivated crops is fair. The potential for gravel and sand is good, but deep subsurface borings are needed to determine the source and extent of sand and gravel. The Warsaw and Fox soils have good potential for urban development, and the Will soils have poor potential. Wetness is a severe limitation and difficult to overcome on the Will soils.

12. Urban land-Drummer-Barrington

Built-up areas and deep, nearly level to undulating, poorly drained and well drained soils that have a silty and loamy subsoil; formed in glacial outwash

This map unit consists of built-up areas and nearly level to undulating soils that are mainly on outwash plains in which the outwash is relatively shallow over glacial till or lake sediment. Most areas of this unit are in Cook County.

This unit makes up about 4 percent of the survey area. It is about 40 percent Urban land, 30 percent Drummer soils, 15 percent Barrington soils, and 15 percent soils of minor extent.

The Urban land consists of buildings and pavements that obscure or alter the soils. The Drummer soils are in the low lying positions. The Barrington soils are on the highest ridges and knolls. Drummer soils are poorly drained, and Barrington soils are well drained. Drummer soils have a surface layer of silty clay loam. Barrington soils have a surface layer of silt loam, and they have a slight tendency to erode when plant cover is removed. Both soils have fairly low strength when wet.

The minor soils in this unit are the altered Orthents, loamy, the somewhat poorly drained Wauconda soils, and the moderately well drained Grays and Zurich soils.

Most areas of this unit are used for homesites and public facilities. A few small areas of unaltered soils are in farmland, in small estates and homesites with relatively large lots, and in some developments that have scattered vacant lots. Trees are in some areas of minor soils. Wetness and occasional brief flooding of low lying areas are the main limitations for urban development and most other uses. Basements are likely to be wet in low lying areas.

The Drummer soils have poor potential for most urban uses because of wetness. Wetness in the Drummer soils is a severe limitation and is difficult to overcome. The better drained Barrington soils have fair to good potential. The potential for development of wetland wildlife habitat is good on the Drummer soils. A few areas of openland in this unit have excellent potential for cultivated crops.

Sandy and loamy soils on uplands

This group consists of three map units, and it makes up about 13 percent of the survey area. The major soils in this group are Watseka, Oakville, Selma, Hoopeston, and Wesley soils. These soils are on outwash plains and on sandy beach ridges of former glacial lakes. They have a sandy or loamy surface layer and underlying materials. They are predominantly somewhat poorly drained and poorly drained, but some are well drained. They have very rapid to moderate permeability.

Most map units in this group consist of heavily built up urban areas. Most areas of soils have been cut, graded, and filled and are covered with dwellings, shopping centers, industrial sites, office buildings, pavements, and other works and structures.

Many soils in this group were used for crops at one time. Some areas are still used for crops, mainly corn and soybeans. A few areas, however, are in vegetable farms. Trees are in a few areas, mostly on well drained, sand ridges.

The soils in this group have contrasting potential for most urban uses. The well drained soils on the sand ridges have good potential, and the somewhat poorly drained and poorly drained, nearly level soils on the outwash plains have poor potential. Wetness is the main limitation on the nearly level soils. The nearly level soils generally are poorly suited to dwellings with basements and to septic tank filter fields.

13. Watseka-Oakville

Deep, nearly level to undulating, somewhat poorly drained and well drained soils that have a sandy subsoil; formed in beach sand

This map unit consists of mainly level to undulating soils on former beach ridges that are higher than the adjacent lake plains. The main areas of this unit are in the southeastern part of Cook County.

This unit makes up less than 1 percent of the survey area. It is about 45 percent Watseka soils, 30 percent Oakville soils, and 25 percent soils of minor extent.

The Oakville soils are on higher ridges than the Watseka soils. The Oakville soils are well drained, and the Watseka soils are somewhat poorly drained. Both soils have a sandy surface layer. These soils have good strength when the sand is confined.

The minor soils in this unit are the poorly drained and very poorly drained Milford and Gilford soils and the somewhat poorly drained Wesley soils.

Many areas of this unit are used for row crops and vegetable crops. Many areas are idle or in small estates and homesites with large lots. A few areas are forest preserves that contain sparse stands of trees. Wetness on the nearly level areas is the main limitation for urban development and other uses.

Most soils in this unit have fair to poor potential for urban development because of wetness. The soils on well drained ridges have very good potential. The potential of this unit for crop production is fair to poor. Most areas need supplemental water in dry periods.

14. Selma-Hoopeston-Wesley

Deep, level and nearly level, poorly drained and somewhat poorly drained soils that have a loamy, silty, or sandy subsoil; formed in glacial outwash and in glacial lake sediment

This map unit consists of soils on edges of former glacial lakebeds and on some low beach ridges. Areas of this unit are in the southern part of Cook County.

This unit makes up less than 1 percent of the survey area. It is about 35 percent Selma soils, 25 percent Hoopeston soils, 20 percent Wesley soils, and 20 percent soils of minor extent.

In most places the Selma soils are on slightly lower positions than the Hoopeston and Wesley soils. Wesley soils are underlain by moderately fine textured lake sediment. Selma soils are poorly drained, and Hoopeston and Wesley soils are somewhat poorly drained. Selma soils have a surface layer of loam, whereas Hoopeston and Wesley soils have a surface layer of fine sandy loam. Many of the soils in this unit contain layers of silt. These layers are soft and compressible when wet.

The minor soils in this unit are the very poorly drained and poorly drained Gilford and Milford soils and the well drained Oakville soils.

Some areas of this unit are in grain farms, and some areas are in vegetable farms. Many areas are idle or in small estates and homesites with relatively large lots. Wetness is the main limitation for urban development.

The potential for many urban uses is poor because of wetness, which is difficult to overcome. About half of the soils have fair potential for homes without basements and for small commercial buildings. Trees to plant are those that tolerate wetness.

15. Urban land-Selma-Oakville

Built-up areas and deep, level to undulating, well drained and poorly drained soils that have a loamy, silty, or sandy subsoil; formed in glacial outwash and in glacial lake sediment

This map unit consists of soils on edges of former glacial lakebeds and on some low beach ridges. Areas of this unit are mainly in the east-central part of Cook County.

This unit makes up about 12 percent of the survey area. It is about 50 percent Urban land, 20 percent Selma soils, 20 percent Oakville soils, and 10 percent soils of minor extent.

Urban land consists of buildings and pavements that obscure or alter the soils. In most places the Selma soils are on slightly lower positions than the Oakville soils. Selma soils are poorly drained, and Oakville soils are well drained. Selma soils have a surface layer of loam, whereas Oakville soils have a surface layer of sand. Many of the soils in this unit contain layers of silt. These layers are soft and compressible when wet.

The minor soils in the unit are the Orthents loamy, the very poorly drained and poorly drained Gilford and Milford soils, and the somewhat poorly drained Hoopeston, Watseka, and Wesley soils.

Most areas of this unit are used for dwellings, public facilities, and other works and structures. A few small tracts are idle or vacant. Some areas are in small estates or homesites with relatively large lots. Wetness is the main limitation for urban development and other uses on the Selma soils. There are no severe limitations for urban development on the Oakville soils.

The well drained soils on ridges, about one-third of the soils in the unit, have very good potential for urban development. About one-third of the soils have fair potential for dwellings without basements and for small commercial buildings and one-third have poor potential for urban development because of wetness.

Silty and loamy soils on terraces and bottom lands

This group consists of two map units, and it makes up about 6 percent of the survey area. The major soils in this group are Fox, Wauconda, Sawmill, Faxon, Kankakee, and Rockton soils. These soils are on nearly level and gently sloping terraces and bottom lands along streams. They have a silty and loamy surface layer and dominantly loamy or silty underlying material. They are well drained to poorly drained and have moderate to moderately rapid permeability. In a few areas they are relatively shallow to bedrock.

Urban development is mostly expanding metropolitan areas. Much of the development is on filled-in areas on flood plains.

Some of the soils on terraces in this group are used for crops, mainly corn and soybeans. The soils on bottom lands are generally idle and used as greenbelts and openland. Many areas are excellent habitat for wildlife.

The soils in this group generally have poor potential for most urban uses. However, a few better drained soils on the higher elevations are well suited to urban works and structures. The main concerns on bottom lands and in low lying areas are wetness and periodic flooding. On bottom lands soils are generally not suited to urban development because of flooding. Depth to bedrock is a limitation in a few areas.

16. Fox-Wauconda-Sawmill

Moderately deep over gravel and deep, gently sloping to level, well drained, somewhat poorly drained, and poorly drained soils that have a loamy and silty subsoil; formed in glacial outwash on terraces and in stream alluvium

Most areas of this map unit are in valleys that parallel major streams.

This unit makes up about 5 percent of the survey area. It is about 25 percent Fox soils, 20 percent Wauconda soils, 20 percent Sawmill soils, and 35 percent soils of minor extent.

The Fox and Wauconda soils are mainly on terraces in stream valleys. Fox soils formed in glacial outwash and are well drained and moderately deep over gravel. Wauconda soils formed in deep, loamy outwash and are somewhat poorly drained. Fox and Wauconda soils have a silt loam surface layer. The Sawmill soils are on bottom lands that border streams. They have a surface layer of silty clay loam. They are poorly drained and are subject to stream overflow. Wauconda and Sawmill soils are soft and compressible when wet.

The minor soils in this unit are the poorly drained Will and Drummer soils, the somewhat poorly drained Mundelein and Kane soils, the moderately well drained and well drained Grays, Warsaw, and Zurich soils, and Dumps.

Many areas of this unit are idle or are used as openland and greenbelts. Some areas of soils on terraces are used for farming or urban development. Small areas of trees are on the terraces. Wetness and flooding are the main limitations for urban development and other uses.

Wetness and flooding are severe limitations that are difficult to overcome. Hence, the potential for urban uses is poor in more than half of the soils in this unit. The potential for development of wildlife habitat is good on bottom lands. The potential for cultivated crops is fair to good on terraces and is poor on bottom lands.

17. Faxon-Kankakee-Rockton

Moderately deep and deep, level and gently sloping, poorly drained and well drained soils that have a dominantly loamy or silty subsoil; formed in dolomite bedrock and very coarse glacial outwash on bottom lands and terraces

Most areas of this map unit are in valleys that parallel the Des Plaines River and the Calumet-Sag Channel.

This unit makes up about 1 percent of the survey area. It is about 30 percent Faxon soils, 25 percent Kankakee soils, 15 percent Rockton soils, and 30 percent soils of minor extent.

The Faxon soils are on bottom lands. They are poorly drained and have a surface layer of silty clay loam. They are subject to stream overflow and ponding for much of the year. Most areas of the Kankakee and Rockton soils are on terraces. Kankakee soils formed in cobbly and stony outwash deposited by torrential glacial streams and ice blocks from the overflow of former Lake Chicago. Rockton soils formed in thin loamy outwash over bedrock. Kankakee and Rockton soils are well drained and have a loam surface layer. Except for the upper part of the Faxon soils, the soils in this unit generally have good strength.

The minor soils in this unit are the very shallow Romeo soils and deep Sawmill soils on bottom lands; the Rockton soils on upland bedrock reef structures; Orthents, stony; and Dumps.

The areas in this unit have a large percentage of openland. The openland is idle or is used as forest preserves. Very few areas are used for farming or urban development. Some industrial areas are near Lemont. Flooding and depth to bedrock are the main limitations for urban development and most other uses.

Flooding and depth to bedrock are severe limitations that are difficult to overcome. Hence, the potential for most urban uses is poor. The potential for farming is poor. The potential for development of wildlife habitat is good.

Broad land-use considerations

Deciding which land should be used for urban development is important in the survey area. Each year a considerable amount of land throughout the survey area is being developed for urban uses. An estimated 545,000 acres, or nearly two-thirds of the two-county area, is urban or built-up land. The general soil map for broad land-use planning is helpful for projecting the general outline of urban areas; it cannot be used for the selection of sites for specific urban structures. In general, in the survey area the soils that have good potential for cultivated crops have fair to poor potential for urban development because of seasonal wetness. The information about specific soils in this survey can be helpful in planning future land-use patterns.

Areas in which soils are so unfavorable that urban development is prohibited are not extensive in the survey area. However, the Faxon-Kankakee-Rockton and the Fox-Wauconda-Sawmill map units have large flood plains in which flooding and ponding are severe limitations. Also, urban development is very costly on clayey soils in the Milford-Martinton, the Frankfort-Bryce, the Markham-Ashkum, and the Morley-Ashkum map units. Small areas of soft, organic soils are throughout the survey area. The use of these soils for urban development depends on economic feasibility. For most urban development, these organic soils can be removed and replaced, bridged by transportation facilities, or penetrated by pilings bearing on a harder underlying stratum. The Morley-Ashkum, the Kidder-Miami, and the Warsaw-Fox-Will map units have a few areas of steep soils in which urban development is costly.

Some soils in the survey area can be developed for urban use at a lower cost than other soils. Such soils are on high positions in large areas of the Warsaw-Fox-Will and the Kidder-Miami map units. Other soils are in the higher positions of the Drummer-Mundelein-Barrington, the Drummer-Lisbon-Saybrook, and the Watseka-Oakville map units. In addition, the Drummer-Lisbon-Saybrook and the Watseka-Oakville map units contain large areas of excellent farmland, and this potential should not be overlooked when broad land uses are considered.

Some areas in the Drummer-Lisbon-Saybrook and the Drummer-Mundelein-Barrington map units have good potential for farming but fair or poor potential for nonfarm uses. In these map units the dominant soils are Drummer, Lisbon, Mundelein, Barrington, and Saybrook soils. Wetness is a limitation to the nonfarm uses of these soils. Proper drainage and shaping of the surface help overcome this limitation in places. It should be noted, however, that the soils have good potential for farming, and many farmers have provided sufficient drainage for farm crops. Many of the soils that have a seasonal high water table do not have suitable outlets for drainage. For these soils to be suitable for dwellings and septic tanks, drainage outlets must exist and drainage systems must be maintained.

Vegetables and other speciality crops are uniquely suited to soils in the Selma-Hoopeston-Wesley map unit where proper drainage has been installed. Also used for such crops are soils in the Milford-Martinton map unit and nearly level soils in the Watseka-Oakville map unit. Supplemental water is generally needed during dry weather for soils in the Watseka-Oakville map unit. Nurseries are best suited to the well drained soils in the Drummer-Mundelein-Barrington map unit and the Drummer-Lisbon-Saybrook map unit.

Most of the soils in the survey area have poor or fair potential for trees. Notable exceptions where trees do well are in small areas of the Kidder-Miami map unit and in some minor areas of the Drummer-Mundelein-Barrington map unit. Commercially valuable hardwoods are less common and generally do not grow rapidly on clayey soils in the Frankfort-Bryce map unit.

The undulating to rolling Kidder-Miami map unit and the undulating Warsaw-Fox-Will map unit have good potential for parks and extensive recreation areas. Undrained marshes on bottom lands in the Faxon-Kankakee-Rockton map unit are good for nature study areas. Other minor areas for recreation and nature study are in the Markham-Ashkum, the Morley-Ashkum, and the

Frankfort-Bryce map units. All of these map units provide habitat for many important species of wildlife.

Soil maps for detailed planning

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

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

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

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

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Morley silt loam, 2 to 5 percent slopes, is one of several phases within the Morley series.

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

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

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

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

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Pits, gravel is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

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

23—Blount silt loam. This nearly level, somewhat poorly drained soil is on low ridges and in shallow depressions and drainageways on uplands. Areas of this soil are irregular in shape and are commonly 2 to 30 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsurface layer is grayish brown silt loam about 6 inches thick. The subsoil is about 26 inches thick. The upper part of the subsoil is dark brown silty clay loam; the middle part is grayish brown, mottled, firm and very firm silty clay; and the lower part is dark grayish brown, mottled silty clay loam that contains lime and some pebbles. The underlying material to a depth of 60 inches is olive brown, mottled, firm, calcareous silty clay loam that contains some pebbles. Some areas have a darker colored surface layer than typical. In some areas the surface layer is loam and depth to lime is more than 45 inches.

Included with this soil in mapping and making up as much as 10 percent of the unit are small areas of poorly drained Ashkum soils and well drained Morley soils. The Ashkum soils are in depressions, and the Morley soils are on higher positions.

Some areas of this soil are artificially drained. In undrained areas or where construction has disrupted drainage, the water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is slow. Available water capacity is moderate. Reaction is very strongly acid in the upper part of the subsoil and neutral to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly medium acid or slightly acid. Content of organic matter is moderately low. The surface layer is friable and easy to work though a wide range in moisture conditions; however, it has a tendency to crust or puddle after hard rains because of the moderately low organic matter content. Root development is restricted below a depth of about 37 inches by the compact, moderately fine textured glacial till.

Some areas of this soil are used for farming. However, many areas are in nonfarm uses or in idle fields. Many of the wooded areas are in forest preserves. This soil has good potential for crops and for openland or woodland wildlife habitat. It has poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage, erosion, and seasonal wetness are the main limitations for cultivated crops. Where wetness is a limitation, tile drains with fairly narrow spacings in combination with shallow surface ditches help to improve drainage. If tile is used, a filter or porous material is more effective. Adding animal manures and returning crop residue help improve fertility, reduce crusting, increase infiltration, and reduce soil loss.

The areas that remain in trees contain mixed northern hardwoods, chiefly oak and hickory. Suitable trees to plant are those that grow well in seasonally wet conditions, such as northern red oak, bur oak, white spruce, green ash, American basswood, eastern redcedar, and eastern white pine.

This soil has a severe limitation for dwellings because of wetness. In some places, the water table can be lowered by installing tile. However, lowering the water table deep enough for construction of dwellings with basements is difficult. Frost heave and low strength are concerns in construction of local streets and roads, but these can be overcome by replacing base material. Use of this soil for septic tank absorption fields is limited by wetness and the slow permeability. Sanitary facilities need to be connected to community sewers and treatment facilities. This soil is well suited to construction of sewage lagoons.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. Good turf can be produced, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. Where plant cover is not present, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing.

This soil is in capability subclass IIw.

27B—Miami silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on low ridges and knolls. It is on uplands in undulating areas of glacial till plains. Areas of this soil are irregular in shape and are commonly 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 22 inches thick. The upper part of the subsoil is dark yellowish brown, firm silty clay loam; the middle part is dark yellowish brown, firm clay loam; and the lower part is yellowish brown, friable clay loam. The underlying material to a depth of 60 inches is light olive brown, mottled, calcareous loam. Pebbles and small stones are common in the lower part of the subsoil and in the underlying material. In some places, the surface layer is thicker and darker colored than typical.

Included with this soil in mapping are small areas of poorly drained Drummer soils in depressions and drainageways. The included soils make up 0 to 15 percent of the unit.

Water and air movement in the surface layer and subsoil is moderate and in the underlying material is moderately slow. Surface runoff from cultivated areas is medium. Available water capacity is high. Reaction is medium acid or slightly acid in the upper part of the subsoil and is slightly acid to mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral to medium acid. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. It tends to crust or puddle after hard rains because of the moderately low organic matter content. Root development is restricted below a depth of about 30 inches by the compact, loamy glacial till.

Some areas of this soil are used for cultivated crops, hay, or pasture, and some areas are in residential use. Many areas are idle or in trees. Most areas are distant from expanding urban development. This soil has good potential for crops and fair potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Conservation tillage, terraces, and contour farming help to control erosion. Returning crop residue and adding animal manures help to maintain organic matter content, improve fertility, reduce crusting, increase infiltration, and reduce soil loss.

This soil is moderately well suited to dwellings with or without basements. Shrink-swell and low strength are concerns in construction. Slight grading may be needed. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover on construction sites helps to reduce erosion. Debris basins help to reduce sedimentation. Frost heave and low strength are concerns in constructing local streets and roads, but these can be overcome by replacing base material. Also, some grading is needed in places. This soil has poor potential for septic tank absorption systems. The moderately slow permeability in the underlying material is a concern but can be corrected by increasing the size of the absorption field.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have a sparse plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Soil limitations are few for camp and picnic areas or for paths and trails. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

27C2—Miami silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on ridges and knolls in gently rolling morainic areas on uplands and on uneven side slopes along waterways. Areas of this soil are irregular in shape and are commonly 5 to 50 acres in size.

Typically, the surface layer is mixed dark grayish brown and brown silt loam about 7 inches thick. The subsoil is about 21 inches thick. The upper part of the subsoil is dark yellowish brown, firm silty clay loam; the middle part is dark yellowish brown, firm clay loam; and the lower part is yellowish brown, friable clay loam. The underlying material to a depth of about 60 inches is light olive brown, calcareous loam. Pebbles and small stones are common in the subsoil and underlying material. In undisturbed areas, the surface layer is very dark grayish brown and a brown subsurface layer about 6 inches thick is present. In some areas, where material from the subsoil has been mixed with material from the surface layer by plowing, the surface layer is brown, firm clay loam.

Included with this soil in mapping are small areas of poorly drained Drummer soils in depressions and drainageways. The included soils make up 1 to 10 percent of the unit.

Water and air movement through the upper part of this soil is moderate and in the underlying material is moderately slow. Surface runoff from cultivated areas is rapid. Available water capacity is high. Reaction is medium acid or slightly acid in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is low because of the loss of surface soil by erosion. The surface layer is friable and easy to work when dry. It is somewhat sticky when wet and becomes hard and lumpy when dry. Root development is restricted below a depth of about 28 inches by the compact, loamy glacial till.

Most areas of this soil are in cultivated crops, or have been cultivated. A few areas are idle or in trees. Some areas are used for homesites, but most of these areas are distant from expanding urban areas. This soil has fair to good potential for crops and fair potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard if the soil is used for cultivated crops. Poor tilth is a limitation. Conservation tillage, terracing, and contour farming help to reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil is moderately well suited to dwellings with or without basements. Shrink-swell and low strength are concerns in construction. Slight to moderate grading may be needed for lots and local streets. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover on construction sites helps to reduce erosion. Detention basins help to reduce siltation. Frost heave and low strength are concerns in constructing local streets and roads, but they can be overcome by replacing base material. This soil has poor potential for septic tank absorption systems. The moderately slow permeability in the underlying material is a concern but can be overcome by increasing the size of the absorption field. Potential for sewage lagoons is poor because of slope.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Soil limitations are few for camp and picnic areas or for paths and trails. Leveling is usually needed for playgrounds, athletic fields, and other intensive play areas. Extensive leveling can expose the underlying material, which is undesirable for maintenance of plant cover.

This soil is in capability subclass IIIe.

49—Watseka loamy fine sand. This nearly level, somewhat poorly drained soil is on low beach ridges of the lake plain. Areas of this soil commonly are irregular in shape and are generally 5 to 160 acres in size.

Typically, the surface layer is black loamy fine sand about 11 inches thick. The subsoil is light olive brown, mottled, very friable loamy fine sand about 14 inches thick. The underlying material to a depth of about 60 inches is mottled light olive brown, grayish brown, light olive gray, and gray fine sand. In some areas the surface layer is thinner and lighter colored than typical and the subsurface layer is grayish brown. Also, in some areas compact, clayey material is below a depth of about 40 inches.

Included with this soil in mapping are a few small areas of poorly drained Gilford soils and well drained Oakville soils. Gilford soils are in depressions, and Oakville soils are on higher sand ridges. These soils make up 1 to 10 percent of the unit.

Some areas of this soil are artificially drained by tile. In undrained areas or in areas where the drainage system has failed, a periodic water table is at a depth of 1 to 3 feet.

Water and air movement through this soil is rapid, and surface runoff from cultivated areas is very slow. Available water capacity is low. Reaction ranges from strongly acid to slightly acid in the subsoil. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate. The surface layer is very friable and easy to work.

Much of the acreage of this soil is idle. Some areas are used for vegetable production, and some areas are in homesites or other nonfarm uses. This soil has fair potential for crops and fair to poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Tomatoes, onions, cabbage, radishes, and other special crops are grown in some places. Droughtiness is a hazard to shallow-rooted plants. A suitable, controlled drainage system is needed in wet spots because this soil is droughty if overdrained. If tile is used, special blindings and filters are needed to prevent seepage of sand into the tile lines. Crop residue management, cover crops, conservation tillage, and field windbreaks help reduce soil blowing and maintain organic matter content and fertility. Supplemental irrigation is needed for crops, such as corn, that need a large amount of water.

Dwellings and buildings should be constructed without basements, unless basements are built above the water table. Tile is needed to remove excess water, but controlling the water table at a desired depth is difficult. Sidewalls of excavations need to be supported to prevent cave-in. Pumps are needed to remove excess water and reduce liquification of sand. Community sewers and treatment facilities are needed to avoid possible ground water contamination. Where septic tanks are used, seepage beds need to be constructed above the water table and in suitable fill material. This soil needs to be covered with suitable base material to reduce frost action on local streets and roads. Sewage lagoons are poorly suited to this soil because of the wetness and seepage hazards. Lawns and shrubs are difficult to maintain and need frequent watering during dry seasons.

This soil has fair to poor potential for most recreational uses. It is fairly slow to dry out after rains, and it commonly needs drainage for best use. Good turf can be produced, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. Walks, roads, and trails need surfacing in a few heavily traveled areas. Tent stakes and pins are difficult to anchor in the sandy soil.

This soil is in capability subclass IIIs.

59—Lisbon silt loam. This nearly level, somewhat poorly drained soil is on low knolls and ridges on glacial till plains. Areas of this soil are irregular in shape and are commonly 5 to 50 acres in size.

Typically, the surface layer is black and very dark grayish brown silt loam about 11 inches thick. The subsoil is about 20 inches thick. The upper part of the subsoil is mixed dark grayish brown and brown, friable silty clay loam; the middle part is brown, mottled, firm silty clay loam; and the lower part is light olive brown, mottled light silty clay loam. The underlying material to a depth of about 60 inches is light olive brown, mottled, calcareous silt loam. The lower part of the subsoil and the underlying material contain many small pebbles and stones. Some areas have a thinner, lighter colored surface layer than typical. In some areas the underlying material has more clay.

Included with this soil in mapping are a few small areas of well drained Saybrook and poorly drained Drummer soils. These soils make up as much as 10 percent of the unit. Saybrook soils are on the higher ridges, and Drummer soils are in the depressions.

Some areas of this soil are artificially drained by tile. In undrained areas or in areas where drainage has been disrupted by construction, the water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is slow. Available water capacity is high. Reaction is slightly acid to neutral in the upper part of the subsoil and is neutral to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is high. The surface layer is friable and easy to work at a proper range in soil moisture. However, the surface layer becomes hard when dry if worked when too wet. Root development is restricted below a depth of about 39 inches by the compact, loamy glacial till.

Most areas of this soil are intensively farmed. However, a few areas near Aurora and Naperville are used for urban development. This soil has excellent potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Extensive artificial drainage is not needed for most crops, but tile drainage is beneficial in some spots in the more level areas. Returning crop residue and adding animal manures help to maintain tilth and organic matter content and to improve fertility. Erosion is a hazard where this soil is used for row crops.

This soil is poorly suited to dwellings without basements because of wetness. The high water table can be lowered by installing tile. To lower the water table sufficiently for construction of dwellings with basements is very difficult. Frost heave is a concern in constructing local streets and roads, but this can be overcome by strengthening or replacing base material. Wetness limits the use of this soil for septic tank absorption fields. Construction of the seepage beds in loamy fill above the water table and in conjunction with subsurface drainage systems improves suitability for septic tank systems. Where possible, sanitary facilities should be connected to community sewers and treatment facilities.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. Good turf can be produced, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover, the soil is muddy and slippery after rains. Walks, roads, and trails commonly need surfacing.

This soil is in capability class I.

60C2—La Rose silt loam, 5 to 10 percent slopes, eroded. This well drained soil is on short, uneven side slopes on gently rolling glacial uplands. Areas of this soil are irregular in shape and are commonly 2 to 25 acres in size.

Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsoil is about 10 inches thick. The upper part of the subsoil is brown, friable silty clay loam, and the lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches is yellowish brown, compact silt loam. In some places the surface layer has a few pebbles and small stones, and the underlying material has common pebbles and small stones. Also, in some areas material from the upper part of the subsoil has been mixed with the original surface layer by plowing, and as a result the present surface layer is brown silty clay loam.

Included with this soil in mapping are a few small areas of somewhat poorly drained Lisbon and poorly drained Drummer soils. These soils are in shallow depressions and drainageways and make up 1 to 10 percent of the unit.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is rapid. Available water capacity is moderate to high. Reaction is mildly alkaline to slightly acid in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly mildly alkaline. Organic matter content is moderate because part of the surface layer has been lost through erosion. The surface layer contains some clay from the subsoil. As a result, it is somewhat sticky when wet and tends to become cloddy when dry. Root development is restricted below a depth of about 18 inches by the compact, loamy glacial till.

Most areas of this soil are used for farming. Some areas are idle, and some are in low density residential development. Most areas are distant from expanding urban development. This soil has good to fair potential for crops and fair potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Excessive soil loss is the main hazard for cultivated crops. Conservation tillage, terraces, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help to maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil is moderately well suited to dwellings with or without basements. Low strength is a concern in the construction of dwellings. Slight to moderate grading is needed in places for lots and local streets. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover on construction sites helps reduce erosion, and detention basins reduce siltation. Frost action is a concern in constructing local streets and roads, but this can be overcome by replacing base material. Potential is fair to good for septic tank absorption systems. Moderate permeability in the underlying material is a concern in some places but can be overcome by increasing the size of the absorption field. Potential for sewage lagoons is fair to poor because of slope.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that do not have sufficient plant cover are somewhat slippery when wet, and heavily traveled areas are very dusty when dry. Limitations are few for camp and picnic areas or for paths and trails. Leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Extensive leveling can expose the underlying material, which is undesirable in maintenance of plant cover.

This soil is in capability subclass IIe.

67—Harpster silty clay loam. This level, poorly drained soil is in flats and on the rims of depressions on uplands. It is calcareous because of a high content of snail shell fragments. It is occasionally flooded for brief periods in spring. Areas are irregular in shape and are commonly 2 to 15 acres in size.

Typically, the surface layer is very dark gray silty clay loam about 15 inches thick. It contains many shell fragments. The subsoil is calcareous and is about 29 inches thick. The upper part of the subsoil is dark grayish brown, mottled, friable silty clay loam; the middle part is olive gray, light olive gray, and dark gray, mottled, firm silty clay loam; and the lower part is light olive gray and light gray, mottled layers of silt loam and very fine sandy loam. The underlying material to a depth of 60 inches is light olive gray and light gray stratified silt loam and very fine sandy loam. In some places the surface layer is silt loam. In some areas, compact, less permeable material is at a depth of less than 60 inches.

Included with this soil in mapping are a few small areas of Peotone soils in potholes. The included soils make up 2 to 10 percent of the unit.

Most areas of this soil are artificially drained by tile and, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where the drainage system has been damaged by construction, the water table is at a depth of 1 foot or less during wet seasons.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is slow. Available water capacity is high. Most areas contain excess lime, which can reduce the availability of some plant nutrients and, thus, develop chlorosis (yellowness) in plants. Organic matter content is high. The surface layer is sticky and somewhat difficult to work when wet. It becomes hard and lumpy when dry if worked when too wet.

Most areas of this soil are used for farming. Some areas are idle, but very little of the acreage has been used for urban development. This soil has very good potential for crops but poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Wetness is the main limitation for cultivated crops. Tile drains can be used to improve drainage. If this soil is fall plowed and left bare, wind erosion can be a hazard in spring. Crop residue management, winter cover crops, and conservation tillage help reduce erosion. Returning crop residue and adding animal manures help maintain good tilth and organic matter content and improve fertility.

Where this soil is used for urban development, it must be artificially drained and protected from flooding. Dwellings with basements should not be constructed because wet basements are likely. Dwellings without basements should be constructed only after drainage systems are installed and grading or filling of the site is completed. Drainage and suitable base material help make this soil suitable for streets and roads. The seepage bed for septic tank absorption fields needs to be constructed above the level of the water table. Where possible, all sanitary facilities should be connected to community sewers and treatment facilities. This soil is not suited to sewage lagoons.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains, even where drained. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. Where this soil has no plant cover, it becomes muddy and very slippery. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

69—Milford silty clay loam. This level, poorly drained soil is on uplands on smooth flat glacial lake plains and in shallow depressions and drainageways. It is occasionally flooded for brief periods in spring. Areas of this soil are commonly broad but irregular in shape and generally several hundred acres in size.

Typically, the surface layer is black, very firm heavy silty clay loam about 13 inches thick. The subsoil is about 23 inches thick. The upper part of the subsoil is very dark gray, mottled, very firm heavy silty clay loam; the middle part is mixed dark gray and yellowish brown, firm heavy silty clay loam; and the lower part is gray, mottled, firm silty clay and silty clay loam. The underlying material to a depth of about 60 inches is gray, mottled, calcareous silty clay loam. In some places, the surface layer and subsoil have more clay than is typical; near former beach ridges, the surface layer has more sand; and in some areas, the surface layer is thinner and lighter colored.

Included with this soil in mapping are a few small areas of somewhat poorly drained Martinton soils on the slightly raised positions. The included soils make up 2 to 15 percent of the unit.

Most areas of this soil are artificially drained by tile and, to a lesser extent, surface ditches or sewer systems. Areas of this soil that are not drained or have drainage systems damaged by construction have a water table at a depth of 1 foot or less during wet seasons.

Water and air movement through this soil is moderately slow, and surface runoff from cultivated areas is slow. Available water capacity is high. Reaction is neutral or mildly alkaline in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral to medium acid. Organic matter content is high. The surface layer is compact and rather difficult to work. Because it is high in clay content, it is quite sticky when wet and becomes hard and cloddy when dry. Root development is restricted below a depth of about 36 inches by excess lime and by the compact, moderately fine textured glacial lakebed sediment.

Large areas of this soil in the southeastern part of Cook County are used for farming; many of these are in vegetable crops. However, many areas are idle or are in nonfarm uses. Much of the acreage is near areas of urban expansion. This soil has very good potential for crops but poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, vegetable crops, grasses, and legumes. Impeded drainage and wetness are the main limitations for cultivated crops. Tile drains with fairly narrow spacings and shallow surface ditches can be used to improve drainage. If tile is used, a filter of porous material improves drainage. If this soil is fall plowed and left bare, wind erosion can be a hazard in spring. Crop residue management, winter cover crops, and conservation tillage help reduce erosion. Returning crop residue and adding animal manures help maintain good tilth and organic matter content and improve fertility.

Areas of this soil used for urban development must be artificially drained and protected from flooding. Dwellings with basements should not be constructed because basements are likely to be wet. Excavation of this soil is difficult because of wetness and the relatively high clay content. Sites for dwellings without basements should be drained before construction. Draining the soils and using suitable base material increase suitability for streets and roads. The seepage beds for septic tank absorption fields need to be constructed above the water table and in suitable mounded fill. Contamination of ground water and septic system failures are likely. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains, even where drained. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. Where areas have no plant cover the soil becomes muddy and very slippery. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

91—Swygert silty clay loam. This nearly level, somewhat poorly drained soil is on till plains or lake plains on uplands. Areas of this soil are commonly irregular in shape and generally 3 to 30 acres in size.

Typically, the surface layer is black silty clay loam about 10 inches thick. The subsoil is about 24 inches thick. The upper part of the subsoil is dark grayish brown and grayish brown, mottled, firm silty clay; the middle part is olive gray, mottled, very firm silty clay; and the lower part is gray, mottled, very firm, calcareous silty clay. The underlying material to a depth of about 60 inches is dark grayish brown, mottled calcareous silty clay. In some places the surface layer is silt loam that is lighter colored and more friable than typical. In some areas the surface layer and the upper part of the subsoil have more sand.

Included with this soil in mapping are a few small areas of poorly drained Bryce soils in depressions and drainageways. The included soils make up 1 to 10 percent of the unit.

Some areas of this soil are artificially drained. In undrained areas or in areas where drainage systems have failed, a periodic water table is at a depth of 1 to 3 feet.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is neutral or slightly acid in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate to high. The surface layer is friable and easy to work at the proper soil moisture. It is sticky when wet and tends to become hard and cloddy when dry. Root development is restricted below a depth of about 28 inches by the compact, clayey glacial till.

A few areas of this soil are used for farming. However, many areas are idle or in nonfarm uses. This soil has good potential for crops but poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and seasonal wetness are limitations in a few areas for cultivated crops. Where wetness is a limitation, tile drains are generally not effective in removing excess water, unless special methods are used. In places, tile with narrow spacings and a porous filter helps in drainage. Shallow surface ditches can be used to improve drainage. Erosion is a hazard for row crops but is generally not serious. Returning crop residue and adding animal manures help to maintain tilth and organic matter content, to improve fertility, and to reduce soil loss.

Dwellings and buildings should be constructed without basements, unless basements are built above the water table. Tile is needed to remove excess water, but to control the water table at a desirable depth is difficult. The low strength and shrink-swell are limitations for foundations and footings, but these can be overcome by replacing base material. Excavating this soil is somewhat difficult because of the high clay content. The excavations fill with water in the spring and dry out slowly. Lawns and shrubs are difficult to establish and maintain. Where possible sanitary facilities need to be connected to community sewers and treatment facilities. If septic tank systems are used, seepage beds need to be constructed above the water table and in suitable fill material. The soil material needs to be replaced or covered with suitable base material to reduce frost action on local streets and roads. Sewage lagoons are well suited to this soil.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it needs drainage for best use. This soil produces good turf, but turf can be damaged if foot traffic is heavy when the surface layer is wet. Where areas have no plant cover, the soil is muddy and slippery after rains. Walks, roads, and trails commonly need surfacing.

This soil is in capability subclass IIw.

93F—Rodman soils, 15 to 40 percent slopes. These excessively drained, steep soils are on side slopes along stream channels and morainic ridges. They are shallow to gravel. Areas of these soils are long and narrow in shape and 5 to 45 acres in size.

Typically, the surface layer is black gravelly loam about 7 inches thick. The subsoil is brown, very friable gravelly sandy loam about 5 inches thick. The underlying material to a depth of about 60 inches is dark yellowish brown and very pale brown, calcareous gravel and sand. It is loose and contains some cobblestones. In some places the surface layer is loam or silt loam and is very dark grayish brown in the upper part and brown in the lower part. In some areas the subsoil is thicker than typical, and loose sand and gravel are deeper.

Included with these soils in mapping are a few small areas of poorly drained Thorp and Will soils in depressions. The included soils make up 2 to 10 percent of the unit.

Water and air movement through these soils is very rapid, and surface runoff is medium. Available water capacity is low. Reaction is mildly alkaline or neutral in the subsoil, and is commonly mildly alkaline in the surface layer. Organic matter content is moderate. Slope limits the use of machinery, and the surface layer is gravelly and rather difficult to till. Root development is restricted below a depth of about 12 inches by the gravel and sand.

Most areas of these soils are idle, in pasture, in sparse stands of trees, or in forest preserves. A few areas are used for residential development. These soils are unsuited to crops and have poor potential for most urban uses. They are generally a good source of gravel and sand.

These soils are not suited to row crops because of the steep slopes, severe hazard of erosion, and droughtiness. If used for farming, they are better suited to grasses and legumes than to most other crops.

Some less sloping areas of these soils produce high quality pasture. Pasture is effective in controlling erosion on these soils. Overgrazing causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates and pasture rotation help to keep the pasture and soil in good condition.

These soils are poorly suited to trees. Because of slopes, however, many areas remain in trees. The main native trees are mixed oaks and hickory and some eastern redcedar. Only a few trees are well formed and of good quality. Regeneration and growth of trees on some exposed slopes is slow because of low available water and heat. In coves and on lower slopes the soils are somewhat deeper and are more favorable for the growth of trees. The principal trees in these areas are mixed oaks, hickory, maple, and basswood. Excessive slope and the presence of numerous cobbles in some areas restrict equipment that is needed for planting, maintaining, and harvesting trees. Trees to plant are eastern white pine, red pine, jack pine, and eastern redcedar. For ornamental plantings, hackberry, shingle oak, northern red oak, Norway maple, and white ash can be grown.

These soils have poor potential for most urban uses because of slope. Much grading is needed to correct slope restrictions. Many cuts and fills are needed for streets and lots. Septic tank absorption systems are poorly suited because of slope and because the rapidly permeable underlying material is a pollution hazard. These soils are unsuited to sewage lagoons and area-type landfill because of slope and because of seepage in the underlying material.

These soils are unsuited to most recreational uses. Too much leveling is generally needed to justify use as playgrounds and athletic fields. Some of the less sloping areas have fair potential for paths and trails. An excessive number of small stones is a hazard in some places. Maintaining a good turf that withstands heavy foot traffic is difficult.

These soils are in capability subclass VIIs.

107—Sawmill silty clay loam. This nearly level, poorly drained soil is on flood plains along rivers and streams. It is frequently flooded for brief periods in spring. Areas of this soil are commonly elongated in shape and are generally 10 to several hundred acres in size.

Typically, the surface layer is silty clay loam about 30 inches thick (fig. 2). It is black in the upper part and very dark gray in the lower part. The subsoil is about 19 inches thick. The upper part of the subsoil is gray, mottled, firm silty clay loam; the middle part is mottled gray and strong brown, firm silty clay loam; and the lower part is gray clay loam. The underlying material to a depth of about 60 inches is dark gray and yellowish brown layers of sandy loam and loam. In some places, the surface layer is calcareous, or it is silt loam because of recent deposits washed from surrounding slopes. In some places the underlying material is extremely variable; it can be gravel, silty clay, or rock at a depth of 40 inches or more.

Included with this soil in mapping are a few small areas of somewhat poorly drained Kane soils and very poorly drained Muskego and Houghton muck soils. The Kane soils are on terraces on the flood plain, and the Muskego and Houghton soils are in depressions. The included soils make up 1 to 10 percent of the unit.

Most areas of this soil are not artificially drained. The water table is at a depth of 1 foot or less during wet seasons.

Water and air movement through this soil is moderate to moderately slow, and surface runoff from cultivated areas is slow to ponded. Available water capacity is high. Reaction is slightly acid to mildly alkaline in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The surface layer is high in clay. It is sticky when wet and becomes hard and cloddy when dry.

Most areas of this soil are not farmed. Many areas are idle and are covered with grasses and weeds. A few areas are in urban development. This soil has good potential for crops if it is protected from flooding and if tracts are large enough; however, it has very poor to poor potential for most urban uses.

If this soil is drained, it is well suited to corn and soybeans and to bluegrass sod. Where flooding is not severe during the growing season, row crops can be grown year after year. Surface drainage is needed in places to remove excess surface water from depressions. Levees can be used to protect the soil from overflow. Where flooding is frequent, this soil is better suited to pasture, open greenbelt areas, or wildlife habitat than to row crops. This soil is seldom used for small grain or hay.

This soil has good potential for food and cover plants for openland wildlife such as pheasant, rabbit, and meadowlark. Frequent flooding is a hazard to species that bed or nest on the ground. Some migratory waterfowl and furbearers are attracted to streams in areas of this soil. Shallow water areas are generally fairly easy to develop. Woody plants that attract deer, squirrels, and birds are generally not present and are not suited to this soil.

Areas of this soil used for urban development need to be drained and protected from flooding (fig. 3). Dwellings must be constructed in stable fill material. Basements should be constructed above the water table. Fill material and suitable base material are needed for streets and roads. Septic tank absorption fields are feasible if the seepage bed is constructed in loamy mounded fill above the levels of floodwater and ground water. Where possible, all sanitary facilties need to be connected to community sewers and treatment facilities. Sewage lagoons on this soil are limited by wetness and flooding. Protection from flooding by levees or other structures helps increase the suitability of this soil for sewage lagoons.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains or floods, even where drained. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. Where plant cover is not present the soil becomes muddy and very slippery when wet. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

125—Selma loam. This nearly level, poorly drained soil is on smooth flats and in some shallow depressions and drainageways on uplands. It is occasionally flooded for brief periods in spring. Areas of this soil are irregular in shape and 5 to 300 acres in size.

Typically, the surface layer is about 14 inches thick. It is black loam in the upper 9 inches and black clay loam in the lower 5 inches. The subsoil is about 36 inches thick. The upper part of the subsoil is olive and olive gray, mottled, friable clay loam, and the lower part is gray, mottled, friable layers of clay loam and silty clay loam. The underlying material to a depth of about 60 inches is gray and light gray, mottled, calcareous bands of silt loam and sand with a few thin bands of silty clay loam. In some places the surface layer and upper part of the subsoil are fine sandy loam. In some areas the underlying material has thick bands of firm silty clay loam.

Included with this soil in mapping are a few small areas of somewhat poorly drained Mundelein and Hoopeston soils. These included soils are on slightly raised positions and make up 1 to 15 percent of the unit.

Most areas of this soil are drained by tile and, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where drainage systems have failed, a periodic water table is at a depth of 1 foot or less.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is very slow or ponded. Available water capacity is high. Reaction is neutral or mildly alkaline in the subsoil. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The loamy surface layer is friable and easy to work through a wide range of soil moisture.

A few areas of this soil are used for farming, mostly vegetable crops. Many areas are idle. Some areas are used for homesites, and the trend of land use is toward nonfarm uses. This soil has very good potential for crops but poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, vegetable crops, grasses, and legumes. Wetness is the main limitation for cultivated crops. Tile drains and shallow surface ditches help improve drainage. Returning crop residue and adding animal manures help to maintain good tilth and organic matter content and improve fertility.

Areas of this soil used for urban development must be artificially drained and protected from flooding. Dwellings with basements are not suited. Dwellings without basements need drainage systems installed before construction. Installing drainage systems and covering the soil with a suitable base material increase the suitability for streets and roads. Septic tank absorption fields need to be constructed in a seepage bed of suitable fill material above the water table. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. Sewage lagoons are limited by wetness, flooding, and seepage. Protection from flooding and sealing the bottom of the lagoon increase suitability of lagoons. Excavations are somewhat difficult because of wetness and because of cave-in of sidewalls below a depth of 3 feet.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains, even when they are drained. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. Where plant cover is not present, the soil becomes muddy and very slippery. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

141—Wesley fine sandy loam. This nearly level, somewhat poorly drained soil is mainly on the flanks of beach ridges of old glacial lakes. Areas of this soil are commonly irregular in shape and are 5 to 160 acres in size.

Typically, the surface layer is about 13 inches thick. It is black fine sandy loam in the upper 6 inches, very dark brown very fine sandy loam in the middle 4 inches, and very dark grayish brown fine sandy loam in the lower 3 inches. The subsoil is about 30 inches thick. The upper part of the subsoil is yellowish brown, mottled, very friable bands of loamy very fine sand and sand; the middle part is gray, mottled, very firm loam; and the lower part is gray, mottled, very firm silty clay loam. The underlying material to a depth of about 60 inches is gray, mottled, calcareous silty clay loam. In some places, the surface layer is thinner than is typical, and it is grayish brown in the lower part. In some areas the underlying material has more clay.

Included with this soil in mapping are a few small areas of well drained Oakville soils and poorly drained Milford soils. The Oakville soils are on sandy ridges, and the clayey Milford soils are on broad flats. The included soils make up 2 to 10 percent of the unit.

Some areas of this soil are drained by tile and, to a lesser extent, by surface ditches or storm sewers. Undrained areas or areas where drainage systems have been disrupted by construction, have a periodic water table at a depth of 1 to 3 feet.

Water and air movement through this soil is moderately rapid in the upper part of the profile and moderately slow in the lower part. Surface runoff is slow. Available water capacity is moderate. Reaction is neutral or slightly acid in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate. The loamy surface layer is friable and easy to work through a wide range of soil moisture. Root development is restricted below a depth of about 31 inches by compact, moderately fine textured glacial till or lakebed sediment.

Some areas of this soil are used for farming, mostly vegetable crops. However, much of the acreage is idle. Some areas are used for individual homesites or other nonfarm uses. This soil has good potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes and to special crops, such as tomatoes, onions, cabbage, and sweet corn. Seasonal wetness, soil blowing, and droughtiness in some more of the sandy areas are concerns in management. Drainage can be provided in wet spots by tile lines. However, tile must be installed with care to prevent seepage of sand into tile lines. Crop residue management, conservation tillage, cover crops, and field windbreaks help reduce wind erosion and maintain organic matter content and fertility.

Buildings should be constructed without basements, unless basements are constructed above the water table. Excess water can be removed by tile, but controlling the water table at a desired depth is difficult. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. If septic tank systems are used, seepage beds need to be constructed above the water table and in suitable fill material. The upper part of the soil needs to be replaced or covered with suitable base material to reduce frost action on local streets and roads. Sewage lagoons are poorly suited to this soil because of wetness and seepage. Excavating this soil is somewhat difficult. Excavations can fill with water in spring and dry out slowly.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil produces good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. Walks, roads, and trails may need surfacing in heavily traveled areas. The surface layer commonly does not have strength to support tent stakes.

This soil is in capability subclass IIw.

145B—Saybrook silt loam, 2 to 5 percent slopes. This moderately well drained soil is on gently sloping ridges or knolls on glacial till plains. Areas of this soil are irregular in shape and are commonly 3 to 45 acres in size.

Typically, the surface layer is about 13 inches thick. It is black to very dark gray silt loam in the upper 7 inches and very dark grayish brown silty clay loam in the lower 6 inches. The subsoil is about 23 inches thick. The upper part of the subsoil is brown, firm silty clay loam, and the lower part is mixed dark yellowish brown and dark brown, friable loam that contains some pebbles. The underlying material to a depth of about 60 inches is yellowish brown, calcareous loam that contains some small stones. In some areas the surface layer is thinner and lighter colored than typical. In some areas the underlying material is more compact and has more clay.

Included with this soil in mapping are a few small areas of somewhat poorly drained Lisbon soils and poorly drained Drummer soils in slight depressions and drainageways. The included soils make up 2 to 15 percent of the unit.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is medium. Available water capacity is high. Reaction is slightly acid in the upper part of the subsoil and moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate to high. The surface layer is friable and easy to work through a wide range of soil moisture. However, if it is too wet when worked, it tends to become hard on drying. Root development is restricted below a depth of about 36 inches by the compact, loamy glacial till. A water table is between depths of 4 and 6 feet in spring.

Many areas of this soil are farmed intensively. A few areas are idle, and some areas are used for homesites. This soil has very good potential for crops and fair potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Conservation tillage, terracing, and contour farming help to control erosion. Returning crop residue and adding animal manures help to maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil is only moderately suited to dwellings because of moderate shrink-swell potential in the subsoil. This concern can be overcome by strengthening or replacing the base material. Frost heave is a concern for local streets and roads, but this can be overcome by replacing the base material. Some grading is necessary in places. Septic tank absorption systems are only moderately suited because of moderate permeability in the underlying material. This concern can be overcome by increasing the size of the absorption field.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that can withstand heavy foot traffic. Areas that do not have a plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. This soil has few limitations for camp and picnic areas or for paths and trails. Leveling is needed in some places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

146—Elliott silt loam. This nearly level, somewhat poorly drained soil is on glacial till plains on uplands. It mainly is on low ridges and knolls but is also in some shallow depressions between ridges. Areas of this soil are irregular in shape and are commonly 5 to 40 acres in size.

Typically, the surface layer is black and very dark gray silt loam about 11 inches thick. The subsoil is about 26 inches thick. The upper part of the subsoil is very dark grayish brown, mottled, friable silty clay loam; the middle part is dark grayish brown, mottled, firm silty clay; and the lower part is light olive brown, mottled, firm silty clay loam that contains some lime and small pebbles. The underlying material to a depth of 60 inches is light olive brown, mottled silty clay loam. It contains some lime and small pebbles. In some places, the surface layer and upper part of the subsoil are higher in content of sand than typical. Also, in some areas the surface layer is thinner and lighter colored.

Included with this soil in mapping and making up 2 to 15 percent of the unit are small areas of poorly drained Ashkum soils and moderately well drained and well drained Varna and Markham soils. The Ashkum soils are in depressions, and the Varna and Markham soils are on higher positions.

Some areas of this soil are artificially drained by tile. In undrained areas or in areas where drainage systems have been disrupted by construction, the water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is moderately slow, and surface runoff from cultivated areas is medium. Available water capacity is moderate to high. Reaction is neutral to medium acid in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or medium acid. Organic matter content is high. The surface layer is friable and easy to work at the proper range in moisture condition. It is somewhat sticky when wet, and if worked when wet, it becomes hard on drying. Root development is restricted below a depth of about 37 inches by the compact, moderately fine textured glacial till.

Many areas of this soil are farmed intensively. Many areas are idle or used for low density urban development and other nonfarm uses. This soil has very good potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and seasonal wetness can limit cultivated crops. Where wetness is a limitation, tile drains with fairly narrow spacings help improve drainage. Erosion is a hazard to row crops. Returning crop residue helps maintain tilth and organic matter content, improve fertility, and reduce soil loss.

This soil is poorly suited to dwellings because of wetness and lack of sufficient strength in the subsoil. The excess water can be removed by installing tile, and strength can be improved by replacing base material. However, lowering the water table to a desired depth for construction of dwellings with basements is difficult. Frost heave of local streets and roads can be reduced by adequate drainage and by replacing base material. Septic tank absorption fields are limited by wetness and the moderately slow permeability. Adding suitable fill material and increasing size of the absorption field help improve suitability for septic systems. This soil is poorly suited to sewage lagoons.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil produces good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. Where plant cover is not present, the soil is muddy and slippery after rains. Walks, roads, and trails commonly need surfacing.

This soil is in capability subclass IIw.

152—Drummer silty clay loam. This nearly level, poorly drained soil is on uplands on smooth flats and in shallow depressions and drainageways. It is occasionally flooded for brief periods in spring. Areas of this soil are irregular in shape and are 2 to several hundred acres in size.

Typically, the surface layer is black silty clay loam about 15 inches thick. The subsoil is about 41 inches thick. The upper part of the subsoil is very dark gray, mottled, firm silty clay loam; the middle part is dark gray and olive gray mottled, firm silty clay loam; the lower part is mottled yellowish brown, gray, and light olive brown, friable silt loam with some layers of loam and fine sandy loam. The underlying material to a depth of 60 inches is yellowish brown, mottled layers of calcareous silt loam, loam, and fine sandy loam. In some places where recent deposits of material washed in from surrounding areas, the surface layer is friable silt loam.

Included with this soil in mapping and making up as much as 10 percent of the unit are small areas of somewhat poorly drained Mundelein soils and well drained and moderately well drained Barrington soils. The Barrington soils are on the higher ridges, and the Mundelein soils are on slightly lower ridges and knolls. Areas of Peotone soils that are less than 2 acres in size and other wet areas are shown on the soil map by special symbols.

Many areas of this soil are artificially drained by tile and, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where the drainage systems have been damaged by construction, a water table is at a depth of 1 foot or less during wet seasons.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is slow to ponded. Available water capacity is high. Reaction is neutral or slightly acid in the upper part of the subsoil and is mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is high. The surface layer is compact and rather difficult to work. It is sticky when wet and tends to become hard and cloddy when dry.

Many areas of this soil are farmed intensively. Many areas are idle, or in low density residential development, or in other nonfarm uses. This soil has excellent potential for crops but poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Wetness is the main limitation to cultivated crops. Tile drains are effective in improving drainage for cultivated crops. If the soil is fall plowed and left bare, wind erosion can be a hazard in spring. Winter cover crops, conservation tillage, returning crop residue, and adding animal manures help maintain good tilth and organic matter content and improve fertility.

Areas of this soil used for building site development must be artificially drained and protected from flooding. Dwellings with basements should not be constructed because wet basements are likely. Dwellings without basements need drainage systems installed before construction (fig. 4). Wetness, flooding, and frost heave are limitations to local streets and roads. Installing drainage systems and replacing base material help increase suitability for streets and roads. Septic tank absorption fields need a seepage bed constructed in loamy mounded material above the water table. Contamination of ground water and failure of septic tank systems are likely. All sanitary facilities need to be connected to community sewers and treatment facilities. Sewage lagoons are limited by wetness, flooding, and seepage. Protection from flooding and sealing the bottom of the lagoon help increase suitability.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains, even if they are drained. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. Where areas are without plant cover, the soil becomes muddy and very slippery. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

172—Hoopeston fine sandy loam. This nearly level, somewhat poorly drained soil is on broad plains on uplands and on benches along streams. Areas of this soil are irregular in shape and are commonly 10 to 300 acres in size.

Typically, the surface layer is fine sandy loam about 17 inches thick. It is black in the upper part and very dark grayish brown in the lower part. The subsoil is about 22 inches thick. The upper part of the subsoil is dark yellowish brown, friable fine sandy loam with dark grayish brown coatings; the middle part is olive brown, mottled, friable sandy loam; and the lower part is brown, mottled, friable bands of very fine sandy loam and loam. The underlying material to a depth of 60 inches is grayish brown, mottled, calcareous bands of fine sand and silt loam. In some places, the surface layer is very friable loamy fine sand or the subsoil is firm clay loam.

Included with this soil in mapping and making up 1 to 15 percent of the unit are small areas of Wesley and Selma soils. The Wesley soils are less permeable than this Hoopeston soil and are on similar positions, but have more clayey material at a depth of less than 60 inches. The poorly drained Selma soils are on broad flats or in depressions.

Many areas of this soil are drained by tile. In undrained areas or in areas where drainage systems have been disrupted by construction, a periodic water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is moderately rapid, and surface runoff from cultivated areas is slow. Available water capacity is moderate. Reaction is slightly acid to mildly alkaline in the upper part of the subsoil and is mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is high. The loamy surface layer is friable and easy to work. Root development is hindered below a depth of about 39 inches by excess lime.

Many areas of this soil are used for farming, mainly vegetable crops. Some areas are idle or built up. The trend of land use is toward nonfarm uses. This soil has excellent potential for crops but has poor potential for most urban uses.

This soil is suited to vegetables, corn, soybeans, small grain, grasses, and legumes. Little artificial drainage is needed for most crops, but spot drainage is beneficial in some level areas. Tile drains can be installed in those areas to remove excess water. Returning crop residue and adding animal manures help maintain tilth and organic matter content and improve fertility. Erosion and droughtiness are concerns in some years.

Areas of this soil used for development must be artificially drained. Dwellings with basments should not be constructed. Dwellings without basements need tile drainage before construction. The sidewalls of excavations should be supported to prevent cave-in. Covering with a suitable base material increases suitability for streets and roads. Septic tank absorption fields need a seepage bed constructed with suitable fill material above the water table. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities to avoid possible ground water contamination. Sewage lagoons are limited by wetness and seepage. Sealing the bottom of lagoons increases suitability.

This soil has fair to poor potential for most recreational uses. It commonly needs drainage for best use. This soil produces good turf, but vegetation can be damaged if foot traffic is heavy when the surface layer is wet. Walks, roads, and trails generally do not need surfacing unless very heavily traveled. Wetness is only moderately limiting for picnic areas and for paths and trails.

This soil is in capability subclass IIs.

189—Martinton silt loam. This nearly level, somewhat poorly drained soil is in areas once occupied by glacial lakes. Areas of this soil are irregular in shape and are commonly 5 to 100 acres in size.

Typically, the surface layer is silt loam about 12 inches thick. The upper part is black, and the lower part is very dark grayish brown. The subsoil is about 33 inches thick. The upper part of the subsoil is dark brown, mottled, firm silty clay loam; the middle part is mixed dark grayish brown to yellowish brown, mottled, firm and very firm silty clay; and the lower part is light olive brown, mottled, very firm silty clay loam. The underlying material to a depth of 60 inches is olive brown, mottled, very firm, calcareous silty clay loam. In some places the surface layer is thinner and is lighter colored than typical or the surface layer and upper part of the subsoil have more sand. In a few areas the underlying material is firm silty clay.

Included with this soil in mapping are a few small areas of poorly drained Milford soils in depressions. The included soils make up 2 to 15 percent of the unit.

Some areas of this soil are artificially drained. In areas that are not drained or in areas where drainage systems have been disrupted by construction, a water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is moderately slow in the upper part of the profile and slow in the lower part. Surface runoff from cultivated areas is slow. Available water capacity is high. Reaction is neutral or slightly acid in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is high. The surface layer is friable and easy to work at the proper range in soil moisture. However, if the surface layer is worked while too wet, it tends to become hard and cloddy when dry. Root development is restricted below a depth of about 39 inches by excess lime and the compact, moderately fine textured glacial lakebed sediment.

Many areas of this soil are intensively farmed. In the southern part of Cook County, a considerable acreage is used for vegetable crops. Some areas are idle or in forest preserves. The trend of land use is toward nonfarm uses. This soil has very good potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, vegetable crops, grasses, and legumes. Impeded drainage and seasonal wetness are limitations in places for cultivated crops. Erosion is a hazard. Where wetness is a limitation, tile drains with fairly narrow spacings and surface ditches can be installed to improve drainage. Where tile is used, a filter of porous material helps make the tile more efficient. Returning crop residue and adding animal manures help maintain tilth and organic matter content, improve fertility, and reduce soil loss.

This soil is poorly suited to dwellings without basements because of wetness and low strength in the subsoil. The wetness can be overcome by installing tile, and the low strength can be overcome by replacing base material. Dwellings with basements are also limited by wetness, and to lower the water table to a desired depth for construction of dwellings with basements is difficult. Frost heave is a concern for local streets and roads, but this can be overcome by replacing base material. Septic tank absorption fields are limited by wetness and slow permeability. Adding suitable material, increasing the size of absorption fields, and constructing subsurface drainage systems help increase suitability for septic tank systems. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. This soil is well suited to sewage lagoons.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil can produce good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. Where areas have no plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing.

This soil is in capability subclass IIw.

192—Del Rey silt loam. This nearly level, somewhat poorly drained soil is in areas once occupied by glacial lakes. Areas of this soil are irregular in shape and are commonly 5 to 300 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. In areas not disturbed by plowing the uppermost 3 to 5 inches is very dark gray, and the lower part is grayish brown. The subsoil is about 38 inches thick. The upper part of the subsoil is dark yellowish brown, firm silty clay; the middle part is mixed grayish brown and yellowish brown, mottled, very firm silty clay that contains thin layers of clay loam; and the lower part is gray, mottled, very firm and firm silty clay loam containing some lime. The underlying material to a depth of 60 inches is gray, mottled, calcareous, stratified silty clay loam, clay loam, silt loam, and sand. In some places the surface layer and upper part of the subsoil have more sand or the underlying material is very firm silty clay.

Included with this soil in mapping and making up 2 to 10 percent of the unit are small areas of poorly drained Milford soils and small areas of well drained Morley soils that have a brighter colored subsoil. The Milford soils are in depressions, and the Morley soils are on low ridges or the sides of drainageways.

Some areas of this soil are artificially drained. In undrained areas or in areas where drainage systems have been disrupted by construction, a water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is slow. Available water capacity is moderate. Reaction is medium acid to neutral in the upper part of the subsoil and is slightly acid to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral to medium acid. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. Because it is moderately low in content of organic matter, the surface layer tends to crust or puddle after a hard rain. Root development is restricted below a depth of about 38 inches by the compact, moderately fine textured glacial lakebed sediment.

Some areas of this soil are used for farming. Many areas are idle or in forest preserves, or used for low density development and other nonfarm uses. This soil has good potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and seasonal wetness are the main limitations for cultivated crops, and erosion is a hazard. Where wetness is a limitation, tile drains with fairly narrow spacings in combination with shallow surface ditches help to improve drainage. Where tile is used, a filter of porous material may be needed. Adding animal manures and returning crop residue help improve fertility, reduce crusting, increase infiltration, and reduce soil loss. Suitable species of trees to plant are those that tolerate seasonal wetness such as bur oak, northern red oak, red maple, green ash, linden, northern white cedar, and hackberry.

This soil has good potential for many types of woodland wildlife such as deer, squirrels, raccoon, and birds. Many types of den trees, shrubs, and vines are available for food and cover.

This soil has severe limitations for dwellings because of wetness and the lack of sufficient strength in the subsoil. The water table can be lowered by installing tile, and strength can be improved by replacing base material. However, lowering the water table to a depth desired for construction of dwellings with basements is difficult. Frost heave is a concern for local streets and roads, but this can be overcome by replacing base material. Septic tank absorption fields are limited by wetness and by the slow permeability. Adding suitable fill material, increasing the size of absorption fields, and constructing subsurface drainage systems can help increase the suitability for septic tank systems. Where possible, sanitary facilities need to be connected to commercial sewers and treatment facilities. This soil is well suited to sewage lagoons.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil produces good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that lack plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing.

This soil is in capability subclass IIw.

194B—Morley silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on low ridges and knolls on undulating glacial till plains or on moraines on uplands. Areas of this soil are irregular in shape and are commonly 5 to 150 acres in size.

Typically, the surface layer is very dark gray silt loam about 2 inches thick (fig. 5). The subsurface layer is dark brown silt loam about 5 inches thick. Where the surface layer is disturbed by plowing, it is dark grayish brown and is about 7 inches thick. The subsoil is about 27 inches thick. The upper part of the subsoil is dark brown, firm silty clay loam; the middle part is dark yellowish brown, very firm silty clay; and the lower part is yellowish brown, mottled, firm silty clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, calcareous silty clay loam. The subsoil and underlying material contain a few small pebbles and stones. In some places the surface layer and upper part of the subsoil have more sand than typical. In some areas the underlying material is more clayey or is silty clay loam that has a few thin layers of silt loam and sandy loam and has no pebbles.

Included with this soil in mapping are a few small areas of somewhat poorly drained Blount soils in shallow depressions and poorly drained Ashkum soils in drainageways. The included soils make up 1 to 15 percent of the unit.

Water and air movement through this soil is moderately slow to slow, and surface runoff from cultivated areas is medium. Available water capacity is moderate. A perched water table is just above the slowly permeable material for brief periods in spring. Reaction is strongly acid to slightly acid in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is moderately low in content of organic matter, it tends to crust or puddle after a hard rain. Root development is hindered below a depth of about 34 inches by the compact, moderately fine textured glacial till.

Some areas of this soil are used for farming. Many areas are wooded. Much of the wooded acreage near urban expansion is in forest preserves or is used for residential development or other nonfarm uses. This soil has fair potential for crops and fair to poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion and the moderate available water capacity are the main concerns in management of cultivated crops. Conservation tillage, crop residue management, terracing, and contour farming help control erosion. Returning crop residue and adding animal manures help to maintain organic matter content and improve fertility, reduce crusting, increase infiltration, and reduce soil loss.

Most undisturbed areas of this soil are suited to trees. A few small areas are in native hardwoods (fig. 6), mainly northern red oak, white oak, bitternut hickory, and sugar maple. Trees to plant are red oak, white oak, sugar maple, black walnut, white ash, eastern white pine, hackberry, and American basswood.

This soil has good potential for woodland wildlife habitat. Stands of trees and other woody plants provide good cover and food for woodland wildlife such as deer, squirrels, and birds.

This soil is only moderately suited to dwellings with or without basements, because the subsoil does not have sufficient strength. This concern can be overcome by strengthening or replacing the base material. Slight grading is needed for streets and lots. Debris basins help to reduce siltation during construction. Frost heave and shrink-swell are concerns for streets and roads, but they can be overcome by replacing base material. Septic tank absorption fields are generally poorly suited because of the moderately slow to slow permeability. Suitability for septic tank systems can be improved by increasing the size of the absorption field and by diverting water from the field. This soil is fairly well suited to sewage lagoons. Lagoons need to be established on the most level areas that have good surface drainage.

This soil is well suited and moderately suited to a wide range of recreational activities. It can support a firm turf that withstands heavy foot traffic, except when the soil is wet. The soil stays wet for brief periods after rains. Areas that have no plant cover are muddy and slippery when wet and are readily compacted. They are commonly dusty when dry. Limitations and concerns are few for picnic areas or paths and trails. The moderately slow to slow permeability somewhat limits use for camp areas and playgrounds. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

194C2—Morley silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on eroded ridges and knolls on gently rolling moraines on uplands and on uneven side slopes bordering streams. Areas of this soil are irregular in shape and are commonly 5 to 150 acres in size.

Typically, the surface layer is mixed dark grayish brown and brown, silt loam about 7 inches thick. Where the surface layer is not disturbed by plowing, it is very dark gray and about 2 inches thick, and the subsurface layer is brown and about 5 inches thick. The subsoil is about 21 inches thick. The upper part of the subsoil is dark brown, firm silty clay loam; the middle part is dark yellowish brown, very firm silty clay; and the lower part is yellowish brown, mottled, very firm silty clay loam containing some lime. The underlying material to a depth of about 60 inches is yellowish brown, mottled, calcareous silty clay loam. A few pebbles and small stones are throughout the subsoil and underlying material. In some severely eroded areas, the surface layer is mainly dark yellowish brown, clayey material from the subsoil. In some places the underlying material has more clay or is silty clay loam that has a few thin layers of silt loam and sandy loam and has no pebbles.

Included with this soil in mapping are a few small areas of somewhat poorly drained Blount and poorly drained Ashkum soils in shallow depressions and drainageways. The included soils make up 1 to 15 percent of the unit.

Water and air movement through this soil is moderately slow to slow, and surface runoff from cultivated areas is rapid. Available water capacity is moderate. A perched water table is just above the slowly permeable material for a brief period in spring. Reaction is medium acid or strongly acid in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid. Organic matter content is moderately low to low because of the loss of surface soil by erosion. Because the surface layer contains some clay from the subsoil, it is somewhat difficult to work. It is somewhat sticky when wet and becomes hard and cloddy when dry. Root development is hindered below a depth of about 28 inches by the compact, moderately fine textured glacial till.

Most areas of this soil have been farmed. Present farming is not intensive, and many areas are idle or in trees. Some areas, especially wooded sites, are being used for residential development. This soil has fair potential for crops and fair to poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion, tilth, and the moderate available water capacity are the main concerns in management for cultivated crops. Conservation tillage, crop residue management, terracing, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil is suited to production of high quality forage. The use of this soil for hay or pasture is effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help to keep the pasture and soil in good condition.

A few small areas remain in native hardwoods, mainly northern red oak, white oak, hickory, and sugar maple. These areas provide good habitat for woodland wildlife such as birds, squirrels, deer, and raccoon. Trees to plant are northern red oak, white oak, sugar maple, black walnut, white ash, eastern white pine, hackberry, and American basswood.

This soil is only moderately suited to dwellings with or without basements, because the subsoil does not have sufficient strength. This concern can be overcome by strengthening or replacing the base material. Excavating this soil is somewhat difficult because of the relatively high clay content. Slight to moderate grading is needed for streets and lots. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover on construction sites helps reduce erosion. Detention basins help reduce siltation. Frost heave is a concern for local streets and roads, but this can be overcome by replacing base material. Septic tank absorption systems are generally poorly suited because of the moderately slow to slow permeability. Suitability for septic tank systems can be improved by increasing the size of the absorption field and by diverting water from the field. This soil is fairly well suited to sewage lagoons. Lagoons need to be established on the most level areas that have good surface drainage.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet, and if heavily traveled, are very dusty when dry. Soil limitations for picnic areas or for paths and trails are few. Moderately slow to slow permeability somewhat limits camp areas and playgrounds. Leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Extensive leveling can expose the underlying material, which is undesirable and makes maintenance of plant cover difficult.

This soil is in capability subclass IIIe.

194D—Morley silt loam, 7 to 15 percent slopes. This moderately sloping, well drained soil is on uneroded or timbered side slopes of morainic ridges and on side slopes bordering streams. Areas of this soil are irregular in shape and are commonly 5 to 50 acres in size.

Typically, the surface layer is very dark gray silt loam about 2 inches thick. The subsurface layer is brown silt loam about 5 inches thick. The subsoil is about 20 inches thick. The upper part of the subsoil is dark brown, very firm silty clay, and the lower part is mixed brown and yellowish brown, firm, calcareous silty clay loam. The underlying material to a depth of about 60 inches is brown, mottled, calcareous silty clay loam. The subsoil and underlying material contain some pebbles and a few small stones. In some places that have been disturbed by plowing, the surface layer is dark grayish brown silt loam about 7 inches thick. In some areas the underlying material contains more clay or has layers of friable silty material.

Included with this soil in mapping are a few small areas of somewhat poorly drained Blount and poorly drained Ashkum soils in shallow depressions and drainageways. The included soils make up 2 to 10 percent of the unit.

Water and air movement through this soil is moderately slow to slow, and surface runoff from cultivated areas is rapid. Available water capacity is moderate. A perched water table is just above the slowly permeable material for a brief period in spring. Reaction is medium acid to strongly acid in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is moderately low in content of organic matter, it tends to crust or puddle after a hard rain. Root development is hindered below a depth of about 27 inches by the compact, moderately fine textured glacial till.

Most areas of this soil are wooded or pastured or are idle. Some areas are used for low density residential development or other nonfarm uses. This soil has fair potential for crops and fair to poor potential for most urban uses.

If this soil is used for cropland, adequate management is needed to prevent excessive soil loss. A cropping system that has more small grain and grasses than row crops is needed. In a proper cropping system, however, row crops such as corn and soybeans can be grown as part of the rotation. The erosion hazard is severe on this soil; consequently, careful management is needed to help control erosion and maintain fertility and good tilth. The use of terracing, contour farming, and conservation tillage helps reduce soil erosion.

This soil can produce high quality forage. The use of the soil for pasture is effective in controlling erosion. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

A few areas of this soil are in native hardwoods, mainly northern red oak, white oak, bitternut hickory, and sugar maple. Trees to plant are northern red oak, white oak, sugar maple, black walnut, green ash, and hackberry.

This soil has good potential for woodland wildlife habitat. Stands of trees and other woody plants provide good woodland habitat for deer, squirrels, raccoon, and birds.

This soil is only moderately suited to dwellings with or without basements, because the subsoil lacks sufficient strength and because the slope is excessive. These concerns can be corrected by strengthening or replacing the base material and by moderate grading. Digging or excavating this soil is somewhat difficult because of the relatively high clay content. The hazards of erosion and siltation are severe during construction and lawn establishment. Maintaining plant cover on construction sites helps reduce erosion, and debris basins reduce siltation. Frost heave is a concern for local streets and roads, but this can be overcome by replacing base material. Moderate grading is necessary in places. Septic tank absorption systems are poorly suited because of the moderately slow to slow permeability. Suitability of septic tank systems can be improved by increasing the size of the absorption field and by diverting water from the field. Community sewer systems and treatment plants are more practical than septic tank systems on this soil. This soil is poorly suited to sewage lagoons.

Even though slope is excessive, this soil can be used for many recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet and are readily compacted. Heavily traveled areas are dusty when dry. Limitations for paths and trails are few. Slope is a moderate limitation for camp or picnic areas. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Leveling generally exposes the underlying material and makes maintenance of plant cover difficult.

This soil is in capability subclass IIIe.

194D3—Morley silty clay loam, 7 to 15 percent slopes, severely eroded. This moderately sloping, well drained soil is on severely eroded side slopes of morainic ridges or on side slopes bordering stream channels. Areas of this unit are irregular in shape and are commonly 2 to 15 acres in size.

Typically, the surface layer is brown silty clay loam about 6 inches thick. The subsoil is about 15 inches thick. The upper part of the subsoil is dark brown, very firm silty clay, and the lower part is mixed brown and yellowish brown, firm, calcareous silty clay loam. The underlying material to a depth of about 60 inches is brown, mottled, calcareous silty clay loam. Pebbles and a few small stones commonly are throughout the soil. In some places, the surface layer is variable in color and thickness, depending upon the amount of erosion, or the underlying material has more clay or layers of friable silty material.

Included with this soil in mapping are a few small areas of somewhat poorly drained Blount soils and poorly drained Ashkum soils in shallow depressions and drainageways. The included soils make up 1 to 10 percent of the unit.

Water and air movement through this soil is moderately slow to slow, and surface runoff from cultivated areas is rapid. Available water capacity is moderate. A perched water table is above the slowly permeable material for brief periods. Reaction is strongly acid or medium acid in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is low because of the loss of most of the surface layer by erosion. The surface layer is firm and rather difficult to work. It is sticky when wet and becomes hard and cloddy when dry. Root development is hindered below a depth of about 21 inches by the compact, moderately fine textured glacial till.

Most areas of these soils have been intensively farmed, mostly to row crops. However, much of the acreage near areas of rapid urban expansion is idle or is in nonfarm uses. These soils have poor potential for crops and fair to poor potential for most urban uses.

If used for cropland, this soil is best suited to grasses and legumes. Because of severe erosion this soil is not suited to row crops. Careful management is needed to reduce erosion and build up fertility and improve tilth.

This soil can produce high quality forage. The use of the soil for hay or pasture is effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help to keep the pasture and soil in good condition.

This soil is only moderately suited to dwellings with or without basements because the subsoil lacks sufficient strength and because slopes are excessive. These concerns can be corrected by strengthening or replacing the base material and by moderate grading. Excavating this soil is somewhat difficult because of relatively high clay content. The hazards of erosion and siltation are severe on construction sites. Maintaining plant cover helps reduce erosion, and debris basins reduce siltation. Frost heave is a concern for local streets and roads, but this can be overcome by replacing base material. Moderate cuts and fills may also be necessary for streets and roads. Septic tank absorption systems are generally poorly suited because of the moderately slow to slow permeability. Suitability of septic tank systems can be improved by increasing the size of the absorption field and by diverting water from the field. Seepage beds need to be constructed as shallow as possible to avoid the dense underlying material. Sites for sewage lagoons are not easily found because of excessive slope.

Even though slope is excessive and erosion is severe, this soil can be used for many recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are very muddy and slippery when wet. Limitations for paths and trails are few. Excessive slope is a moderate limitation for camp or picnic areas. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Leveling generally exposes the underlying material and makes maintenance of plant cover difficult.

This soil is in capability subclass VIe.

194F—Morley silt loam, 15 to 35 percent slopes. This steep, well drained soil is on side slopes of morainic ridges or areas bordering stream channels. Areas of this soil are long and narrow in shape and are commonly 3 to 30 acres in size.

Typically, the surface layer is very dark gray silt loam about 2 inches thick. The subsurface layer is brown silt loam about 5 inches thick. The subsoil is about 14 inches thick. The upper part of the subsoil is dark yellowish brown, firm silty clay, and the lower part is brown, mottled, firm, calcareous silty clay loam. The underlying material to a depth of about 60 inches is brown, mottled, calcareous silty clay loam. Pebbles and a few small stones commonly are throughout the soil. In some eroded places the surface layer is dark brown silty clay loam, and in other places the underlying material has more clay or has layers of friable, loamy material.

Included with this soil in mapping are a few small areas of somewhat poorly drained Blount soils and poorly drained Ashkum soils in depressions and drainageways. The included soils make up 1 to 10 percent of the unit.

Water and air movement through this soil is moderately slow to slow, and surface runoff is rapid. Available water capacity is moderate. A perched water table is above the slowly permeable material for a brief period in spring. Reaction is strongly acid or medium acid in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is moderately low or low, depending on the extent of erosion. Slope limits the use of machinery, but the surface layer is friable and can be worked through a wide range of soil moisture. Because the surface layer is somewhat low in content of organic matter, it tends to puddle and crust over after a rain. Root development is restricted below a depth of about 21 inches by the compact, moderately fine textured glacial till.

Areas of this soil are mainly in trees and pasture or are idle. Few areas are used for urban development. This soil is unsuited to crops and has poor potential for most urban uses.

If used for farming, this soil is best suited to grasses and legumes. Some less sloping areas can produce high quality forage. The use of the soil for pasture is effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help to keep the pasture and soil in good condition.

Most areas of this soil are well suited to trees and, because of steep slopes, many areas are in trees. The main species are northern red oak, white oak, shagbark hickory, and sugar maple. Trees to plant include northern red oak, white oak, sugar maple, black walnut, green ash, and hackberry. The many woody plants provide good food and cover for woodland wildlife such as deer, raccoon, squirrels, and birds.

This soil is poorly suited to dwellings. The extensive grading needed for construction of dwellings generally is not feasible. Excavating this soil is difficult because of slope and the relatively high clay content. Frost heave and excessive slope are concerns for local streets and roads. These concerns can be overcome by replacing base material, but extensive cuts and fills are necessary in places. Septic tank absorption systems are generally not practical because of excessive slope.

This soil is unsuited to most recreational uses. Too much leveling is generally needed to justify use as playgrounds and athletic fields. Some less sloping areas are fairly well suited as paths and trails. Areas that have no plant cover are muddy and slippery when wet.

This soil is in capability subclass VIe.

201—Gilford fine sandy loam. This level, very poorly drained soil is on broad flats in former glacial lakes adjacent to beach ridges. It is frequently flooded for brief periods in winter and spring. Areas of this soil are irregular in shape and are commonly 20 to 400 acres in size.

Typically, the surface layer is about 11 inches thick. It is black fine sandy loam in the upper 8 inches and very dark gray fine sandy loam in the lower 3 inches. The subsoil is about 25 inches thick. The upper part of the subsoil is very dark grayish brown, friable fine sandy loam; the middle part is dark gray, mottled, friable fine sandy loam with a 5-inch band of sandy clay loam; and the lower part is dark gray, and gray, and light olive gray, mottled very friable loamy sand. The underlying material to a depth of 60 inches is olive gray, mottled, loose fine sand. In some places the sandy material is less than 60 inches deep over silty material. In some areas the subsoil has thin bands of clay loam or is loamy fine sand.

Included with this soil in mapping are a few small areas of somewhat poorly drained Hoopeston soils on the slightly higher positions. The included soils make up 1 to 15 percent of the unit.

Most areas of this soil are drained by tile and, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where tile systems have failed, a periodic water table is at a depth of 1 foot or less.

Water and air movement through this soil is moderately rapid in the upper part of the profile and rapid in the lower part. Surface runoff from cultivated areas is very slow. Available water capacity is moderate. Reaction in the subsoil is neutral. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is high. The surface layer is very friable and easy to work.

Many areas of this soil are used for farming. However, much of the acreage is idle or used for low density residential development. The trend of land use is toward nonfarm uses. This soil has good potential for crops but poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, vegetable crops, grasses, and legumes. Wetness is the main limitation for crops. Tile drains and shallow surface ditches help remove excess water. Installation of tile in the sandy underlying material requires special cover material to prevent clogging of tile lines. If the soil is fall plowed and left bare, wind erosion may occur during spring. Winter cover crops, crop residue management, conservation tillage, and field windbreaks help reduce soil loss. Returning crop residue and adding animal manures help maintain good tilth and organic matter content and improve fertility.

If this soil is used for urban development, it must be artificially drained. Dwellings with basements should not be constructed. Dwellings without basements should be constructed only after drainage systems are installed. Excavating is somewhat difficult because this soil is wet and sidewalls are unstable. Stabilizing of sidewalls is generally necessary to reduce cave-in. Covering the soil with a suitable base material makes it more suitable for streets and roads. The seepage bed for septic tank absorption fields needs to be constructed in suitable fill material above the water table. To prevent possible ground water contamination, community sewers and treatment facilities are needed.

Most areas of this soil are poorly suited to recreational uses. They remain wet for a long period after rain. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. Where areas have no plant cover, the soil becomes muddy and slippery if heavily traveled when wet. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

206—Thorp silt loam. This nearly level, poorly drained soil is in depressions surrounded by sloping, better drained soils. It is occasionally ponded for a brief period in spring. Areas of this soil are generally rounded or elongated in shape and 2 to 25 acres in size.

Typically, the surface layer is very dark gray silt loam about 12 inches thick. The subsurface layer is dark grayish brown silt loam about 5 inches thick. The subsoil is about 31 inches thick. The upper part of the subsoil is dark grayish brown and olive gray, mottled, firm and very firm silty clay loam; the middle part is olive gray and light olive gray, mottled, firm clay loam; and the lower part is mottled light olive gray and yellowish brown, friable loam. The underlying material to a depth of about 60 inches is mottled light olive gray and yellowish brown, calcareous layers of loam and silt loam. In some places the surface layer is as much as 24 inches thick where the soil receives much sediment from surrounding slopes. In some areas the subsoil and underlying material are compact silty clay loam.

Included with this soil in mapping are a few small areas of somewhat poorly drained Mundelein soils and well drained Barrington soils on the higher positions. The included soils make up 2 to 10 percent of the unit.

Some areas of this soil are artificially drained by surface ditches or drainage tile. In undrained areas of this soil or in areas where drainage systems have been damaged by construction, a water table is within a depth of 1 foot during wet seasons.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is slow to ponded. Available water capacity is high. Reaction is slightly acid in the upper part of the subsoil and mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is not high in content of organic matter, it tends to crust or puddle after a hard rain.

Many areas of this soil are used for farming. However, much of the acreage is idle. A few areas are used for urban development. This soil has good potential for crops but poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and seasonal wetness are the main limitations for cultivated crops. Tile drains with surface inlets and shallow surface ditches help improve drainage. Returning crop residue and adding animal manures help maintain good tilth and organic matter content and improve fertility.

Areas of this soil used for urban development must be artificially drained and protected from flooding. Dwellings with basements should not be constructed because wet basements are likely. Dwellings without basements should be constructed only after drainage systems are installed. Installing drainage systems and use of suitable base material help increase suitability for streets and roads. Septic tank absorption fields are not suited, unless the seepage bed is constructed above the water table in suitable fill material. Contamination of ground water and septic system failures are likely. Sanitary facilities need to be connected to community sewers and treatment facilities where possible. Sewage lagoons are limited by wetness and a seepage hazard. Sealing the bottom of the lagoon helps increase suitability in places.

Most areas of this soil are poorly suited to recreational uses. They remain wet for a long period after rains, even where drained. This soil generally produces good turf. However, when wet, the sod is easily damaged by heavy foot traffic and the soil becomes muddy and very slippery where it lacks plant cover. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

223B—Varna silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges of till plains or moraines on uplands. Areas of this unit are irregular in shape and are commonly 5 to 100 acres in size.

Typically, the surface layer is about 15 inches thick. It is black silt loam in the upper part and very dark grayish brown and dark brown silt clay loam in the lower part. The subsoil is about 18 inches thick. The upper part of the subsoil is brown, firm silty clay loam; the middle part is brown, faintly mottled, firm silty clay; and the lower part is light olive brown, mottled, firm silty clay loam. The underlying material to a depth of about 60 inches is light olive brown, mottled, calcareous silty clay loam. In some places the surface layer is thinner and browner colored than typical or the surface layer and upper part of the subsoil have more sand.

Included with this soil in mapping are a few small areas of somewhat poorly drained Elliott and poorly drained Ashkum soils in shallow depressions and drainageways. The included soils make up 2 to 10 percent of the unit.

Water and air movement through this soil is moderately slow in the upper part of the profile and slow to moderately slow in the lower part. Surface runoff from cultivated areas is medium. Available water capacity is moderate. A perched water table is above the moderately slowly permeable material for a brief period in spring. Reaction is medium acid to neutral in the upper part of the subsoil and moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is moderate to high. The surface layer is friable and easy to work at the proper range of soil moisture. However, if the surface layer is too wet, it tends to become hard when dry. Root development is restricted below a depth of about 33 inches by the compact, moderately fine textured glacial till.

Many areas of this soil are intensively farmed. However, much of the acreage is idle or is used for low density development. This soil has good potential for crops, but fair to poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. If the soil is used for cultivated crops, the main concerns in management are the hazard of erosion and the lack of adequate available water during dry seasons. Conservation tillage, crop residue management, terracing, and contour farming help to control erosion. Returning crop residue and adding animal manures help maintain organic matter content and improve fertility, improve soil tilth, increase infiltration, and reduce soil loss.

This soil is only moderately suited to dwellings with and without basements, because the subsoil does not have sufficient strength. This lack of strength can be overcome by strengthening or replacing the base material. Excavating this soil is somewhat difficult because of the relatively high clay content. Only slight grading is needed for streets and lots. Debris basins help to trap sediment from construction sites. Frost heave is a concern for local streets and roads but can be overcome if base material is replaced. Septic tank absorption systems are generally poorly suited because of the moderately slow to slow permeability. Septic system failures are likely. Systems can be improved by increasing the size of the absorption field and by diverting water from the field. This soil is fairly well suited to sewage lagoons. Lagoons can be established on level areas that have good surface drainage.

This soil is suited to a wide range of recreational activities. It can support a firm turf that can withstand heavy foot traffic, except when the soil is wet. The soil stays wet for a brief period after rains. Areas that have no plant cover are muddy and slippery when wet and are readily compacted. They are commonly very dusty when dry. Soil limitations are few for picnic areas or paths and trails. Camp areas and playgrounds are somewhat limited by the moderately slow permeability, and artificial drainage is needed in some areas to increase suitability. Leveling is needed in some places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

228B—Nappanee silt loam, 1 to 5 percent slopes. This nearly level and gently sloping, somewhat poorly drained soil is on low ridges and knolls of glacial till plains and tops of broad moraines on uplands. Areas of this soil are irregular in shape and are commonly 5 to 300 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsurface layer is grayish brown silt loam about 2 inches thick. The subsoil is about 23 inches thick. The upper part of the subsoil is dark grayish brown, mottled, firm silty clay loam; the middle part is dark grayish brown, mottled, very firm clay; and the lower part is mixed brown and gray, mottled, very firm, calcareous silty clay. The underlying material to a depth of about 60 inches is mixed gray and grayish brown, calcareous silty clay. In some undisturbed places the surface layer is very dark gray in the upper 3 inches and dark grayish brown in the lower 6 inches. In some areas the surface layer and upper part of the soil have more sand, the subsoil is browner in color than typical, or the underlying material commonly contains layers of friable loamy material.

Included with this soil in mapping are a few small areas of poorly drained Bryce soils in depressions. The included soils make up 2 to 15 percent of the unit.

Some areas of this soil are artificially drained by tiles. In undrained areas or in areas where systems have failed, a periodic water table is at a depth of 1 to 2 feet during wet seasons.

Water and air movement through this soil is very slow, and surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is strongly acid to slightly acid in the upper part of the subsoil and mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is relatively low in content of organic matter, it tends to crust or puddle after a hard rain. Root development is hindered below a depth of about 28 inches by the compact, clayey glacial till.

A few areas of this soil are intensively farmed. Many areas are in trees or are idle. A few areas are used for residential development or other nonfarm uses. This soil has fair to poor potential for crops and poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. If the soil is used for cultivated crops, the chief concerns in management are erosion, seasonal wetness, and the moderate available water capacity. Conservation tillage, crop residue management, terracing, and contour farming help control erosion. Returning crop residue and adding animal manures help maintain organic matter content and improve fertility, reduce surface crusting, increase infiltration, and reduce soil loss. Tile drains generally do not function well, but narrow spacings and porous filters can be used to help improve drainage of wet spots.

Common trees in areas are mixed northern hardwoods, chiefly oak and hickory. Suitable trees to plant are those that tolerate seasonal wetness such as pin oak, northern red oak, red maple, green ash, American basswood, eastern redcedar, and eastern white pine.

This soil has good potential for woodland wildlife habitat. Many species of trees, shrubs, and vines are available for food and cover.

This soil is suitable for some urban uses. Buildings should be constructed without basements, unless basements are built above the water table. Sites must be artificially drained, but keeping the water table at a desired depth is difficult. Excavating this soil is somewhat difficult because of the high clay content. Excavations fill with water in the spring and dry out slowly. The low strength and shrink-swell are limitations for foundations and footings, but these can be overcome by replacing base material. Slight grading is generally needed for streets and lots. Debris basins help reduce siltation. Lawns and shrubs are difficult to establish. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. If septic tank systems are used, seepage beds need to be constructed above the water table and in suitable fill material. The upper layer of the soil needs to be replaced or covered with suitable base material to reduce frost action on local streets and roads. Sewage lagoons are well suited to this soil.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. It produces good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing. Some grading is generally needed for playgrounds, athletic fields, and other intensive play areas

This soil is in capability subclass IIIe.

232—Ashkum silty clay loam. This nearly level, poorly drained soil is along drainageways and in depressions between ridges on glacial plains. It is occasionally flooded for brief periods in spring. Areas of this soil are very irregular in shape and 2 to several hundred acres in size.

Typically, the surface layer is black silty clay loam and silty clay about 11 inches thick. The subsoil is about 36 inches thick. The upper part of the subsoil is very dark gray, mottled, firm silty clay; the middle part is gray, mottled, firm and very firm silty clay; and the lower part is mixed gray, yellowish brown, and dark yellowish brown, very firm silty clay loam. The underlying material to a depth of 60 inches is mixed gray and dark yellowish brown, very firm silty clay loam and has a few pebbles and stones. In some places where recent deposits of soil material are from the surrounding higher areas, the surface layer is more silty. In some areas the very firm underlying material is at a depth of more than 60 inches.

Included with this soil in mapping and making up 1 to 15 percent of the unit are small areas of Peotone and Varna soils. The Peotone soils are in the deeper depressions, and the moderately well drained and well drained Varna soils are on the higher ridges and knolls.

Most areas of this soil are artificially drained by tile and, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where drainage systems have been damaged by construction, a water table is at a depth of 1 foot or less during wet seasons.

Water and air movement through this soil is moderately slow, and surface runoff from cultivated areas is slow to ponded. Available water capacity is high. Reaction is neutral or mildly alkaline in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The surface layer is compact and rather difficult to work. Because it is relatively high in clay content, it is sticky when wet and becomes hard and cloddy when dry. Root development is restricted below a depth of about 37 inches by the compact, moderately fine textured glacial deposits.

Some areas of this soil are intensively farmed. However, many areas near urban development are idle. The trend of land use is toward nonfarm uses. This soil has very good potential for crops and poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and wetness are the main limitations and erosion is a hazard for cultivated crops. Tile drains with fairly narrow spacings and shallow surface ditches help improve drainage. Crop residue management and conservation tillage help reduce erosion. Returning crop residue and adding animal manures help maintain good tilth and organic matter content and improve fertility.

Areas of this soil used for urban development must be artificially drained and protected from flooding. Dwellings with basements should not be constructed because basements are likely to be wet. Dwellings without basements should be constructed only after drainage systems are installed and subgrade material is replaced. Excavating this soil is difficult because of wetness and relatively high clay content. Draining this soil and using suitable fill material improve strength and increase suitability for streets and roads. Septic tank absorption fields need seepage beds that are constructed above the water table in suitable fill material. Contamination of ground water and septic system failures are likely. Where possible, all sanitary facilities need to be connected to community sewers and treatment facilities. Sewage lagoons are suited to this soil.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains, even where drained. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. In areas that lack plant cover, this soil becomes muddy and very slippery. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

235—Bryce silty clay. This nearly level, poorly drained soil is on upland flats and in depressions and drainageways. It is occasionally flooded for a long period in spring. Areas of this soil are irregular in shape and 2 to several hundred acres in size.

Typically, the surface layer is black silty clay about 17 inches thick. The subsoil is about 31 inches thick. The upper part of the subsoil is very dark gray, mottled, very firm silty clay; the middle part is mixed gray and yellowish brown, mottled, very firm silty clay; and the lower part is mixed gray and grayish brown, mottled, very firm silty clay. The underlying material to a depth of about 60 inches is mixed gray and grayish brown, calcareous silty clay. In some places, where recent deposits of soil material are from the surrounding higher areas, the surface layer is more silty than typical. In some areas the surface layer is thinner.

Included with this soil in mapping are small areas of the somewhat poorly drained Nappanee and Frankfort soils on the slightly higher positions and the poorly drained Peotone soils in potholes. The included soils make up 2 to 10 percent of the unit.

Many areas of this soil are artificially drained by drainage tile and, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where drainage systems have been damaged by construction, a water table is at a depth of 1 foot or less during wet seasons.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is slow to ponded. Available water capacity is moderate. Reaction ranges from neutral in the upper part of the subsoil to mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The surface layer is compact and rather difficult to work. Because it is high in clay content, this soil is quite sticky when wet and hard and cloddy when dry. Root development is restricted below a depth of about 32 inches by the compact, clayey glacial till.

Many areas of this soil are intensively farmed. However, much of the acreage is idle or in built-up areas. The trend of land use is toward nonfarm uses. This soil has good potential for crops but very poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and wetness are the main limitations and erosion is a hazard for cultivated crops. Even though this soil is difficult to drain, tile drains and shallow surface ditches improve drainage. If tile is used for drainage, a filter of porous material is needed. Bare, unprotected soil is susceptible to wind erosion. Field windbreaks, crop residue management, and conservation tillage help reduce wind erosion. Returning crop residue and adding animal manures help maintain good tilth and organic matter content.

Areas used for building sites must be artificially drained and protected from flooding. Dwellings should be constructed without basements, unless basements are elevated above the water table. Foundations and footings need to be placed in suitable base material. Excavating this soil is difficult because of wetness and clayey material. Excavations fill with water and are very slow to dry out. Septic systems function better if the seepage beds are placed above the water table and in loamy mounded fill material. Failure of septic tank systems is possible. Consequently, all sanitary facilities need to be connected to community sewers and treatment facilities. The soil needs to be drained and covered with a suitable base material for local streets and roads. It is suited to sewage lagoons. Lawns and shrubs are difficult to establish and maintain.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains, even when drained. This soil produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. In areas that lack plant cover, the soil becomes muddy and very slippery when wet. Surfacing of heavily traveled paths and trails is needed in many areas.

This soil is in capability subclass IIw.

241D3—Chatsworth silty clay, 7 to 15 percent slopes, severely eroded. This strongly sloping, moderately well drained soil is on severely eroded side slopes (fig. 7) of ridges and knolls in rolling morainal areas. Areas commonly are long and narrow and 2 to 25 acres in size.

Typically, the surface layer is dark grayish brown silty clay about 6 inches thick. The subsoil is about 12 inches thick. It is mixed dark grayish brown and yellowish brown, mottled, very firm silty clay and contains some lime. The underlying material to a depth of about 60 inches is brown, mottled, calcareous silty clay. In some places the underlying material is firm silty clay loam, and in some uncultivated areas the surface layer is more friable.

Included with this soil in mapping are a few small somewhat poorly drained areas of Nappanee and Frankfort soils on broad, gently sloping ridges. The included soils make up 1 to 7 percent of the unit.

Water and air movement through this soil is very slow, and surface runoff from cultivated areas is rapid. Available water capacity is low. A perched water table is above the very slowly permeable material for brief periods in spring. Reaction is mildy alkaline or moderately alkaline in the calcareous subsoil. Reaction in the surface layer varies, depending on past management, but is commonly mildly alkaline. Organic matter content is low because most of the surface layer has been lost through erosion. The surface layer is compact and rather difficult to work. Because it consists mostly of material from the clayey subsoil, it is sticky when wet and becomes hard and cloddy when dry. Root development is restricted below a depth of about 18 inches by the compact, clayey glacial till.

Some areas of this soil are used for farming. Many areas are idle because they are severely eroded and have been abandoned. This soil has poor potential for crops and for most urban uses.

This soil is better suited to grasses and legumes than to most other uses. Some less eroded areas produce high quality forage. Pasture is effective in controlling erosion. Very little can be grown on some of the more severely eroded areas where calcareous till is exposed. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

This soil is poorly suited to urban uses. Dwellings and buildings should be constructed without basements, unless basements are elevated above the water table. Footings need adequate drainage. The low strength limits use of this soil for foundations and footings, but this can be overcome by replacing the base material. Excavating this soil is difficult because of the high content of clay. Excavations can fill with water in spring and dry out slowly. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. If septic tank systems are used, seepage beds need to be constructed above the water table and in suitable fill material. The upper layer of the soil needs to be replaced or covered with suitable base material to reduce frost action on local streets and roads. Sewage lagoons are poorly suited to this soil.

The clayey texture, excessive slope, and erosion severely limit this soil for recreation. Limitations are severe for paths and trails. Plant cover is difficult to establish. The clayey surface layer and the very slow permeability severely limit camp or picnic areas. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Play areas are slow to dry out.

This soil is in capability subclass VIe.

290B—Warsaw silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on low ridges on outwash plains or on benches along streams. It is moderately deep over sand and gravel. Areas of this soil are irregular in shape and are commonly 5 to 150 acres in size.

Typically, the surface layer is silt loam about 14 inches thick. It is black in the upper part and dark brown in the lower part. The subsoil is about 17 inches thick. The upper part of the subsoil is dark yellowish brown, firm silty clay loam, and the lower part is dark brown, firm gravelly clay loam. The underlying material to a depth of about 60 inches is mixed yellowish brown and dark yellowish brown, calcareous gravel and sand (fig. 8). In some areas the surface layer is thinner and browner colored than typical. In some places depth to loose sand and gravel is more than 40 inches.

Included with this soil in mapping are a few small areas of somewhat poorly drained Kane soils and poorly drained Will soils in shallow depressions and drainageways. The included soils make up 2 to 15 percent of the unit.

Water and air movement through this soil is moderate in the upper part and is very rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction ranges from medium acid in the upper part of the subsoil to neutral in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. However, if worked when too wet, it tends to become hard when dry. Root development is restricted below a depth of about 31 inches by the calcareous gravel and sand.

Many areas of this soil are intensively farmed. Some areas are idle, and some areas are used for individual homesites or other nonfarm uses. This soil has good potential for crops and for many urban uses. It is generally a good source of sand and gravel.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. If the soil is used for cultivated crops, the major concerns in management are erosion and the lack of adequate available water during dry seasons. Crop residue management, conservation tillage, terracing, and contour farming help control erosion. Returning crop residue and adding animal manures help maintain organic matter content and improve fertility, improve tilth, increase infiltration, and reduce soil loss.

This soil is well suited to dwellings with or without basements. Only slight grading is needed on construction sites. Debris basins help to reduce siltation. Local streets and roads are only moderately suited because of low strength and frost action, but these limitations can be overcome by using the gravelly underlying material for subbase. Septic tank absorption systems are well suited. However, pollution of ground water is possible because of the rapidly permeable underlying material. This soil is unsuited to sewage lagoons because of seepage in the underlying material.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that lack a plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths and trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

293—Andres silt loam. This nearly level, somewhat poorly drained soil is on low ridges and foot slopes or in very shallow depressions. Areas of this soil are irregular in shape and are commonly 2 to 20 acres in size.

Typically, the surface layer is about 15 inches thick. It is black silt loam in the upper 9 inches and very dark brown silty clay loam in the lower 6 inches. The subsoil is about 23 inches thick. The upper part of the subsoil is very dark grayish brown, brown, dark yellowish brown, and yellowish brown, mottled, friable and firm silty clay loam that increases in sand content as depth increases; the middle part is mixed dark brown and black, mottled, friable clay loam; and the lower part is pale olive, mottled, very firm silty clay loam. The underlying material to a depth of about 60 inches is grayish brown, mottled, very firm, calcareous silty clay loam. In some places the surface layer is lighter colored or higher in sand content than typical, and in some areas calcareous silty clay loam glacial material is at a depth of more than 40 inches.

Included with this soil in mapping are some small areas of poorly drained Ashkum and Milford soils in the deeper depressions. The included soils make up 1 to 10 percent of the unit.

Some areas of this soil are drained by tile. In undrained areas or in areas where drainage has been disrupted by construction, a periodic water table is at a depth of 1 to 3 feet.

Water and air movement through this soil is moderately slow, and surface runoff from cultivated areas is slow. Available water capacity is high. Reaction is slightly acid to mildly alkaline in the upper part of the subsoil and generally moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is high. The surface layer is friable and easy to work at the proper soil moisture. If worked when wet, the surface layer is somewhat sticky and becomes somewhat hard and cloddy when dry. Root development is restricted below a depth of about 38 inches by the compact, moderately fine textured glacial till or lakebed sediment.

Some areas of this soil are farmed. Many areas near urban development are idle. The trend of land use is toward nonfarm uses. This soil has excellent potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain grasses, and legumes. Seasonal wetness can be a limitation in places for cultivated crops, and erosion is a hazard. Drainage or spot drainage with tile benefits most crops where wetness is a limitation. Returning crop residue and adding animal manures help maintain tilth and organic matter content, improve fertility, and reduce soil loss.

This soil is poorly suited to dwellings without basements because of wetness. The water table can be lowered by installing tile, and strength can be improved by replacing base material. To lower the water table to a desired depth for construction of dwellings with basements is very difficult. Frost heave of local streets and roads can be reduced by adequate drainage and by replacing base material. Septic tank absorption fields are limited by wetness and the moderately slow permeability in the underlying material. Adding suitable fill material and constructing the seepage bed above the water table help improve suitability for septic tank systems. This soil is fairly well suited to sewage lagoons.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil can produce good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing.

This soil is in capability class I.

294B—Symerton silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on low ridges and knolls or lower side slopes of ridges on uplands. Areas of this soil are irregular in shape and 3 to 25 acres in size.

Typically, the surface layer is about 12 inches thick. It is very dark brown silt loam in the upper 8 inches and dark brown silt loam in the lower 4 inches. The subsoil is about 23 inches thick. The upper part of the subsoil is brown, friable clay loam, and the lower part is dark brown, very firm silty clay loam. The underlying material to a depth of about 60 inches is dark yellowish brown, very firm, calcareous silty clay loam that contains a few pebbles and small stones. In some places the surface layer is very dark grayish brown in the upper part and brown in the lower part, and in some areas the surface layer and upper part of the subsoil contain more sand.

Included with this soil in mapping are a few small areas of somewhat poorly drained Elliott and poorly drained Ashkum soils in slight depressions and in drainageways. The included soils make up 1 to 10 percent of the unit.

Water and air movement is moderate in the upper part of the profile and moderately slow in the lower part. Surface runoff from cultivated areas is medium. Available water capacity is high. A perched water table is above the moderately slowly permeable material for a brief period in spring. Reaction is medium acid to neutral in the upper part of the subsoil and mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. However, if the surface layer is worked when too wet, it is slightly sticky and tends to become hard when dry. Root development is restricted below a depth of about 35 inches by the compact, moderately fine textured glacial till or lakebed sediment.

Many areas of this soil are used for farming. Many areas are idle or are used for individual homesites or other nonfarm uses. This soil has very good potential for crops and fair potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Conservation tillage, terracing, and contour farming help control erosion. Returning crop residue and adding animal manures help maintain organic matter content and fertility, improve soil tilth, increase infiltration, and reduce soil loss.

This soil is moderately suited to dwellings with or without basements because the subsoil does not have sufficient strength. This can be corrected by strengthening or replacing the base material. Excavating this soil is somewhat difficult below a depth of about 3 feet because of the relatively high clay content. Only slight grading is needed for streets and lots. Debris basins help trap sediment from construction sites. Low strength is a concern for local streets and roads, but this can be corrected by replacing base material. Septic tank absorption systems are generally poorly suited because of the moderately slow permeability in the lower part of the profile. Septic tank system failures are possible. Systems can be improved by increasing the size of the absorption field. This soil is fairly well suited to sewage lagoons. Lagoons need to be established on the most level areas that have good surface drainage.

This soil is suited to a wide range of recreational activities. It can support a firm turf that withstands heavy foot traffic, except when the soil is wet. The soil stays wet for brief periods after rains. Areas that have no plant cover are muddy and slippery when wet. They are commonly dusty when dry. Limitations for picnic and camp areas or paths and trails are few. Some leveling may be needed for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

295—Mokena silt loam. This nearly level, somewhat poorly drained soil is on low ridges in very shallow depressions. Areas of this soil are irregular in shape and are commonly 2 to 20 acres in size.

Typically, the surface is about 14 inches thick. It is very dark brown silt loam in the upper 10 inches and very dark grayish brown silt loam in the lower 4 inches. The subsoil is about 29 inches thick. The upper part of the subsoil is grayish brown and light olive brown, mottled, friable silty clay loam that increases in sand content as depth increases; the middle part is light olive brown, mottled, friable clay loam; and the lower part is light yellowish brown, mottled, very firm silty clay. The underlying material to a depth of about 60 inches is light yellowish brown, mottled, very firm silty clay. It is calcareous and commonly contains a few small pebbles. In some places the surface layer is thinner and lighter colored than typical, or the surface layer and upper part of the subsoil have more sand.

Included with this soil in mapping are some small areas of less permeable Frankfort soils on positions similar to this Mokena soil and small areas of poorly drained Bryce soils in depressions. The included soils make up 1 to 15 percent of the unit.

Some areas of this soil are drained by tile. In undrained areas or in areas where drainage sysems have been disrupted by construction, a periodic water table is at a depth of 1 to 3 feet.

Water and air movement is moderately slow in the upper part of the profile and slow in the lower part. Surface runoff from cultivated areas is medium. Available water capacity is high. Reaction is medium acid to neutral in the upper part of the subsoil and is slightly acid to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is high. The surface layer is friable and easy to work at the proper range in soil moisture. However, if the surface layer is too wet when worked, it is somewhat sticky and tends to become hard and cloddy when dry. Root development is restricted below a depth of about 36 inches by the compact, clayey glacial material.

Many areas of this soil are used intensively for cultivated crops. Some areas are idle, and some areas are used for residential development or other nonfarm uses. This soil has good potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and seasonal wetness are limitations in some places for cultivated crops, and erosion is a hazard. Where wetness is a limitation, installation of tile benefits most crops. Returning crop residue and adding animal manure help maintain tilth and organic matter content, improve fertility, and reduce soil loss.

This soil is poorly suited to dwellings without basements because of wetness and because the subsoil does not have sufficient strength. The water table can be lowered by installing tile, and strength can be improved by replacing base material. Excavating this soil is somewhat difficult because of the periodic water table and the high clay content below a depth of about 3 feet. To lower the water table to a desired depth for construction of dwellings with basements is difficult. Frost heave of local streets and roads can be reduced by wetness and the moderately slow to slow permeability. Adding suitable fill material and constructing the seepage bed above the water table help improve suitability for septic tank systems. This soil is well suited to sewage lagoons.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil can produce good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that lack plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing.

This soil is in capability subclass IIw.

298—Beecher silt loam. This nearly level, somewhat poorly drained soil is on low ridges and in shallow depressions and drainageways on uplands. Areas of this soil are irregular in shape and are commonly 2 to 30 acres in size.

Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsurface layer is mixed dark gray and dark grayish brown silt loam about 4 inches thick. The subsoil is about 28 inches thick. The upper part of the subsoil is dark grayish brown, mottled, firm silty clay; the middle part is light olive brown, mottled, very firm silty clay and silty clay loam; and the lower part is light olive brown, mottled, firm silty clay loam. The underlying material to a depth of 60 inches is light olive brown, mottled, very firm, calcareous silty clay loam that has a few pebbles. Some areas have a lighter colored surface layer than is typical, and some areas at the base of slopes receive deposition from surrounding soils.

Included with this soil in mapping and making up 2 to 10 percent of the unit are small areas of moderately well drained and well drained Markham soils and poorly drained Ashkum soils. The Markham soils are on higher ridges, and the Ashkum soils are in depressions and drainageways.

Some areas of this soil are artificially drained by tile. In undrained areas or in areas where drainage has been disrupted by construction, a water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is slow. Available water capacity is moderate. Reaction is medium acid in the upper part of the subsoil and mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is moderate in organic matter, it tends to crust or puddle after hard rains. Root development is restricted below a depth of about 34 inches by the compact, moderately fine glacial till.

Some areas of this soil are wooded, and some areas are farmed. Many areas are idle, are in forest preserves, or are in nonfarm uses. This soil has very good potential for crops and poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and seasonal wetness are limitations in places for cultivated crops, and erosion is a hazard. Where wetness is a limitation, tile drains with narrow spacings in combination with surface ditches help improve drainage. Conservation tillage and crop residue management reduce soil loss. Returning crop residue and adding animal manures help maintain tilth and organic matter content and improve fertility.

Areas of this soil that have not been disturbed are in trees and grasses. Suitable trees to plant are those that tolerate seasonal wetness, such as bur oak, northern red oak, red maple, green ash, American basswood, eastern white pine, and eastern red cedar.

This soil has good potential for a variety of food and cover plants for openland and woodland wildlife. Open fields and idle areas of grasses and weeds favor openland wildlife such as rabbit, pheasant, and meadowlark. Protective cover and food is commonly available nearby for many woodland species such as deer, squirrels, raccoon, and birds. In most places small developments of shallow water or dugout ponds are relatively easy to provide for wetland wildlife habitat. Maintaining water at the desired level for migratory waterfowl and furbearers is generally somewhat difficult.

This soil is poorly suited to dwellings without basements because of wetness. Excavating this soil is somewhat difficult because of wetness and the relatively high clay content. The water table can be lowered by installing tile, and the lack of strength can be overcome by replacing base material. To lower the water table sufficiently for construction of dwellings with basements is difficult. Frost heave and lack of sufficient strength are concerns for local streets and roads, but these concerns can be overcome by replacing base material. Septic tank absorption fields are limited by wetness and the slow permeability. Adding suitable fill material and increasing the size of the absorption field help improve suitability for septic tank systems. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. This soil is well suited to sewage lagoons.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil can produce good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing.

This soil is in capability subclass IIw.

316—Romeo silt loam. This very shallow, nearly level soil is on flood plains and waterswept beaches along the Des Plaines River and Calumet-Sag Channel. It is frequently flooded for brief periods in spring. Most areas of this soil appear to be poorly drained, but drainage is difficult to assess because of the thin soil. Areas of this soil are commonly long and 10 to 300 acres or more in size.

Typically, the surface layer is black silt loam about 5 inches thick. Underlying this is light gray, very hard limestone. In places the surface layer contains many flagstones, and in some areas the underlying bedrock is fractured and the voids between flagstones are filled with soil material.

Included with this soil in mapping are a few small areas of moderately deep Faxon soils and deep Sawmill soils. The included soils make up 1 to 15 percent of the unit.

Most areas of this soil are not artificially drained because of the lack of suitable outlets and the very shallow depth to the underlying bedrock. The water table is at a depth of 1 foot or less during wet seasons, and most areas are flooded by runoff from higher slopes.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is slow. Available water capacity is very low. Reaction in the surface layer is commonly mildly alkaline. Organic matter content is moderate to high. The surface layer is stony and difficult to till. Root development is restricted below a depth of about 5 inches by bedrock.

Very few areas of this soil are used for farming or for urban development because of the risk of flooding and the shallow depth to bedrock. Most areas are idle, but some areas are in forest preserves. This soil is unsuited for crops and has poor potential for most urban uses. It has poor to fair potential for some types of outdoor recreation and for wildlife habitat.

This soil generally is not cultivated because of the shallow bedrock. Also, the soil is droughty. Some legumes and grasses could be produced for early hay or pasture, but productivity would be low.

This soil has very poor potential for trees. For ornamental plantings, eastern red cedar, European larch, and almondleaf willow can be grown.

Wildlife food and cover plants generally are not well suited to this soil. A few nearby streams are attractive to migratory waterfowl. Development of shallow water areas is generally not feasible.

Areas of this soil that are used for urban development need to be protected from flooding. Dwellings or other buildings need to be constructed in stable fill material. Basements need to be constructed above the water table. Cutting or blasting of bedrock is needed for installation of sewers and utility lines. Covering the soil with suitable base material in places increases suitability for streets and roads. Septic tank absorption fields need seepage beds constructed above the floodwater level, the water table, and the bedrock. The absorption field needs to be in loamy mounded till to avoid ground water contamination (*3*). Where possible, all sanitary facilities need to be connected to community sewers and treatment facilities.

This soil is poorly suited to many recreational uses. It remains wet for long periods after rains or floods, even where drained. Good plant cover is difficult to establish. Stones limit suitability for playgrounds and other intensive play areas. The bedrock makes driving of tent stakes difficult. Suitability for picnic areas and for paths and trails is poor.

This soil is in capability subclass VIs.

318C2—Lorenzo loam, 5 to 10 percent slopes, eroded. This gently rolling, well drained soil is on ridges and side slopes on uplands. It is shallow to calcareous gravel and sand. Areas of this soil are irregular in shape and are commonly 5 to 50 acres in size.

Typically, the surface layer is very dark brown loam about 7 inches thick. The subsoil is about 9 inches thick. The upper part of the subsoil is brown, firm gravelly clay loam, and the lower part is dark yellowish brown, friable gravelly clay loam. The underlying material to a depth of about 60 inches is dark yellowish brown, loose sand and gravel. In some places the surface layer is dark grayish brown in the upper part and brown in the lower part, or the surface layer varies considerably in color and thickness because of erosion. In places loose gravel and sand range from less than 12 inches to more than 24 inches in depth.

Included with this soil in mapping are a few small areas of poorly drained Will and Thorp soils in depressions and drainageways. The included soils make up 1 to 10 percent of the unit.

Water and air movement is moderately rapid in the upper part of the profile and is very rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is low. Reaction is neutral in the upper part of the subsoil and moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is moderate because of the loss of surface soil by erosion. The loamy surface layer is easy to work, except where gravel is exposed. Root development is restricted below a depth of about 18 inches by the loose gravel and sand.

Some areas of this soil in the northwestern part of Cook County are farmed. Many areas are idle or used for low density residential development. The trend of land use is toward nonfarm uses. This soil has poor potential for crops but has good potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion and droughtiness are the main concerns in management for cultivated crops. Conservation tillage, crop residue management, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, and reduce soil loss.

This soil can produce high quality forage. Plants best suited to this soil are those that tolerate droughtiness. Hayland or pasture is effective in controlling erosion. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

Some of the more sloping areas in this map unit are only moderately suited to dwellings with or without basements; otherwise, the soil is generally well suited. Slight to moderate grading is needed for lots and streets. Lawns and shrubs are well suited, except droughtiness is a concern in establishing lawns. Local streets and roads are well suited because this soil has low shrink-swell potential and has favorable material. Septic tank absorption systems are well suited except pollution of ground water is possible because of the rapidly permeable underlying material. Sewage lagoons are unsuited because of seepage in the underlying material.

This soil is suited to a wide range of recreational activities. It is suited to plants that are tolerant to droughty conditions. In most areas a firm turf that withstands foot traffic can be maintained. In areas that have no plant cover, the surface is somewhat slippery when wet. Limitations for camp and picnic areas or for paths or trails are few. Leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Extensive leveling can expose the underlying material which is undesirable and makes maintenance of plant cover difficult. Watering is needed in places in summer.

This soil is in capability subclass IIIe.

318D2—Lorenzo loam, 10 to 15 percent slopes, eroded. This rolling, well drained soil is on ridges and short, uneven side slopes on uplands. It is shallow to calcareous gravel and sand. Areas of this soil are commonly long and narrow or oval in shape and 2 to 45 acres in size.

Typically, the surface layer is very dark brown loam about 7 inches thick. The subsoil is about 9 inches thick. The upper part of the subsoil is brown, firm gravelly clay loam, and the lower part is dark yellowish brown, friable gravelly clay loam. The underlying material to a depth of about 60 inches is dark yellowish brown, loose sand and gravel. In some places the surface layer is very dark gray in the upper part and brown in the lower part, or the surface layer varies in color and thickness because of erosion, or the depth to the underlying gravel and sand is more than 20 inches or less than 12 inches.

Included with this soil in mapping are a few small areas of poorly drained Thorp and Will soils in depressions and drainageways. The included soils make up 1 to 8 percent of the unit.

Water and air movement is moderately rapid in the upper part of the profile and rapid or very rapid in the underlying gravel and sand. Surface runoff from cultivated areas is medium. Available water capacity is low. Reaction is neutral in the upper part of the subsoil and moderately alkaline in the lower part. Reaction in the surface layer varies depending on past management, but is commonly neutral. Organic matter content is moderate because of the loss of surface soil by erosion. The loamy surface layer is easy to work, except for areas where gravel is exposed. Root development is restricted below a depth of about 16 inches by gravel and sand.

A few areas of this soil are used for farming. Most areas are abandoned farmland and are idle. Many areas are used for low density urban development. The trend of land use is toward nonfarm uses. This soil has poor potential for crops and fair potential for most urban uses.

The areas of this soil in cropland are best suited to grasses and legumes. Row crops are not suited because erosion is severe on this soil. Careful management is needed to control erosion and maintain fertility and good tilth.

This soil can produce high quality forage. Species that tolerate droughtiness are best suited. Hay or pasture is effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep pasture and soil in good condition.

This soil is moderately suited to dwellings with or without basements. Excessive slope is a limitation. Moderate grading is needed for streets and lots. Erosion and siltation can be reduced by maintaining plant cover and by using debris basins. Lawns and shrubs are somewhat difficult to establish and maintain because of slope and droughtiness. Slope is a concern for streets and roads. Septic tank absorption fields are moderately suited. The rapidly permeable underlying material causes a potential for pollution of ground water. Sewage lagoons are unsuited because of seepage in the underlying material.

Even though this soil has excessive slope, it can be used for many kinds of recreational activities. It is suited to drought tolerant plants, and it can support a firm turf that withstands foot traffic. Areas that do not have a cover of plants are slippery when wet. Limitations for paths and trails are few. Slope somewhat limits use for camp and picnic areas. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Leveling commonly exposes the underlying material and makes maintenance of plant cover difficult, unless the exposed areas of underlying material are covered with topsoil.

This soil is in capability subclass VIe.

320B—Frankfort silty clay loam, 1 to 5 percent slopes. This nearly level and gently sloping, somewhat poorly drained soil is on till plains and moraines on uplands. Areas of this soil are generally broad and irregular in shape and 5 to 300 acres or more in size.

Typically, the surface layer is very dark gray silty clay loam about 8 inches thick. In undisturbed areas, the subsurface layer is dark gray or dark grayish brown and is about 5 inches thick (fig. 9). The subsoil is about 22 inches thick. The upper part of the subsoil is mottled, dark brown, very firm silty clay; the middle part is dark grayish brown, very firm silty clay; and the lower part is brown, calcareous, very firm silty clay that has many greenish gray mottles. The underlying material to a depth of about 60 inches is mottled brown and greenish gray, calcareous silty clay. In some places the surface layer is darker colored or has a higher sand content than typical, and in a few eroded areas some brownish material from the upper part of the subsoil is mixed with material from the surface layer.

Included with this soil in mapping are small areas of poorly drained Bryce soils in shallow depressions and drainageways. The included soils make up 2 to 10 percent of the unit.

Some areas of this soil are artificially drained. In undrained areas or in areas where drainage systems have failed, a periodic water table is at a depth of 1 to 3 feet or less.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is neutral to medium acid in the upper part of the subsoil and is moderately alkaline in the extreme lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is moderate. The surface layer is somewhat firm and is sticky when wet. It becomes hard and cloddy when dry if worked when too wet. Root development is restricted below a depth of about 30 inches by the compact, clayey glacial till.

A few areas of this soil are used for farming, and a few areas are wooded. Many areas near expanding urban development are idle or used for forest preserves. This soil has fair potential for crops and poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. If it is used for cultivated crops, the main limitations are erosion, seasonal wetness, and the moderate available water supply. Conservation tillage and crop residue management help control erosion. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility, reduce crusting, increase infiltration, and reduce soil loss. Tile drains generally do not function well, but tile with porous filters can improve drainage in wet spots.

Dwellings and buildings should be constructed without basements, unless basements are built above the water table. The soil must be artificially drained; however, to control the water table at a desired depth is difficult. Excavating this soil is somewhat difficult because of the high clay content. Excavations fill with water in spring and dry out slowly. The low strength of the soil limits its use for foundations and footings, but this can be overcome by replacing base material. Slight grading is generally needed for streets and lots. Debris basins help to reduce siltation. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. Where septic tank systems are used, seepage beds need to be constructed above the water table and in suitable fill material. The upper layer of the soil needs to be replaced or covered with suitable base material to reduce frost action for local streets and roads. Sewage lagoons are well suited to this soil. Lawns and shrubs are difficult to establish.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil can produce good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing. Some grading is generally needed for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIIe.

320C2—Frankfort silty clay loam, 5 to 10 percent slopes, eroded. This moderately sloping, somewhat poorly drained soil is on side slopes of knolls and ridges in rolling morainal areas. Areas of this soil are irregular in shape and are generally 2 to 45 acres in size.

Typically, the surface layer is very dark grayish brown silty clay loam about 7 inches thick. The very firm subsoil is about 20 inches thick. The upper part of the subsoil is dark brown, mottled silty clay, and the lower part is mixed grayish brown and brown, calcareous silty clay that has greenish mottles. The underlying material to a depth of 60 inches is brown and greenish gray, calcareous silty clay. In some places brownish material from the subsoil has been mixed with the surface layer by plowing, and the surface layer is lighter colored than typical. In some areas the surface layer and upper part of the subsoil are higher in content of sand.

Included with this soil in mapping are a few small areas of poorly drained Bryce soils in depressions and waterways. The included soils make up 1 to 10 percent of the unit.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is rapid. Available water capacity is moderate. Reaction is medium acid to neutral in the upper part of the subsoil and moderately alkaline in the extreme lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is moderately low because of the loss of surface soil by erosion. Because the surface layer is rather low in organic matter, it is difficult to work. It is sticky when wet, and it becomes hard and cloddy when dry. Root development is restricted below a depth of about 27 inches by the compact, clayey glacial till.

Many areas of this soil are used for farming. Near expanding urban population, many areas are idle or used for low density urban development. This soil has fair to poor potential for crops and poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Excessive soil loss is the main hazard for cultivated crops. Seasonal wetness, poor tilth, and seasonal droughtiness are limitations. Conservation tillage, management of crop residue, terracing, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss. Tile drains generally do not function well, but tile with porous filters placed above sidehill seeps can improve drainage in wet areas.

This soil can produce high quality forage. Hayland or pasture is effective in controlling erosion. Overgrazing or grazing when the soil is too wet causes surface compaction, decreased water intake, and poor tilth.

Dwellings and buildings should be constructed without basements, unless basements are built above the water table. The soil must be artificially drained. Controlling subsurface water at a desired depth is difficult. Excavating this soil is somewhat difficult because of the high clay content. Excavations fill with water in the spring and dry out slowly. The low strength of the soil limits its use for foundations and footings, but this can be overcome by replacing base material. Slight to moderate grading is needed for lots and local streets and roads. Debris basins help to reduce siltation. Where community sewers and treatment facilities are available, sanitary facilities need to be connected to them. Where septic tank systems are used, seepage beds need to be constructed above the water table and in suitable fill material. The upper layer of the soil needs to be replaced or covered with suitable base material to reduce frost action on local streets and roads. Sewage lagoons are poorly suited to this soil. Lawns and shrubs are difficult to establish.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil can produce good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IVe.

320C3—Frankfort silty clay, 5 to 10 percent slopes, severely eroded. This moderately sloping, somewhat poorly drained soil is on side slopes of knolls and ridges on moraines. Areas of this soil are irregular in shape and are generally 2 to 45 acres in size.

Typically, the surface layer is dark grayish brown silty clay about 6 inches thick. The very firm subsoil is about 18 inches thick. The upper part of the subsoil is dark brown, mottled silty clay and the lower part is mixed grayish brown and brown, calcareous silty clay that has greenish mottles. The underlying material to a depth of 60 inches is brown and greenish gray, calcareous silty clay. In some places brownish material from the subsoil has been mixed with the surface layer by plowing, and the surface layer is dark brown silty clay less than 6 inches thick. In some areas the surface layer and upper part of the subsoil are higher in content of sand than typical.

Included with this soil in mapping are a few small areas of poorly drained Bryce soils in depressions and waterways. The included soils make up 1 to 10 percent of the unit.

Water and air movement through this soil is slow, and surface runoff from cultivated areas is rapid. Available water capacity is moderate to low. A perched water table is near the surface for brief periods during spring. Reaction is slightly acid or neutral in the upper part of the subsoil and moderately alkaline in the extreme lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is low because of the loss of surface soil by erosion. Because the surface layer is high in clay and low in organic matter, it is difficult to work. It is sticky when wet and becomes hard and cloddy when dry. Root development is restricted below a depth of about 24 inches by the compact, clayey glacial till.

Many areas of this soil are used for farming. However, much of the acreage near expanding urban development is idle or in low density urban uses. This soil has poor potential for crops and for many urban uses.

This soil is better suited to grasses and legumes than to corn, soybeans, and small grain. Excessive soil loss is the main hazard for cultivated crops. Seasonal wetness, poor tilth, and seasonal droughtiness are limitations. Sod crops reduce soil losses and improve soil tilth. Tile drains generally do not function well, but tile with porous filters placed above sidehill seeps can improve drainage in wet spots.

This soil can produce high quality forage. Hay and pasture is effective in controlling erosion. Overgrazing or grazing when the soil is too wet causes surface compaction, decreased water intake, and poor tilth.

Dwellings and buildings should be constructed without basements, unless basements are built above the water table. This soil must be artificially drained. However, to control the water table at a desired depth is difficult. Excavating this soil is somewhat difficult because of the high clay content. Excavations fill with water in the spring and dry out slowly. The low strength of the soil limits its use for foundations and footings, but this can be overcome by replacing base material. Slight to moderate grading is needed for lots and local streets and roads. Debris basins help to reduce siltation. Where possible, sanitary facilities should be connected to community sewers and treatment facilities. If septic tank systems are used, seepage beds need to be constructed above the water table and in suitable fill material. The upper layer of the soil needs to be replaced or covered with suitable base material to reduce frost action on local streets and roads. Sewage lagoons are fairly well suited to poorly suited. Lawns and shrubs are difficult to establish.

This soil has poor potential for most recreational uses. It is slow to dry out after rains, and it commonly needs drainage for best use. Producing good turf on this soil is difficult, and the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass VIe.

327B—Fox silt loam, 2 to 6 percent slopes. This gently sloping, well drained soil is on outwash plains and terraces along major streams. It is moderately deep to sand and gravel. Areas of this soil are irregular in shape and are commonly 10 to 300 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. In undisturbed areas the surface layer is 3 to 5 inches thick and is very dark grayish brown. The subsurface layer is brown silt loam about 3 inches thick. The subsoil is about 25 inches thick. The upper part of the subsoil is dark yellowish brown, friable to firm silty clay loam; the middle part is dark yellowish brown, firm clay loam; and the lower part is dark yellowish brown, friable sandy clay loam. The underlying material to a depth of about 60 inches is dark yellowish brown, calcareous sand and gravel. In some places the surface layer is darker colored than typical, sand and gravel are at a depth of more than 40 inches, or the surface layer and upper part of the subsoil contain more sand than typical.

Included with this soil in mapping and making up 2 to 15 percent of the unit are small areas of darker colored Lorenzo and Will soils. The Lorenzo soils are on more rolling parts of the landscape and have gravel near the surface. The poorly drained Will soils are in depressions.

Water and air movement is moderate in the subsoil and very rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is strongly acid in the upper part of the subsoil and mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly medium acid or slightly acid. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is somewhat low in organic matter, it tends to crust or puddle after hard rains. Root development is restricted below a depth of about 36 inches by the calcareous gravel and sand.

A few areas of this soil are used for farming. Many areas are idle or in trees, and some areas are used for low density residential development. This soil has good potential for crops and fair to poor potential for urban uses. It is generally a good source of sand and gravel.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. If the soil is used for cultivated crops, the major concerns in management are erosion and the lack of adequate available water during dry seasons. Conservation tillage, crop residue management, terracing, and contour farming help control erosion. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility, improve soil tilth, increase infiltration, and reduce soil loss.

A few small areas are in native hardwoods, mainly northern red oak, white oak, bitternut hickory, and sugar maple. Black oak and bur oak are on the drier sites. Trees to plant are northern red oak, white oak, sugar maple, white ash, black walnut, red pine, and eastern white pine.

The areas of trees and brush favor woodland wildlife such as birds, deer, raccoon, and squirrels.

This soil is only moderately suited as a site for dwellings with or without basements because of the shrink-swell potential of the subsoil. This limitation can be overcome by strengthening the foundation or replacing the base material. Only slight grading is needed for lots and local streets. Siltation from construction sites can be reduced by use of debris basins. Local streets and roads are poorly suited, but this can be overcome by replacing base material. Septic tank absorption systems are well suited. However, pollution of ground water is possible because of the rapidly permeable underlying material. Sewage lagoons and trench-type landfills are unsuited because of seepage in the underlying material.

This soil is suitable for a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths and trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

329—Will silty clay loam. This nearly level, poorly drained soil is on smooth flats on uplands and in shallow depressions and drainageways. It is moderately deep to sand and gravel. It is occasionally flooded for brief periods during spring. Areas of this soil are irregular in shape and are commonly 5 to 150 acres in size.

Typically, the surface layer is black and is about 14 inches thick. It is silty clay loam in the upper part and clay loam in the lower part. The subsoil is about 20 inches thick. The upper part of the subsoil is gray, mottled, firm clay loam, and the lower part is gray gravelly loam. The underlying material to a depth of about 60 inches is gray, mottled, calcareous gravel and sand. In some places loose sand and gravel are at a depth of more than 40 inches.

Included with this soil in mapping are a few small areas of somewhat poorly drained Kane soils and well drained Warsaw soils in the higher positions. The included soils make up 2 to 10 percent of the unit.

Most areas of this soil are artificially drained by drainage tile and, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where the drainage system has been damaged by construction, a water table is at a depth of 1 foot or less during wet seasons.

Water and air movement is moderate in the upper part of the soil and rapid in the underlying material. Surface runoff from cultivated areas is slow. Available water capacity is moderate. Reaction of the subsoil is neutral in the upper part and moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The surface layer is somewhat clayey and rather difficult to work. It is sticky when wet and becomes hard and cloddy when dry.

A few areas of this soil are intensively farmed. Many areas are idle. Some areas are in nonfarm uses. This soil has very good potential for crops but poor potential for most urban uses. It is generally a good source of sand and gravel.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Seasonal wetness is the main limitation for cultivated crops. Tile drains and shallow surface ditches can be installed to improve drainage. If the soil is fall plowed and left bare, it is subject to wind erosion during spring. Winter cover crops, field windbreaks, and conservation tillage help reduce erosion. Returning crop residue and adding animal manures help maintain good tilth and organic matter content and improve fertility.

Areas of this soil that are used for urban development must be artificially drained and protected from flooding. Excavating this soil is somewhat difficult because excavations fill with water. Dwellings with basements should not be constructed because basements are likely to be wet. Dwellings without basements should be constructed only after drainage systems are installed. Local streets and roads are limited by wetness, flooding, and frost heave. Installing drainage systems and covering the soil with suitable base material increase suitability for streets and roads. Septic tank absorption fields need a seepage bed constructed in suitable fill material above the water table. Contamination of ground water and septic system failures are likely. Where community sewers and treatment facilities are available, all sanitary facilities should be connected to them. This soil is not suited to sewage lagoons. Protection from flooding and sealing the bottom of lagoons help increase suitability of the lagoons.

Most areas of this soil are poorly suited to recreational uses. They remain wet for long periods after rains, even where drained. This soil generally produces good turf. However, sod is easily damaged when wet if foot traffic is heavy. In areas that have a plant cover, the soil becomes muddy and very slippery when wet. Surfacing of paths and trails is needed in many areas.

This soil is in capability subclass IIw.

330—Peotone silty clay loam. This nearly level, very poorly drained soil is in depressions that receive sediment from surrounding slopes. It is occasionally flooded for long periods during spring. Areas of this soil are commonly circular or eliptical in shape and are generally 2 to 30 acres in size.

Typically, the surface layer is black silty clay loam about 25 inches thick. The subsoil is about 27 inches thick. The upper part of the subsoil is black, mottled, very firm silty clay loam; the middle part is gray, mottled, firm silty clay loam; and the lower part is gray, mottled layers of friable silty clay loam and silt loam. The underlying material to a depth of about 68 inches is gray and light gray, mottled silt loam that has thin layers of loam, sandy loam, and silty clay loam. In some places the surface layer is friable silt loam where recent deposits of soil material have washed from surrounding slopes. In some areas the underlying material has more clay than is typical.

Included with this soil in mapping are a few small areas of Muskego and Houghton soils and poorly drained Ashkum soils. The Muskego and Houghton soils are on positions similar to those of Peotone soils, and the Ashkum soils are on higher positions. The included soils make up 2 to 10 percent of the unit.

Most areas of this soil are artificially drained by tile with surface inlets or, to a lesser extent, by surface ditches or sewer systems. In undrained areas or in areas where drainage systems have been blocked by construction, a water table is at a depth of less than 1 foot during wet seasons.

Water and air movement is moderately slow in the upper part of the profile and slow in the lower part. Surface runoff from cultivated areas is very slow to ponded. Available water capacity is high. Reaction is slightly acid to moderately alkaline in the subsoil. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The surface layer is generally compact and difficult to work. It is sticky if worked when wet and becomes hard and cloddy when dry.

Many areas of this soil are used for farming. Many areas are idle, and some areas are used for urban development. This soil has good potential for crops but poor to very poor potential for most urban uses.

This soil is suited to corn and soybeans. It is seldom used for small grain and hay. In some places where wetness is severe, it is used for pasture. Impeded drainage and seasonal wetness are the main limitations for cultivated crops. Tile and shallow surface ditches help improve drainage. If tiles are used, a filter of porous material is needed. Returning crop residue and adding animal manures help maintain good tilth and organic matter content and improve fertility.

Areas of this soil that are used for urban development must be artificially drained and protected from ponding. Dwellings with basements should not be constructed because basements are likely to be wet. Excavating this soil is difficult because of wetness, the high clay content, and the risk of encountering organic material. Installing drainage systems and using proper fill material can increase suitability for dwellings, streets and roads, and septic tank absorption fields. Absorption fields need a seepage bed constructed in suitable fill material above the water table. Ground water contamination and septic system failures are likely. Where community sewers and treatment facilities are available, sanitary facilities need to be connected to them.

This soil is poorly suited to most recreational uses. Most areas remain wet for long periods after rains, even where drained. This soil generally can produce good turf. However, sod is easily damaged when foot traffic is heavy. In areas that lack plant cover, the soil becomes muddy and very slippery when wet. Paths and trails need surfacing in most areas, and they are difficult to maintain.

This soil is in capability subclass IIw.

343—Kane silt loam. This nearly level, somewhat poorly drained soil is on outwash plains on uplands and on benches along streams. It is moderately deep to calcareous gravel and sand. Areas of this soil commonly are irregular in shape and 2 to 40 acres in size.

Typically, the surface layer is about 13 inches thick. It is black silt loam in the upper part and very dark gray silt loam in the lower part. The subsoil is about 16 inches thick. The upper part of the subsoil is dark yellowish brown, mottled, firm silty clay loam; the middle part is light olive brown, mottled, firm clay loam; and the lower part is brown, mottled, friable clay loam that has some gravel. The underlying material to a depth of 60 inches is grayish brown and brown, loose gravel and sand. In some places the surface layer is lighter colored than typical and is less than 10 inches thick, or the surface layer and upper part of the subsoil have more sand, or loose sand and gravel are at a depth of more than 40 inches.

Included with this soil in mapping are a few small areas of poorly drained Will and Thorp soils in depressions. The included soils make up 1 to 10 percent of the unit.

Some areas of this soil are drained by tile. In undrained areas or in areas where drainage systems have failed, a periodic water table is at a depth of 1 to 3 feet.

Water and air movement is moderate in the upper part of this soil and is rapid in the underlying material. Surface runoff from cultivated areas is slow. Available water capacity is moderate. Reaction is neutral or slightly acid in the upper part of the subsoil and is mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The surface layer is friable and easy to work in a proper range of soil moisture. However, it is somewhat sticky if worked when wet, and it becomes hard when dry. Root development is restricted below a depth of about 29 inches by loose gravel and sand.

Some areas of this soil are used for farming. Many areas are idle or in forest preserves, and a few areas are used for low density urban development. This soil has good potential for crops and poor potential for most urban uses. It is generally a good source of sand and gravel.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is a hazard for row crops. Little drainage is needed for most crops, but spot drainage with tile is beneficial on some more level areas. Conservation tillage and crop residue management help reduce soil loss. Returning crop residue and adding animal manures help maintain tilth and organic matter content and improve fertility.

Areas of this soil that are used for urban development need artificial drainage. Excavating this soil is somewhat difficult because of wetness and because of caving of sidewalls below a depth of 3 feet. Dwellings with basements should not be constructed. Dwellings without basements should be constructed only after drainage systems are installed and base material is replaced. Installing drainage systems and covering with a suitable base material increases suitability for streets and roads. Septic tank absorption fields need seepage beds constructed in suitable fill material above the water table. Where community sewers and treatment facilities are available, sanitary facilities need to be connected to them to avoid possible ground water contamination. Sewage lagoons are limited by wetness and seepage. Sealing the bottom of lagoons helps increase suitability of the lagoon.

Most areas of this soil are moderately suited to recreational uses. They are slow to dry out after rains. This soil generally can produce good turf. However, turf can be damaged when wet if foot traffic is heavy. In areas that have no plant cover, the soil becomes muddy and slippery when wet. Surfacing of paths and trails is needed in some areas that are heavily traveled.

This soil is in capability subclass IIs.

361B—Kidder silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on broad ridges on glacial till plains on uplands. Areas of this soil are irregular in shape and are commonly 5 to 200 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 5 inches thick. In undisturbed soils the surface layer is dark grayish brown silt loam about 8 inches thick and the subsurface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 31 inches thick. The upper part of the subsoil is dark yellowish brown, silty clay loam; the middle part is brown, firm clay loam; and the lower part is dark yellowish brown, friable cobbly loam. The underlying material to a depth of 60 inches is yellowish brown gravelly sandy loam. It is calcareous and contains many small stones. In some places the underlying material is loose gravel and sand, or it is compact loam and has fewer stones.

Included with this soil in mapping are a few small areas of poorly drained Thorp and Drummer soils in depressions and drainageways. The included soils make up 2 to 10 percent of the unit.

Water and air movement is moderate in the upper part of this soil and is moderately rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is strongly acid to slightly acid in the upper part of the subsoil and is slightly acid to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is relatively low in organic matter, it tends to crust or puddle after hard rains. Root development is restricted below a depth of about 43 inches by the compact, loamy glacial till.

Many areas of this soil distant from expanding urban development are used for farming. Some areas are idle or in woods. Except for some use as individual homesites, few areas are used for urban development. This soil has good potential for crops and fair potential for urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Conservation tillage, crop residue management, terracing, and contour farming help control erosion. Returning crop residue and adding animal manures help maintain organic matter content and improve fertility, reduce crusting, increase infiltration, and reduce soil loss.

This soil is well suited to trees and a few small areas remain in native trees. Main species are northern red oak, white oak, bitternut hickory, and sugar maple. Trees to plant are northern red oak, white oak, sugar maple, white ash, black walnut, red pine, and eastern white pine. Existing areas of trees and other woody plants favor woodland wildlife such as birds, deer, squirrels, and raccoon. Idle areas of weeds and grass are well suited to openland wildlife such as ring-necked pheasant, cottontail rabbit, and red fox.

This soil is only moderately suited to dwellings with or without basements because of shrink-swell in the subsoil. However, this can be overcome by strengthening the footings or by placing the foundations in material that has low shrink-swell potential. Slight grading is needed in places. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover helps reduce erosion, and debris basins help to reduce siltation. Frost heave and low strength are concerns for local streets and roads, but they can be overcome by replacing base material. Some grading is necessary in places. Septic tank absorption systems are generally well suited. This soil has poor potential for sewage lagoons because of seepage in the underlying material.

This soil is suitable for a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths or trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

361C2—Kidder silt loam, 4 to 7 percent slopes, eroded. This moderately sloping, well drained soil is on short, uneven side slopes and ridges on gently rolling glaciated uplands. Areas of this soil are irregular in shape and are commonly 2 to 150 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 31 inches thick. The upper part of the subsoil is brown, firm silty clay loam; the middle part is brown, firm clay loam; and the lower part is brown, dark brown, and dark yellowish brown, friable gravelly loam. The underlying material to a depth of about 60 inches is yellowish brown gravelly sandy loam. Small stones are common in the subsoil and underlying material. In some undisturbed places the surface layer is thicker than typical and is very dark gray in the upper part and brown in the lower part. In some severely eroded areas the surface layer is brown clay loam subsoil material.

Included with this soil in mapping are a few small areas of poorly drained Thorp and Drummer soils in depressions. The included soils make up 1 to 10 percent of the unit.

Water and air movement is moderate in the upper part of the soil and moderately rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is slightly acid or medium acid in the upper part of the subsoil and is mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is low because of the loss of surface soil by erosion. The soil is somewhat sticky when wet. It tends to become cloddy when dry if worked when too wet. Root development is somewhat restricted below a depth of about 33 inches by the compact, loamy glacial till.

Most areas of this soil have been farmed. Some areas are now idle, and a few areas are in woods. Very little of the acreage has been used for urban development. This soil has fair potential for crops and for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Excessive soil loss is the main hazard for cultivated crops. Poor tilth is also a concern in management. Conservation tillage, terracing, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

A few small areas remain in native trees. Main species are northern red oak, white oak, bitternut hickory, and sugar maple. Trees to plant are northern red oak, white oak, sugar maple, white ash, black walnut, red pine, and eastern white pine. The few areas of trees and brush favor woodland wildlife such as birds, deer, raccoon, and squirrels. Cultivated fields and idle areas of grass and weeds are well suited to openland wildlife such as ring-necked pheasant and cottontail rabbit.

This soil is only moderately suited to dwellings with or without basements because of moderate shrink-swell potential in the subsoil, but this can be corrected by strengthening or replacing the base material. Slight to moderate grading is needed in places to develop sites. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover on construction sites helps reduce erosion, and debris basins help reduce siltation. Frost heave and low strength are concerns for local streets and roads, but they can be corrected by replacing base material. Some cuts are needed in places. Septic tank absorption systems are generally well suited. This soil has poor potential for sewage lagoons because of seepage in the underlying material.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths or trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIIe.

361D2—Kidder silt loam, 7 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on short, uneven side slopes on rolling glaciated uplands. Areas of this soil are commonly long and narrow and 2 to 100 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil is about 28 inches thick. The upper part of the subsoil is brown, firm silty clay loam; the middle part is brown, firm clay loam; and the lower part is mixed, dark brown, brown, and dark yellowish brown, friable gravelly loam. The underlying material to a depth of about 60 inches is yellowish brown, gravelly sandy loam. Small stones are common in the subsoil and underlying material. In some places that are undisturbed by plowing, the surface layer is thicker than typical and is very dark gray in the upper part and brown in the lower part. In some areas that are severely eroded, the surface layer is brown clay loam subsoil material.

Included with this soil in mapping are a few small areas of poorly drained Thorp and Drummer soils in depressions. The included soils make up 1 to 8 percent of the unit.

Water and air movement is moderate in the upper part of the soil and moderately rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is medium acid in the upper part of the subsoil and moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is low because of the loss of surface soil by erosion. Because the surface layer generally contains some clay from the subsoil, it is somewhat sticky when wet and tends to become cloddy when dry. Root development is somewhat restricted below a depth of about 30 inches by the compact, loamy glacial till.

Most areas of this soil have been farmed. However, many areas have been abandoned and are idle. A few areas are in trees. Because of the distance from most expanding areas, very few areas have been used for urban development. This soil has poor potential for crops and fair potential for most urban uses.

If this soil is used for cropland, it is best suited to hay and pasture. The hazard of erosion is severe for row crops. Careful management is needed to control erosion and maintain fertility and good tilth. Terracing, contour farming, and conservation tillage help reduce erosion. Cropping systems in which grasses and legumes are grown or in which small grain and grasses are grown more often than row crops are best suited to this soil.

This soil can produce high quality forage. Hay and pasture are effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and erosion. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

A few small areas of this soil remain in native trees. Main species are northern red oak, white oak, shagbark hickory, and sugar maple. Black oak and bur oak are on the drier sites. Trees to plant are northern red oak, white oak, sugar maple, white ash, black walnut, red pine, and eastern white pine.

This soil has good potential for openland and woodland wildlife habitat. Small stands of trees and other woody plants provide good woodland habitat for deer, squirrels, and birds. In addition, abandoned fields containing weeds and grass provide good food and cover for openland wildlife such as game birds and cottontail rabbit.

This soil is only moderately suited as a site for dwellings because of the shrink-swell potential of the subsoil and the slope. The shrink-swell potential can be overcome by strengthening the foundation or replacing the base material. Some grading is commonly needed for building sites and local streets and roads. The underlying material is adequate for foundation and road grade support. Erosion and siltation are severe during construction and lawn establishment. Maintaining plant cover on construction sites helps reduce erosion, and debris basins reduce siltation. Frost heave, low strength, and slope are concerns for local streets and roads. Septic tank absorption systems are moderately suited, but slope can restrict size of field. This soil has poor potential for sewage lagoons because of seepage in the underlying material.

Even though this soil has excessive slope, it is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet. Limitations for paths or trails are few. Slope somewhat limits camp and picnic areas. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Leveling commonly exposes the underlying material and makes maintenance of plant cover difficult, unless the exposed underlying material is covered with topsoil. Watering is generally needed in summer.

This soil is in capability subclass IVe.

363B—Griswold silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on broad ridges on glacial till plains on uplands. Areas of this soil are irregular in shape and are commonly 5 to 300 acres in size.

Typically, the surface layer is about 10 inches thick. It is black to very dark brown silt loam in the upper part and dark brown silt loam in the lower part. The subsoil is about 20 inches thick. The upper part of the subsoil is dark brown, friable silty clay loam; the middle part is brown, firm clay loam; and the lower part is mixed dark yellowish brown and yellowish brown, friable, calcareous heavy loam. The underlying material to a depth of about 60 inches is light yellowish brown, calcareous sandy loam. The lower part of the subsoil and underlying material contain many small stones. In some places the surface is thinner and lighter colored than typical, and in some areas the underlying material is more compact and has less sand.

Included with this soil in mapping are a few small areas of somewhat poorly drained Mundelein soils and poorly drained Thorp soils in the lower positions. The included soils make up 2 to 10 percent of the unit.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is medium acid to neutral in the upper part of the subsoil and is mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. However, if the surface layer is worked when too wet, it tends to become hard and lumpy when dry. Root development is restricted below a depth of about 34 inches by the compact, loamy glacial till.

Most areas of this soil are distant from expanding urban development. Many areas are intensively farmed. A few areas are idle, and some are used for individual homesites. This soil has good potential for crops and good potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Conservation tillage, crop residue management, terracing, contour farming, and winter cover crops help control soil loss. Returning crop residue and adding animal manures help maintain organic matter content and improve fertility, improve tilth, increase infiltration, and reduce soil loss.

This soil is well suited to dwellings with or without basements. Slight grading is needed in places for streets and lots. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover on construction sites helps reduce erosion, and debris basins help reduce siltation. Frost action is a concern for local streets and roads, but this can be corrected by using the underlying material for a road base. Septic tank absorption systems are generally well suited. Contamination of ground water is possible, however. This soil has poor potential for sewage lagoons because of seepage in the underlying material.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that lack plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths or trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

363C2—Griswold silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on gently rolling glaciated uplands. It formed mainly in loamy, calcareous glacial till. Areas of this soil are irregular in shape and 2 to 50 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is about 18 inches thick. The upper part of the subsoil is dark brown, friable clay loam; the middle part is brown, firm clay loam; and the lower part is mixed yellowish brown and dark yellowish brown, friable loam containing many pebbles and cobblestones. The underlying material to a depth of 60 inches is yellowish brown, friable sandy loam. It is calcareous and contains many pebbles and cobblestones. In some places the dark colored surface layer is thicker than typical, and in some areas the surface layer consists mainly of brown clay loam subsoil material.

Included with this soil in mapping are a few small areas of poorly drained Thorp and Drummer soils in depressions and drainageways. The included soils make up 1 to 8 percent of the unit.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is medium. Available water capacity is moderate. Reaction is neutral to slightly acid in the upper part of the subsoil and mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral to slightly acid. Organic matter content is moderate because of the loss of surface soil by erosion. The surface layer is friable and easy to work. However, where the surface soil and organic matter have been lost, the surface layer is somewhat sticky when wet and becomes hard and lumpy when dry. Root development is hindered below a depth of about 25 inches by the compact, loamy glacial till.

Most areas of this soil are farmed; however, some areas are idle. This soil is distant from expanding urban areas, and very little acreage has been used for urban development. Potential for crops is fair, and potential for urban uses is good.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Excessive soil loss is the main hazard for cultivated crops. Conservation tillage, crop residue management, terracing, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil can produce high quality forage. Hayland and pasture are effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and erosion. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

This soil is well suited to dwellings with or without basements. Slight to moderate grading is needed in places for lots and local streets. Erosion and siltation are likely during construction and lawn establishment. Maintaining plant cover on construction sites helps reduce erosion, and detention basins help reduce siltation. Local streets and roads are moderately suited because of frost action, but this can be overcome by replacing base material. Slight to moderate cuts and fills are needed in places. Septic tank absorption systems are well suited, but ground water contamination is possible. This soil is moderately suited to sewage lagoons because of seepage in the underlying material.

This soil can be used to develop a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that lack a plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths or trails are few. Leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Extensive leveling can expose the underlying material, which is undesirable and makes maintenance of plant cover difficult. The areas of exposed underlying material need to be covered with topsoil.

This soil is in capability subclass IIIe.

369B—Waupecan silt loam, 1 to 5 percent slopes. This well drained soil is in broad, nearly level areas and on gently sloping ridgetops. It is deep to gravel. Areas of this soil are irregular in shape and are commonly 10 to several hundred acres in size.

Typically, the surface layer is silt loam about 16 inches thick. It is very dark brown in the upper part and very dark grayish brown in the lower part. The subsoil is about 34 inches thick. The upper part of the subsoil is brown, friable silty clay loam; the middle part is dark brown, brown, and dark yellowish brown, firm silty clay loam; and the lower part is dark reddish brown, very firm clay loam. The underlying material to a depth of about 60 inches is yellowish brown, calcareous gravel and sand that contains some small stones. In some places the surface layer is thinner than typical and is grayish brown in the lower part, and in some areas the underlying material is compact gravelly loam.

Included with this soil in mapping are a few small areas of poorly drained Thorp and Will soils in depressions and drainageways. The included soils make up 2 to 15 percent of the unit.

Water and air movement is moderate in the upper part of the soil and is very rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is high. Reaction is slightly acid to strongly acid in the upper part of the subsoil and is neutral in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate to high. The surface layer is friable and easy to work through a wide range of soil moisture. However, it tends to become hard when dry if worked when too wet.

Most areas of this soil are in the western part of the survey area, and many areas are used for farming. However, some areas are idle or in nonfarm uses. This soil has very good potential for crops and fair potential for many urban uses. It is generally a good source of sand and gravel.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Crop residue management, terracing, contour farming, conservation tillage, and winter cover crops help control erosion. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil is moderately suited to dwellings with or without basements because of shrink-swell and low strength. Only slight grading is needed for construction of streets and building sites. Siltation during construction can be reduced by trapping sediment in debris basins. Frost heave and low strength are concerns for local streets and roads, but they can be overcome by replacing base material. Septic tank absorption systems are generally well suited; however, ground water pollution is possible through the rapidly permeable underlying material (*7*).

This soil can be used to develop a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths or trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

392—Urban land-Orthents complex, loamy. This map unit consists of Urban land and areas of altered, medium textured soils. Areas of this map unit are commonly blocky in shape and 20 to 500 acres in size.

This unit is less than 75 percent Urban land, and the rest is Orthents, loamy. The Urban land and Orthents, loamy are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

In the Urban land part of the unit the landscape has been radically altered. The Urban land is covered by buildings, parking lots, and pavements, and identification of the underlying soils is not feasible. The Orthents, loamy consists of medium textured soils that have been altered or mixed by cutting and filling.

In the Orthents, loamy part of the unit, the soils have been mixed. The soils formerly had a surface layer of loam, sandy loam, silt loam, or silty clay loam and a subsoil of clay loam, sandy loam, or silty clay loam. The underlying material was calcareous loam, silt loam, or light silty clay loam. Slopes are generally 1 to 7 percent, but some cutbanks are nearly vertical. In some places are large reshaped or heavily graded tracts that have no buildings or pavements. Some areas of Orthents, loamy along highways contain borrow pits.

Included in mapping and making up 10 to 25 percent of the unit are minor areas of Orthents, clayey and Dumps. Orthents, clayey consist of altered, fine textured soils; Dumps consist of fills containing refuse material.

Many areas of this map unit have been graded so that water drains to the edges of lots, and eventually into sewer systems. Some low spots and excavations in undeveloped areas of Orthents, loamy collect water and are slow to dry out.

Permeability is variable because the soil material is variable and has been compacted by construction equipment. Available water capacity is variable but generally high. Organic matter content and plant nutrients are low on new exposures, but developed areas are usually topdressed where lawns and shrubs have been established. Reaction is medium acid to moderately alkaline. Runoff is medium to very rapid, depending on slope and plant cover. Plant roots are commonly restricted by compacted soil or by excess lime if the original underlying material is near the surface.

The Orthents, loamy are used for lawns, gardens, parks, recreation areas, building sites, borrow areas, and highway rights-of-way. Most fresh exposures have sparse or inadequate plant cover. Established areas commonly have good bluegrass sod and a few trees and shrubs. Some idle areas, or heavily reshaped areas where construction is slow, have sparse to dense stands of weeds. Species for planting need to adapt to a variety of soil material and soil conditions. Special precautions are generally needed in planting trees and shrubs because of the altered, compacted soil. To prevent waterlogging of roots, planting of trees on gentle slopes is desirable. Special soil mixes are needed in places to replace soil that was removed for tree planting. Poor aeration of tree roots is a common concern in the Orthents, loamy soils.

Limitations of Orthents, loamy for building sites and recreation areas are variable because of the soil material and soil conditions. Excavating the soil is commonly not difficult, because the content of clay or sand is not high. Soil material that lacks strength and stability is subject to frost action and shrink-swell. It needs to be replaced with suitable base material before foundations and roadbeds are constructed. Erosion and sedimentation are major concerns in construction, especially where the soil is bare and exposed for a considerable time. A variety of measures can be used to control erosion on construction sites (*15*). Maintaining plant cover and mulching help reduce erosion, and debris basins help control sedimentation (fig. 10).

Many areas of this unit have been leveled for playgrounds, athletic fields, and other intensive play areas. Most areas support a firm turf that withstands heavy traffic. If extensive leveling has taken place, underlying material can be exposed in places and maintenance of plant cover can be difficult. Some areas need additional drainage, topdressing, and special management before a firm turf can be established. Heavily used play areas and walkways require special surfacing in places.

This map unit is not assigned to a capability subclass.

442—Mundelein silt loam. This nearly level, somewhat poorly drained soil is on very low ridges or knolls and in shallow depressions on outwash plains and on benches along streams. Areas of this soil are irregular in shape and are commonly 5 to 160 acres in size.

Typically, the surface layer is about 17 inches thick. It is black and very dark gray silt loam in the upper part and very dark grayish brown silty clay loam in the lower part. The subsoil is about 19 inches thick. The upper part of the subsoil is dark grayish brown, mottled, firm silty clay loam; the middle part is light olive brown, mottled, firm silty clay loam; and the lower part is mixed light olive brown and dark yellowish brown, mottled, calcareous layers of silty clay loam, clay loam, and loam. The underlying material to a depth of about 60 inches is mottled gray, strong brown, and pale olive, calcareous layers of silt loam and very fine sand. In some places the surface layer and upper part of the subsoil have more sand than is typical, and in some areas compact silty clay loam is at a depth of less than 40 inches.

Included with this soil in mapping are a few small areas of moderately well drained or well drained Barrington soils and poorly drained Drummer soils. The Barrington soils are on higher ridges, and the Drummer soils are in depressions. The included soils make up 2 to 10 percent of the unit.

Some areas of this soil are artificially drained by tile. In undrained areas or in areas where drainage systems have been disrupted by construction, a water table is at a depth of 1 to 3 feet during wet seasons.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is slow. Available water capacity is high. Reaction is neutral to medium acid in the upper part of the subsoil and is moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is high. The surface layer is friable and easy to work through a wide range of soil moisture. However, if the surface layer is worked when too wet, it tends to become hard and lumpy when dry. Root development is hindered below a depth of about 36 inches by excess lime.

Most areas of this soil are in the western part of the survey area. Many areas are intensively cultivated to row crops. This soil has excellent potential for crops but has poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, vegetable crops, grasses, and legumes. Erosion is a hazard for row crops. Little artificial drainage is needed for most crops, but spot drainage is beneficial in some level areas. Tile drains can be installed in those areas to improve drainage. Conservation tillage and crop residue management help reduce soil loss. Returning crop residue and adding animal manures help maintain tilth and organic matter content and improve fertility.

This soil is poorly suited to dwellings with or without basements because of wetness. To construct dwellings without basements, the water table can be lowered by installing tile, but to lower the water table to a desired depth for construction of dwellings with basements is difficult. Frost heave and low strength are concerns for local streets and roads, but these can be overcome by strengthening or replacing base material. Wetness is a limitation for septic tank absorption fields. Construction of the seepage bed in suitable material above the water table improves suitability for septic tank systems. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities to avoid pollution. The suitability of the soil for sewage lagoons is limited by wetness. Seepage is also a concern, but this can be overcome by sealing the bottom of the lagoon.

This soil has fair to poor potential for most recreational use. It is slow to dry out after rains, and it commonly needs drainage for best use. This soil produces good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that lack plant cover, the soil is muddy and slippery after rains. Walks, roads, and trails commonly need surfacing.

This soil is in capability class I.

443B—Barrington silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on upland ridges and knolls and on benches along streams. Areas of this soil are irregular in shape and are generally 2 to 30 acres in size.

Typically, the surface layer is silt loam about 14 inches thick. It is black in the upper part and very dark grayish brown in the lower part. The subsoil is about 27 inches thick. The upper part of the subsoil is brown and dark yellowish brown and yellowish brown, firm silty clay loam; the middle part is dark yellowish brown, friable silty clay loam and is higher in sand as depth increases; and the lower part is light olive brown, mottled, friable layers of silt loam and very fine sandy loam that contain some lime. The underlying material to a depth of about 60 inches is mixed gray and light yellowish brown, calcareous layers of silt loam and very fine sandy loam. In some places the surface layer is lighter colored than typical; or the surface layer and upper part of the subsoil have a higher sand content, and lime is deeper; or compact, silty clay loam glacial material is at a depth of less than 60 inches.

Included with this soil in mapping are a few small areas of somewhat poorly drained Mundelein soils and poorly drained Drummer soils in shallow depressions and drainageways. The included soils make up 1 to 10 percent of the unit.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is medium. Available water capacity is high. Reaction is neutral or slightly acid in the upper part of the subsoil and neutral to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate to high. The surface layer is friable and easy to work at the proper range in soil moisture. Root development is hindered below a depth of about 33 inches by excess lime.

Many areas of this soil are intensively farmed. However, much of the acreage is idle. The trend in land use is toward urban development. This soil has very good potential for crops and fair potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Conservation tillage, crop residue management, terracing, contour farming, and winter cover crops help control erosion. Returning crop residue and adding animal manures help maintain organic matter content and improve fertility, improve tilth, increase infiltration, and reduce soil loss.

This soil is only moderately suited to dwellings with or without basements because of low strength and moderate shrink-swell potential. These limitations can be overcome by strengthening or replacing the base material. Only slight grading is needed for lots and local streets. Siltation from construction sites can be reduced by using debris basins and by maintaining plant cover. Frost heave and low strength are concerns for local streets and roads, but this can be overcome by replacing base material. Septic tank absorption systems are generally well suited, but ground water pollution is possible. This soil is poorly suited to sewage lagoons because of seepage.

This soil can be used to develop a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that lack plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths and trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

494B—Kankakee loam, 2 to 7 percent slopes. This gently sloping, well drained soil is mainly on terraces along the Des Plaines River and Calument-Sag Channel. It is moderately deep over cobbly material. Areas of this soil are long and narrow in shape and are commonly 5 to 300 acres in size.

Typically, the surface layer is loam about 11 inches thick. It is black in the upper part and very dark brown in the lower part. The subsoil is about 17 inches thick. The upper part of the subsoil is brown, friable clay loam; the middle part is dark yellowish brown, friable very cobbly loam; and the lower part is yellowish brown, very friable cobbly sandy loam. The underlying material to a depth of 60 inches is mixed yellowish brown and light brownish gray cobbly sandy loam. In some places the surface layer is thinner than typical and is lighter colored. In some areas the underlying material is more gravelly and sandy.

Included with this soil in mapping are small areas of Rockton soils in positions similar to this Kankakee soil and small areas of Kane soils in shallow depressions.

The Rockton soils are moderately deep to bedrock, and the Kane soils are somewhat poorly drained. The included soils make up 1 to 10 percent of the unit.

Water and air movement through this soil is moderately rapid, and surface runoff from cultivated areas is medium. Available water capacity is low. Reaction of the subsoil is mildly alkaline or moderately alkaline. Reaction in the surface layer varies, depending on past management, but is commonly mildly alkaline or neutral. Organic matter content is moderate. The loamy surface layer is friable and easy to work through a wide range of soil moisture. Root development is restricted below a depth of about 28 inches by stony material.

Very few areas of this soil are farmed. Many areas are idle, are in forest preserves, or are used as openland. A few areas are used for low density urban development. This soil has fair potential for crops and fair potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. If the soil is used for cultivated crops, the major concerns in management are erosion and lack of adequate available water during dry seasons. Conservation tillage, crop residue management, terracing, contour farming, and winter cover crops help control erosion. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

Because the underlying rubble is somewhat difficult to excavate, this soil is generally only moderately suited to dwellings with or without basements. Plants and shrubs are somewhat difficult to maintain and generally need watering in summer. Local streets and roads are moderately suited because of frost action, but this can be overcome by replacing base material. Septic tank absorption systems are well suited; however, pollution of ground water is possible because of the rapidly permeable underlying material. Sewage lagoons are unsuited because of seepage in the underlying material.

This soil can be used to develop a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that lack plant cover are somewhat slippery when wet. Small stones are limitations for camp and picnic areas or for paths and trails. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas. Where leveling is extensive and underlying material is exposed, maintaining a good plant cover is difficult, unless the exposed material is covered with topsoil.

This soil is in capability subclass IIIs.

503B—Rockton loam, 2 to 7 percent slopes. This moderately deep, well drained soil is on high, gently sloping bedrock domes. Areas of this soil are generally rounded in shape and 10 to 240 acres in size.

Typically, the surface layer is about 13 inches thick. It is very dark brown loam in the upper 10 inches and mixed dark brown and brown loam in the lower 3 inches. The subsoil is about 16 inches thick. The upper part of the subsoil is brown, friable loam; the middle part is brown, friable sandy clay loam; and the lower part is brown, very firm clay. Light gray bedrock is at a depth of about 29 inches (fig. 11). In some places the surface layer contains more sand than typical or is thinner and lighter colored, or the underlying bedrock is overlain by flagstone. In places the depth to bedrock is less than 20 inches.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is medium. Available water capacity is low. Reaction is neutral to strongly acid in the upper part of the subsoil and is mildly alkaline or slightly acid in the lower part. Reaction in the surface layer varies, depending on past management, and is commonly medium acid to neutral. Organic matter content is moderate. The loamy surface layer is friable and easy to work through a wide range of soil moisture. Root development is restricted below a depth of about 29 inches by bedrock.

Very few areas of this soil are farmed. Much of the acreage is idle. Some areas are used for residential development or other nonfarm uses. Several areas contain quarries for construction materials. This soil has fair to poor potential for crops and for most urban uses.

This soil is not well suited to row crops and small grain. Some grasses and legumes can be grown for hay and pasture. Droughtiness and the hazard of erosion are the main concerns in management.

This soil can produce high quality forage. Crops to plant are those that tolerate periods of water stress. Pasture is effective in controlling erosion. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

This soil is better suited to openland wildlife than to other kinds of wildlife. Idle areas containing weeds and grasses favor such openland wildlife as pheasants and cottontail rabbit. Most places lack food and cover for woodland wildlife.

This soil is poorly suited to dwellings with or without basements because of the moderate depth to bedrock. Limitations can be overcome for dwellings without basements by building on rock and filling to grade level. Some blasting is needed in places for construction of utility lines and for streets and roads. Septic tank absorption systems are poorly suited, and pollution of ground water because of seepage through the fractured bedrock is a potential. Construction of the seepage bed in medium textured, mounded fill helps to alleviate this potential (*3*).

A wide range of recreational activities are suited to this soil. Limitations for camp and picnic areas or for paths or trails are few. Areas that lack plant cover are somewhat slippery when wet. Some leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Extensive leveling exposes the underlying rock and makes maintenance of plant cover difficult.

This soil is in capability subclass IIe.

531B—Markham silt loam, 2 to 5 percent slopes. This gently sloping and moderately well drained soil is on ridges, knolls, and short, uneven side slopes of undulating glacial till plains or moraines on uplands. Areas of this soil are irregular in shape and are commonly 5 to 100 acres in size.

Typically, the surface layer is black silt loam about 8 inches thick. The subsurface layer is dark grayish brown silt loam about 4 inches thick. The subsoil is about 28 inches thick. The upper part of the subsoil is brown, friable silty clay loam; the middle part is mixed brown, dark yellowish brown and light olive brown, firm and very firm silty clay; and the lower part is light olive brown, mottled, very firm, calcareous silty clay loam. The underlying material to a depth of about 60 inches is light olive brown, mottled, very firm, calcareous silty clay loam. Small pebbles and stones are common in the subsoil and underlying material. In some areas that have been disturbed by plowing, the surface and subsurface layers and upper part of the subsoil have more sand than typical.

Included with this soil in mapping are a few areas of somewhat poorly drained Beecher soils and poorly drained Ashkum soils in shallow depressions and drainageways. The included soils make up 2 to 15 percent of the unit.

Water and air movement through this soil is moderately slow to slow, and surface runoff from cultivated areas is medium. Available water capacity is moderate. A perched water table is above the slowly permeable material for brief periods during spring. Reaction is strongly acid to neutral in the upper part of the subsoil and is mildly alkaline to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. It tends to crust after a hard rain or to puddle if worked when too wet. Root development is restricted below a depth of about 34 inches by the compact, moderately fine textured glacial till.

Some areas of this soil are used for farming; however, much of the acreage is idle or in trees. Some areas are used for low density residential development. Because most areas are near urban development, the land-use trend is toward nonfarm uses. This soil has good to fair potential for crops and fair potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. The main concerns in management of cultivated crops are erosion and the lack of adequate available water during dry seasons. Conservation tillage, crop residue management, winter cover crops, terracing, and contour farming help control erosion. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility, reduce crusting, increase infiltration and reduce soil loss.

Most undisturbed areas of this soil are suited to trees. Some areas are wooded and contain both trees and grasses. Trees to plant are northern red oak, white oak, sugar maple, black walnut, green ash, and hackberry.

The suitability of this soil for buildings and local roads and streets can be improved by replacing base material. The relatively high clay content makes excavating this soil somewhat difficult. Only slight grading is needed for building sites and for local streets and roads. Erosion and sedimentation generally are concerns in construction. Erosion can be reduced by maintaining plant cover, and debris basins help to reduce sedimentation. The moderately slow to slow permeability is a concern for septic tank absorption systems. This concern can generally be overcome by placing the seepage beds above the dense underlying material and by diverting water from the field. Sewage lagoons are moderately suited. Lagoons need to be established on the most level areas that have good surface drainage.

This soil is suited to a wide range of recreational activities. It can support a firm turf that withstands heavy foot traffic, except when the soil is wet. The soil stays wet for brief periods after a rain. Where plant cover is sparse, areas are muddy and slippery when wet and are readily compacted. They are commonly dusty when dry. Limitations for picnic areas or paths and trails are few. For camp areas, the relatively slow permeability somewhat limits use. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

531C2—Markham silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, moderately well drained soil is on ridges, knolls, and uneven side slopes of gently rolling glacial till plains or moraines on uplands. Areas of this soil are irregular in shape and are commonly 5 to 80 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. In some undisturbed areas a grayish brown subsurface layer about 4 inches thick is present. The subsoil is about 20 inches thick. The upper part of the subsoil is brown, very firm silty clay, and the lower part is mixed brown and yellowish brown, calcareous silty clay loam. The underlying material to a depth of about 60 inches is mixed yellowish brown and light olive brown, mottled, calcareous silty clay loam. Small pebbles and stones are common in the subsoil and underlying material. In some places the surface layer is variable in color and thickness, depending on the degree of erosion. Also, the surface layer and upper part of the subsoil have more sand than typical.

Included with this soil in mapping are a few small areas of somewhat poorly drained Elliott and Beecher soils in shallow depressions and some small areas of poorly drained Ashkum soils in drainageways. The included soils make up 2 to 15 percent of the unit.

Water and air movement through this soil is moderately slow or slow, and surface runoff from cultivated areas is rapid. Available water capacity is moderate. A perched water table is above the slowly permeable material for brief periods during spring. Reaction is medium acid or slightly acid in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderate to moderately low because of the loss of surface soil by erosion. Because the surface layer contains some clay from the subsoil, it is somewhat sticky when wet and tends to become hard and cloddy when dry. Root development is restricted below a depth of about 27 inches by the compact, moderately fine textured glacial till.

Most areas of this soil have been cultivated. Many areas are idle farmland. Some areas are used for urban development. The land-use trend is toward nonfarm use. This soil has fair potential for crops and fair to poor potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Excessive soil loss is the main concern for cultivated crops. Poor tilth is also a concern. Conservation tillage, crop residue management, terracing, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil can produce high quality forage. Hay and pasture are effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

This soil is only moderately suited to dwellings with or without basements because of low strength and shrink-swell. Wetness affects dwellings with basements. The low strength and shrink-swell limitations can be overcome by strengthening or replacing the base material. Slight to moderate grading is needed for local streets and for lots. Erosion and siltation are likely during construction and lawn establishment. Use of plant cover and debris basins helps reduce siltation. Frost heave and low strength are concerns for local streets and roads, but they can be overcome by replacing base material. Septic tank absorption systems are generally poorly suited because of the moderately slow to slow permeability. Waste disposal systems need to be connected to community sewers and treatment plants. This soil is fairly well suited to sewage lagoons. Lagoons need to be established on the most level areas that have good surface drainage.

This soil is suited to a wide range of recreational activities. It can support a firm turf that withstands heavy foot traffic, except when the soil is wet. In areas that have no vegetation or where plant cover is sparse, the soil is muddy and slippery when wet and is readily compacted. Limitations for picnic areas or paths and trails are few. For camp areas and playgrounds, the moderately slow to slow permeability somewhat limits use. Extensive leveling is generally needed for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIIe.

533—Urban land. This map unit consists of land covered by pavement and buildings. Most areas of Urban land are in the eastern part of the survey area. Large segments are also along major transportation corridors to Chicago. Areas are commonly blocky in shape, or in strips, and are typically 5 to 160 acres in size.

More than 85 percent of Urban land consists of buildings and pavements. Paved areas are mostly parking lots that surround shopping centers, industrial plants, and other commercial areas. Most areas are nearly level to gently sloping because of extensive grading and smoothing. Urban land is so modified by cuts and fills for works and structures that identification of the soil is not feasible. Soil materials underlying Urban land are ordinarily the same as the minor inclusions.

Included in mapping and making up less than 15 percent of this unit are minor areas of Orthents, clayey; Orthents, loamy; and Dumps. Orthents, clayey consist of altered, fine textured soils; Orthents loamy, consist of altered, medium textured soils; and Dumps consist of mixed refuse materials.

Runoff is generally very rapid on Urban land, and available water capacity is very low. Most paved areas are designed to lead runoff into storm drainage systems, but some are not. Where drainage is diverted to adjacent soils, the additional runoff generally causes severe erosion. In addition, the increased runoff from paved areas aggravates flooding.

Vegetation is mainly grassed borders and widely spaced trees and shrubs. A few idle areas along edges of built-up areas contain weeds and grasses. Special management is needed for planting and maintaining trees and shrubs. Periodic supplemental watering is needed. Trees, such as Washington hawthorne, that grow in small planters are generally better suited. Honey locust and green ash are reasonably well suited to restricted planting areas in shopping centers and similar places. Trees to plant along streets are red maple, silver maple, sugar maple, Norway maple, hackberry, littleleaf linden, white ash, green ash, and sycamore. Some commonly used trees have limitations; pin oak is subject to chlorosis and frequently has yellowish leaves, birch is subject to borers, Siberian elm is subject to wind damage, and American elm is subject to Dutch elm disease.

This map unit is not assigned to a capability subclass.

534—Urban land-Orthents complex, clayey. This map unit consists of Urban land and areas of altered, fine textured soils. Areas of this map unit are commonly blocky in shape and 20 to 500 acres in size.

Generally, this unit is less than 75 percent Urban land, and the rest is Orthents, clayey. The Urban land and Orthents, clayey are so intricately mixed, or areas are so small in size that they are not shown separately on the soil map.

In the Urban land part of the unit the landscape has been radically altered (fig. 12). The Urban land is covered by buildings, parking lots, and pavements so that identification of the underlying soils is not feasible. The Orthents, clayey consist of fine textured soils that have been altered or mixed by cutting and filling.

In the Orthents, clayey part of the unit the soils have been mixed. The soils formerly had a surface layer of silt loam, silty clay loam, or silty clay and a subsoil of silty clay or clay. The underlying material was calcareous silty clay loam or silty clay. Slopes are generally 1 to 7 percent, but some cutbanks are nearly vertical. In some places are large, reshaped or heavily graded tracts that have no buildings or pavements. Some areas of Orthents, clayey along highways contain borrow pits.

Included in mapping and making up 10 to 25 percent of the unit are minor areas of Orthents, loamy and Dumps. The Orthents, loamy consist of altered, medium textured soils. The Dumps consist of fills containing refuse material.

Many areas of this map unit have been graded so that water drains to the edges of lots, and eventually into sewer systems. Some low spots and excavations in undeveloped areas of Orthents, clayey collect water and are slow to dry out.

Permeability is variable because the soil material is altered and has been compacted by construction equipment. Available water capacity is variable but generally low to moderate. Organic matter content and plant nutrients are low on new exposures, but developed areas are usually topdressed where lawns and shrubs have been established. Reaction is medium acid to moderately alkaline. Runoff is medium to very rapid, depending on slope and plant cover. Plant roots are commonly restricted by compacted soil, or by excess lime if the original underlying material is near the surface.

The Orthents, clayey are used for lawns, gardens, parks, recreation areas, building sites, borrow areas, and highway rights-of-way. Onsite investigation is essential on specific sites to evaluate and plan for alternative uses. Most fresh exposures have no plant cover. Older established areas commonly have good bluegrass sod and a few trees and shrubs. Some idle areas, or heavily reshaped areas where construction is slow, have sparse to dense stands of weeds. Species for planting need to adapt to a variety of soil material and soil conditions. Special precautions are generally needed in planting trees and shrubs because of the altered and compacted, fine textured soil. To help prevent waterlogging of roots, gravel drains can be installed. In larger projects, special drainage lines may be needed. Trees to plant are silver maple, green ash, river birch, Siberian elm, and Washington hawthorn. Red maple can be planted in places that have no alkaline material. Most trees need supplemental water during prolonged drought.

Limitations of Orthents, clayey for building sites and recreation areas are variable because of the soil material and soil conditions. Excavating this soil generally is difficult because of the high clay content. Soil material that lacks strength and stability is subject to frost action and shrink-swell and needs to be replaced with suitable base material before foundations and roadbeds are constructed. Erosion and sedimentation are major concerns in construction, especially where the soil is bare and exposed for a considerable time. A variety of measures can be used to control erosion on construction sites. Maintaining plant cover and mulching help reduce erosion, and debris basins help control sedimentation.

Many areas of this unit have been leveled for playgrounds, athletic fields, and other intensive play areas. Extensive leveling exposes the underlying material in places and makes maintenance of plant cover difficult. Many areas need extensive drainage, topdressing, and other special management before a firm turf can be established. Heavily used play areas and walkways require special surfacing in places.

This map unit is not assigned to a suitability subclass.

535—Orthents, stony. This map unit consists mainly of spoil banks several miles in length along the Chicago Sanitary and Ship Canal and the Calumet Sag Channel. Stones make up 15 to 50 percent of the spoil material. Areas of this soil are typically long and narrow in shape and several hundred acres in size.

Orthents, stony consist of 50 to 85 percent loamy material, and the rest is stones and small boulders. The spoil banks have been spread and smoothed in some places, and slopes are commonly 1 to 7 percent. Other banks are nearly 40 feet high, and slopes are 15 to 60 percent. The stones were dredged from the underlying limestone rubble or blasted from bedrock. They are commonly 10 to 18 inches in diameter, but some are as large as 3 or 4 feet.

Included in mapping are a few areas that contain stony material from quarry operations.

The available water capacity is generally low, but it ranges from low to moderate. Permeability is variable, but it commonly ranges from rapid to moderate. Surface runoff is slow to medium on the spoil banks, but runoff from the surrounding slopes collects in some depressions between mounds.

Vegetation has been established in many areas to prevent erosion. The vegetation consists mainly of eastern cottonwood, some brushy plants, and various grasses and weeds. Some of the recently smoothed or disturbed spoil banks have no plant cover.

Some industrial developments north and west of Lemont are in areas of this map unit. Most areas are idle or used for wildlife habitat. Onsite investigation is needed to evaluate and plan for alternative uses. The feasibility of reclamation depends on conditions at the site and the desired use. For most industrial and commercial uses, smoothing and removal of stone are needed. To establish trees, shrubs, and good turf, topdressing and other special management are generally required.

This soil is not assigned to a capability subclass.

536—Dumps. This map unit consists of landfill throughout the survey area. In some landfill the soil has been altered by cutting, filling, and mixing, and in other landfill the soil has been overlain to overcome or suppress soil limitations for urban development. Dumps are in large designated area-type landfills, in mined out clay or gravel pits, on flood plains and frequently ponded potholes, and on unstable soil areas. Some smaller areas are just convenient dumping spots and occur at random. Areas are irregular or blocky in shape and are generally 2 to 150 acres in size.

Landfill consists of garbage and other refuse, mixed soil materials, rubble from demolition of buildings and pavements, and other material. In the area-type landfills, waste materials are covered by compacted earth (*18*).

Slope is variable in Dumps. Smoothed areas are typically nearly level to gently sloping; where not smoothed, areas are typically irregular in shape. The sides of some larger dumps are very steep.

Dumps are generally above the water table; consequently, wetness and contamination of ground water are not concerns. Most areas are graded so that water drains to the edge. Some unsmoothed areas collect water in depressions. The area-type landfills commonly have a buildup of heat and gases from decomposition of the refuse material. In some areas the explosive and odoriferous gases are dissipated by burning. Ground water contamination is possible in some fills, unless the porous material is properly sealed.

Available water capacity is variable but is generally quite low. Permeability is variable; it is very rapid in construction debris and slow in compacted soil material. Surface runoff is variable; it is slow on rubble piles and very rapid on tall, smoothed areas. Erosion is very severe on some taller, graded fills that have no plant cover. Organic matter content and plant nutrients are very low; however, some areas have been topdressed to establish plant cover.

Many areas of this unit are idle. Some areas are used for residential and commercial sites or other developments. Much of the fill material is in areas of unstable organic soils. Differential settlement of the fill material is possible. If the refuse material is not selected and compacted, especially in areas where a larger amount of fill and slopes are involved, cracks and displacement of foundations, walks, and driveways can develop. Dumps are so variable in nature that onsite investigations are needed to determine the suitability of these areas for proposed uses.

Some of the newer area-type landfills are being developed for recreation (fig. 13), mainly ski and toboggan slopes. To establish vegetation, topdressing and other special management are needed.

This map unit is not assigned to a capability subclass.

696B—Zurich silt loam, 2 to 5 percent slopes. This moderately well drained soil is on undulating knolls and ridges on outwash plains or on gently sloping lower side slopes in the uplands. Areas of this soil are irregular in shape and are commonly 3 to 25 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. In areas undisturbed by plowing, the surface layer is very dark gray and about 3 inches thick, and the subsurface layer is brown and about 6 inches thick. The subsoil is about 25 inches thick. The upper part of the subsoil is brown, firm silty clay loam; the middle part is dark yellowish brown, mottled, firm silty clay loam; and the lower part is yellowish brown, friable silty clay loam that increases in sand content as depth increases. The underlying material to a depth of about 60 inches is yellowish brown, mottled, calcareous layers of silt loam and very fine sand. In some places the surface layer and upper part of the subsoil have more sand than typical and lime is deeper. Also, in some areas compact, clayey material is below a depth of about 40 inches.

Included with this soil in mapping are a few small areas of somewhat poorly drained Wauconda soils and poorly drained Drummer soils in shallow depressions or drainageways. The included soils make up 1 to 12 percent of the unit.

Water and air movement is moderate in the upper part of the soil and moderately rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is high. A water table is at a depth of 4 to 6 feet during winter and spring. Reaction in the subsoil is medium acid or strongly acid in the upper part and slightly acid to mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderately low. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is somewhat low in organic matter, it tends to crust or puddle after a hard rain. Root development is hindered below a depth of about 33 inches by excess lime.

A few areas of this soil are used for farming, and a few areas remain in trees. Many areas are used for homesites and other urban uses. Much of the acreage is idle. The land-use trend is toward nonfarm uses. This soil has good potential for crops and moderate potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Crop residue management, terracing, conservation tillage, contour farming, and winter cover crops help control erosion. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility, reduce crusting, increase infiltration, and reduce soil loss.

A few small areas are in native hardwoods. Suitable species of trees to plant are white oak, northern red oak, green ash, sugar maple, hackberry, American basswood, and eastern white pine.

The areas of trees and brush favor woodland wildlife, such as birds, deer, raccoon, and squirrels. Cultivated fields and idle areas of grasses and weeds are well suited to openland wildlife, such as ring-necked pheasant and cottontail rabbit.

This soil is only moderately suited to dwellings with or without basements because of low strength and shrink-swell. These limitations can be overcome by strengthening or replacing the base material. Slight grading is needed for lots and local streets. Debris basins help trap sediment from construction sites. Frost heave and low strength are concerns for local streets and roads, but these can be overcome by replacing base material. Septic tank absorption systems are only moderately suited because of wetness. Also, ground water contamination is possible. Seepage is a concern for lagoons, but this can be overcome by sealing the bottom of the lagoon.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have no plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

696C2—Zurich silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, moderately well drained soil is on gently rolling knolls and ridges on outwash plains and short, uneven side slopes along drainageways. Areas of this soil are irregular in shape and 3 to 35 acres in size.

Typically, the surface layer is mixed dark grayish brown and dark brown silt loam about 7 inches thick. In areas undisturbed by plowing, the surface layer is very dark gray and about 3 inches thick, and the subsurface layer is brown and about 6 inches thick. The subsoil is about 23 inches thick. The upper part of the subsoil is brown, firm silty clay loam; the middle part is dark yellowish brown, firm silty clay loam; and the lower part is yellowish brown, friable silty clay loam that increases in sand content as depth increases. The underlying material to a depth of about 60 inches is yellowish brown, mottled, calcareous layers of silt and very fine sand. In some places where erosion is severe, the surface layer is dark brown silty clay loam. Also, in some areas the surface layer and upper part of the subsoil have more sand than typical. Less permeable clayey material is at a depth less than 60 inches.

Included with this soil in mapping are a few small areas of somewhat poorly drained Wauconda soils and poorly drained Drummer and Thorp soils. The included soils are in lower positions and make up 1 to 10 percent of the unit.

Water and air movement is moderate in the upper part of the soil and moderately rapid in the underlying material. Surface runoff from cultivated areas is medium. Available water capacity is high. A water table is at a depth between 4 to 6 feet during winter and spring. Reaction of the subsoil is medium acid or strongly acid in the upper part and mildly alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral or slightly acid. Organic matter content is moderately low because of the loss of surface soil by erosion. The surface layer is friable and easy to work when dry. In areas where the surface layer is mixed with the silty clay loam subsoil, it is more difficult to work and is somewhat sticky when wet. If the surface layer is worked when too wet it becomes hard and cloddy when dry. Root development is hindered below a depth of about 30 inches by excess lime.

A few areas of this soil are used for farming. However, much of the acreage is idle. Many areas are used for individual homesites. The land-use trend is toward urban uses. This soil has good to fair potential for crops and fair potential for most urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Excessive soil loss is the main hazard for cultivated crops. Poor tilth is also a limitation. Conservation tillage, crop residue management, terracing, and contour farming help reduce soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility and tilth, increase infiltration, and reduce soil loss.

This soil can produce high quality forage. Hay and pasture are effective in controlling erosion. Overgrazing causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help keep the pasture and soil in good condition.

A few small areas are in native hardwoods. Suitable species of trees to plant are white oak, northern red oak, green ash, sugar maple, American basswood, and eastern white pine.

The areas in trees and brush favor woodland wildlife such as deer, raccoon, squirrels, and birds. Cultivated fields and idle areas of grasses and weeds are well suited to openland wildlife such as pheasant, rabbit, and meadowlark.

This soil is only moderately suited to dwellings without basements because of low strength and moderate shrink-swell potential. These limitations can be overcome by strengthening or replacing the base material. Dwellings with basements are moderately suited because of shrink-swell and wetness. Slight to moderate grading is needed for lots and local streets. Erosion and siltation from construction sites can be reduced by maintaining plant cover and by using debris basins. Frost heave and low strength are concerns for local roads and streets, but these can be overcome by replacing base material. Septic tank absorption fields are moderately suited. However, ground water contamination is possible.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that have sparse or no plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths and trails are few. Leveling is generally needed for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

697—Wauconda silt loam. This nearly level, somewhat poorly drained soil is on low ridges and knolls or in shallow depressions on outwash plains. Areas of this soil are irregular in shape and 2 to 40 acres in size.

Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsurface layer is dark grayish brown silt loam about 3 inches thick. The subsoil is about 34 inches thick. The upper part of the subsoil is dark grayish brown, mottled, firm silty clay loam; the middle part is brown and grayish brown, mottled, firm silty clay loam; and the lower part is grayish brown, mottled, friable, calcareous silty clay loam that increases in sand content as depth increases. The underlying material to a depth of about 60 inches is mixed light yellowish brown and yellowish brown, mottled, calcareous layers of silt and very fine sand. In some places, the surface layer and upper part of the subsoil have more sand than typical, and lime is deeper. Also, in some areas less permeable, compact material is at a depth of less than 60 inches.

Included with this soil in mapping are a few small areas of well drained or moderately drained Grays soils on higher ridges and poorly drained Drummer soils in depressions. The included soils make up 2 to 10 percent of the unit.

Some areas of this soil are artificially drained. In undrained areas or in areas where drainage systems have failed, a water table is at a depth of 1 to 3 feet or less during wet seasons.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is medium. Available water capacity is high. Reaction is medium acid in the upper part of the subsoil and mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid or neutral. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. Because the surface layer is not high in organic matter, it tends to crust or puddle after hard rains. Root development is hindered below a depth of about 36 inches by excess lime.

Many areas of this soil are used for farming. Many areas are in trees, are idle, or are used for individual homesites or other nonfarm uses. This soil has very good potential for crops but poor potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Impeded drainage and seasonal wetness can limit cultivated crops in some spots. Where wetness is a limitation, tile drains can be installed to improve drainage. Erosion is a hazard for row crops. Returning crop residue, conservation tillage, and adding animal manures help maintain tilth and organic matter content, improve fertility, and reduce soil loss.

Some areas of this soil are wooded. Principal trees are hardwoods. Some areas contain widely spaced trees with an undercover of grasses. Suitable species of trees to plant are those which tolerate seasonal wetness such as swamp white oak, bur oak, red maple, green ash, American basswood, northern white spruce, and shingle oak.

This soil has good potential for a variety of food and cover plants for openland and woodland wildlife. Open fields and idle areas of grasses and weeds favor openland wildlife such as rabbit, pheasant, and meadowlark. Protective cover and food is commonly available nearby for many woodland wildlife species such as deer, squirrels, raccoon, and birds.

This soil is poorly suited to dwellings with or without basements because of wetness. For dwellings without basements, wetness can be overcome by installing tile and low strength can be overcome by replacing the base material. For dwellings with basements, wetness is difficult to overcome because lowering the water table to a desired depth is very difficult. Frost heave, low strength, and wetness are concerns for local streets and roads, but these can be overcome by strengthening or replacing base material. Wetness limits this soil for septic tank absorption fields. Construction of the seepage bed in suitable fill material above the water table improves suitability for septic tank systems. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities to avoid water pollution. Sewage lagoons are limited by wetness. Seepage is a concern for lagoons, but this can be overcome by sealing the bottom of the lagoon.

This soil has fair to poor potential for most recreational uses. It is slow to dry out after a rain, and it commonly needs drainage for best use. It can produce good turf, but the vegetation is damaged if foot traffic is heavy when the surface layer is wet. In areas that have no plant cover or where plant cover is sparse, the soil is muddy and slippery after a rain. Walks, roads, and trails commonly need surfacing.

This soil is in capability class I.

698B—Grays silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on undulating outwash plains and benches along streams. Areas of this soil are irregular in shape and are commonly 2 to 45 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is about 22 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam; the middle part is olive brown, mottled, firm silty clay loam; and the lower part is light olive brown, mottled, friable silty clay loam. The lower part of the subsoil is calcareous and increases in sand content as depth increases. The underlying material between depths of 35 and 60 inches is mixed yellowish brown and grayish brown, mottled layers of calcareous silt loam and very fine sandy loam. In some small areas the surface layer has more sand than typical, and the subsoil is calcareous to a depth of 35 inches or more. In some areas less permeable, compact material is at a depth of less than 60 inches.

Included with this soil in mapping are a few small areas of somewhat poorly drained Wauconda soils and poorly drained Drummer soils in shallow depressions and waterways. The included soils make up 2 to 10 percent of the unit.

Water and air movement through this soil is moderate, and surface runoff from cultivated areas is medium. Available water capacity is high. A water table is at a depth of 4 to 6 feet during winter and spring. Reaction is medium acid to neutral in the upper part of the subsoil and is neutral to moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly slightly acid. Organic matter content is moderate. The surface layer is friable and easy to work through a wide range of soil moisture. The surface layer tends to crust or puddle after hard rains. Root development is hindered below a depth of about 35 inches by excess lime.

Some areas of this soil are used for farming. Some areas are in trees. Many areas are idle or in forest preserves. The land-use trend is toward nonfarm uses. This soil has good potential for crops and fair potential for many urban uses.

This soil is suited to corn, soybeans, small grain, grasses, and legumes. Erosion is the main hazard for cultivated crops. Conservation tillage, crop residue management, terracing, contour farming, and winter cover crops help control soil loss. Returning crop residue and adding animal manures help maintain organic matter content, improve fertility, reduce crusting, increase infiltration, and reduce soil loss.

This soil is well suited to trees. A few small areas contain widely spaced hardwoods with a cover of grasses in the open spaces. Suitable species of trees to plant are white oak, northern red oak, green ash, sugar maple, hackberry, American basswood, and eastern white pine.

The few areas of trees and brush favor woodland wildlife such as birds, deer, raccoon, and squirrels. Cultivated fields and idle areas of grasses and weeds are well suited to openland wildlife such as ring-necked pheasant and cottontail rabbit.

This soil is only moderately suited to dwellings with or without basements because of low strength and shrink-swell. These limitations can be overcome by strengthening or replacing the base material. Only slight grading is needed for lots and streets. Frost heave and low strength are concerns for local streets and roads, but these can be overcome by replacing base material. Septic tank absorption systems are poorly suited because of the seasonal high water table. Ground water contamination is possible. Seepage is a limitation for lagoons, but this can be overcome by sealing the bottom of the lagoon.

This soil is suited to a wide range of recreational activities. It is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic. Areas that lack plant cover are muddy and slippery when wet, and heavily traveled areas are very dusty when dry. Limitations for camp and picnic areas or for paths or trails are few. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas.

This soil is in capability subclass IIe.

741B—Oakville fine sand, 2 to 7 percent slopes. This well drained, coarse textured soil is on undulating and gently rolling sand dunes and former beach ridges. Areas of this soil generally are elongated in shape and 5 to 150 acres in size.

Typically, the surface layer is fine sand about 6 inches thick. It is black in the upper part and very dark grayish brown in the lower part. The subsurface layer is mixed yellowish brown and brown fine sand about 7 inches thick. The subsoil is about 27 inches thick. It is yellowish brown fine sand in the upper part and brownish yellow sand in the lower part. The underlying material to a depth of about 60 inches is mixed yellowish brown and light yellowish brown sand and fine sand. Plowed areas of this soil have a dark grayish brown surface layer about 7 inches thick. In some places, the surface layer is thicker than typical and a subsurface layer is not present. In some areas the subsoil and underlying material contain bands of sandy loam and silt loam or fine gravel.

Included with this soil in mapping are a few small areas of somewhat poorly drained Watseka soils and poorly drained Gilford soils in the lower positions. The included soils make up 1 to 10 percent of the unit.

Water and air movement through this soil is very rapid, and surface runoff from cultivated areas is very slow. Available water capacity is low. Reaction is strongly acid to slightly acid in the subsoil. Reaction in the surface layer varies, depending on past management, but is commonly medium acid. Organic matter content is low to moderately low. The sandy surface layer is very friable and easy to work.

Most areas of this soil are idle or in woodland. Very few areas are used for farming. Many areas of this soil were used for early trails and are now used for roads and highways. Some areas on ridges are used for homesites. This soil has very poor potential for crops but good potential for many urban uses. It is generally a good source of sand.

Because available water capacity is low, these soils are generally poorly suited to row crops or vegetable crops. Production of small grain is low. The major concerns in management are droughtiness, wind erosion, and tilth. Field windbreaks, conservation tillage, crop residue management, and winter cover crops help improve tilth, increase infiltration, and reduce wind erosion.

This soil is poorly suited to pasture, but some drought-resistant grasses and legumes can be established. Production of forage is low. Protective vegetation and carefully regulated grazing help prevent wind erosion.

This soil is fairly well suited to poorly suited to trees. Some areas are in native trees, mainly black oak, white oak, and various hickories. Many trees are short and poorly formed. Trees to plant are eastern white pine, red pine, black oak, scarlet oak, red pine, eastern white pine, Siberian elm, and hackberry.

This soil is well suited to dwellings. Sidewalls of excavations are subject to cave-in. Slight grading is needed for building sites and local streets and roads. Lawns and shrubs are difficult to maintain because available water capacity is low. Septic tank absorption systems are well suited. However, pollution of ground water is a potential because of the rapidly permeable underlying material. Sewage lagoons are unsuited because of seepage in the underlying material.

If this soil is used for recreation, maintaining a good turf that can withstand heavy foot traffic is difficult. Some leveling is generally needed for playgrounds, athletic fields, and other intensive play areas. Leveling can expose the sandy underlying material, which is highly susceptible to wind erosion. The soil becomes loose and soft if used for paths, trails, and roads. It is too loose for tent stakes. Wind erosion is likely in any area that has inadequte plant cover.

This soil is in capability subclass IVs.

862—Pits, sand. This map unit consists of excavations from which sand is being removed for construction, roadfill, or other uses. The excavations are generally on sandy beach ridges. Areas of this map unit are commonly 50 to 100 acres in size, the largest of which is near Lynwood in the southeastern part of Cook County.

Included in mapping of this unit are areas of unidentified soils surrounding the pits.

The excavations are commonly many feet deep, and many are filled with water. Areas of water larger than 2 acres generally are shown on the soil map. The soil material surrounding the pits is generally low in fertility and organic matter content. Most areas support only sparse vegetation.

Onsite investigation is needed to determine possible alternative uses of these pits. For some uses the pits need to be reclaimed. Feasibility of reclamation depends on the conditions at the site and the desired alternative use. Generally, intensive or drastic reclamation that involves filling the pits is required.

Some pits could be filled with solid refuse and covered with clean soil material; other pits could be converted into ponds or lakes. After reclamation, many areas of this unit are suitable for recreation or for commercial and industrial sites. The fill material needs time to settle and become stable. To establish vegetation, topdressing is generally required.

This map unit is not placed in a capability subclass.

863—Pits, Clay. This map unit consists of areas in which clay has been removed for making bricks and other clay products. Most of the clay is fine textured lakebed sediment, although some is glacial till. Most areas are in the southeastern part of Cook County and are 30 to 80 acres in size.

Most pits are no longer active. Some have been used for sanitary landfills. Most pits are 10 to 30 feet deep. Some have filled with water and are indicated as water on the soil map. Urban land-Orthents, clayey complex surrounds some pits or pits that are filled with water.

The soil material is generally low in fertility and organic matter content. It is generally slowly permeable and supports only sparse vegetation. Calcareous, compact glacial material is exposed in some places.

Some water-filled areas of this map unit are used for boating and fishing. Unless the pits are reclaimed, they are not satisfactory for most urban uses. The feasibility of reclamation depends on the conditions at the site and the desired alternative use. Onsite investigation is essential to evaluate the site and plan for a specified use.

For most uses, these areas require intensive or drastic reclamation that involves filling the pits. They can be filled with refuse and covered with clean soil material. Seepage generally is low. If a stable fill is desired, solid fill is needed and the fill needs sufficient time to settle. To establish vegetation, topdressing is generally required. After reclamation, most areas of this unit are suitable for recreation or for commercial and industrial sites.

This map unit is not assigned to a capability subclass.

864—Pits, quarry. This map unit consists of excavations and spoil piles where limestone has been mined for building stone, riprap on the shoreline of lakes, road construction, ground lime, and other agricultural and industrial uses (fig. 14). The quarries are chiefly on bedrock domes covered with a thin layer of glacial drift or on waterswept benches along the Des Plaines River. Areas of this unit are commonly 40 to several hundred acres in size. One of the largest quarries in the world is located near Thornton in southeastern part of Cook County.

Included with this unit in mapping are areas surrounding the pits where the soils have been mixed, or otherwise disturbed, and some areas of Orthents, stony.

Most quarries are limited in size by the surrounding land use. The excavations generally are about 100 to 200 feet deep. Disturbed soil areas and spoil piles near the excavations are scraped or mixed by mining operations. They commonly contain many large boulders. They are generally low in organic matter content, fertility, and available water capacity.

Areas no longer used for mining can be used for recreation and wildlife. Plants generally do not grow well because the spoil material is shallow, rocky, and limy and has poor tilth. Some excavations have been designed for use as stormwater retention basins to reduce metropolitan area flood damage. Others have been used for landfills. Unless the quarries are reclaimed, they generally are not satisfactory for most urban uses.

The feasibility of reclamation depends on the conditions at the site and the desired alternative use. Onsite investigation is essential to evaluate and plan for a specific use. For most uses, this involves filling the excavations. They can be filled with refuse and covered with clean soil material. Solid refuse is needed because of seepage through fractured bedrock. To establish vegetation, topdressing is generally required. After reclamation, most areas of this unit are suitable for recreation or for commercial and industrial sites.

This map unit is not assigned to a capability subclass.

865—Pits, gravel. This map unit consists of excavations from which gravel and some sand have been removed. The pits are generally on outwash plains, benches near streams, or kames. The gravel is used mainly for roadfill, concrete or asphalt, or other construction uses. It commonly contains a large amount of dolomitic stones that need to be crushed. Areas of this unit are commonly 5 to 500 acres in size. Included with this unit in mapping are some disturbed areas that surround the gravel pits.

The excavations are commonly 10 to 30 feet deep. Many have filled with water and are indicated as water on the soil map. The disturbed soil material surrounding the pits has generally been deeply scraped or mixed by mining operations. It generally is quite low in fertility and organic matter content. Available water capacity is variable.

Many interesting uses can be made of the old abandoned pits (fig. 15). Several of the pits that have filled with water have been stocked with fish. Other recreational uses, besides fishing, include boating and swimming. Some of the older excavations are used as wildlife habitat. The pits generally make poor sites for sanitary landfills. For most purposes, they require intensive or drastic reclamation that involves filling or grading.

Some pits could be filled with solid refuse and then covered with clean fill material. Fill material needs to settle and stabilize before it is graded. After reclamation, some areas of this unit can be suitable for recreation or for commercial and industrial sites. To establish vegetation, topdressing is generally required. The feasibility of reclamation depends on the conditions at the site and the desired alternative use. Onsite investigation is essential to evaluate and plan the development for a specified use.

This map unit is not assigned to a capability subclass.

903—Muskego and Houghton mucks. These level, very poorly drained Muskego and Houghton soils are in depressions on uplands and along streams. They formed in fibrous plant remains deposited in marshy areas. They are frequently flooded for long periods during winter and spring. Areas of this unit are commonly circular or elliptical in shape and generally are 2 to 100 acres in size.

These soils are similar in behavior, and they are so intermingled that it was not practical to show them separately on the soil map. Mapped areas can consist entirely on one soil, or of both soils. About 65 percent of the map unit is Muskego muck and 35 percent is Houghton muck.

Typically, the Muskego soil has a surface layer of black muck material about 27 inches thick. The underlying material is very dark grayish brown coprogenous earth.

Typically, the Houghton soil has a surface layer of black muck about 16 inches thick. The next layer is dark brown muck about 11 inches thick. Below this is black muck about 32 inches thick. The underlying material to a depth of 65 inches is gray loamy sand and sand.

In some places, the surface layer of these soils contains lime or silty material washed from surrounding slopes. In other areas, the underlying material consists of bands of silty and clayey material and muck or marl.

Included with these soils in mapping are some small areas of Muskego and Peotone soils, ponded, and Dumps. The Muskego and Peotone soils, ponded, generally are in the center of depressions, whereas Dumps consist of fills along the edges. The included areas make up 1 to 15 percent of the unit.

Most areas of these soils are drained by tile or surface ditches. Tile systems are difficult to maintain because of subsidence and alignment concerns. In areas that are not drained or in areas where drainage systems have failed, a continuous or frequent high water table is near the surface.

These soils are very unstable. They are highly compressible when loaded and are subject to subsidence when overdrained. Water and air movement in the Muskego soil is moderately slow to moderately rapid in the upper part of the profile and slow in the lower part. In the Houghton soil it is moderately slow to moderately rapid.

In both soils available water capacity is very high. Reaction is neutral or slightly acid in the upper part of the profile and slightly acid to mildly alkaline in the lower part. Organic matter makes up most of these soils. When dry, the surface layer is easy to work.

Some areas of these soils are cultivated. Many areas are idle or in nonfarm uses. Some areas have been built up, and are used for urban development. These soils have good potential for row crops and very poor potential for most urban uses. A few areas have been mined for topsoil.

If adequately drained, these soils are well suited to corn, vegetables, and bluegrass sod. They are seldom used for small grain and hay. The main concerns in management are ponding and maintaining drainage systems and outlets. Row crops can be grown year after year if management is good. Overdraining can result in wind erosion and fire. Many areas have burned at one time or another.

A few areas of these soils are used for pasture. Pasture can be improved by installing surface drains and by seeding improved varieties of grasses that tolerate wetness.

In undrained places, these soils have good potential for many kinds of wetland wildlife. Shallow water developments and suitable water habitat are fairly easily provided, and water can be maintained at a desired level without difficulty.

These soils are unsuited to most urban uses. They are highly compressible when loaded; foundations, walks, and streets and roads are subject to subsidence and cracking (fig. 16). In addition, maintenance costs for roads, utility lines, and sewers are very high because of the need to keep structures in alignment and because of the frequent or continuous water saturation.

If these soils are used for urban development, the organic material needs to be removed and replaced with suitable mineral soil material. Backfilling is generally unsatisfactory, unless all the organic material is removed. In many places the organic material is too deep to remove economically, and pilings are needed to penetrate the organic material to attain stability (*27*). Floating equipment on planks may be needed during construction to avoid bogging down; in addition, the sidewalls of excavations need support to prevent sloughing (fig. 17). Pumps are generally needed to remove excess water.

Many areas of these soils are dug out for private lakes or flood-control reservoirs and used for recreation, such as boating and fishing (fig. 18). These soils are very poorly suited to playgrounds, picnic and camp areas, and hiking. They remain wet for long periods after rains. Trafficability is poor, and sod is easily damaged.

These soils are in capability subclass IIIw.

904—Muskego and Peotone soils, ponded. These very poorly drained or frequently ponded, level or nearly level Muskego and Peotone soils are mainly in deep depressions on glacial moraines and are commonly adjacent to lakes, ponds, and streams throughout the survey area. Frequent and occasional ponding occurs during winter and spring, and many areas are partly occupied by shallow lakes or ponds during the year.

These soils have similar management, and they are so intermingled that it was not practical to separate them on the soil map. This unit is about 65 percent Muskego soils and 35 percent Peotone soils.

Typically, the Muskego soil has a surface layer of black muck material about 27 inches thick. The underlying material is very dark grayish brown coprogenous earth.

Typically, the Peotone soil has a surface layer of black silty clay loam about 25 inches thick. The subsoil is about 28 inches thick. The upper part of the subsoil is black, mottled, very firm, heavy silty clay loam; the middle part is gray, mottled, firm silty clay loam; and the lower part is gray, mottled, friable silt loam with thin layers of friable silty clay loam. The underlying material to a depth of about 60 inches is gray layers of mottled, silty and loamy material.

Included with these soils in mapping are some areas of Ashkum and Houghton soils. The included soils are commonly near the perimeter of the unit and occupy 2 to 25 percent of the area.

The available water capacity is very high. Permeability of the Muskego soil is moderately slow to moderately rapid in the upper part of the profile. The Peotone soil is moderately slowly permeable in the upper part. Both soils are slowly permeable in the lower part. These soils accumulate runoff and wash from surrounding slopes.

Most areas of these soils are not used for farming because drainage is not practical. Small areas that have been reclaimed by dredging or by filling are used for urban devlopment. However, most areas are not suited to urban uses because fill materials and the underlying soil may be unstable.

Cattails, rushes, sedges, willows and other water tolerant plants are abundant on these soils. Shallow water areas and suitable habitat provide good food and cover for all wetland wildlife. Nesting boxes are needed for wood ducks. The potential for openland and woodland wildlife habitats is poor.

These soils are unsuited to most urban uses. They have standing water most of the year, and drainage is difficult. Areas commonly contain some organic material. Onsite investigation is required to determine presence and thickness of organic material. If organic material is present, it is highly compressible if loaded and subsides when drained. Backfilling is generally unsatisfactory. The areas of mineral soil material have fair to poor stability when drained because of frost heave and shrink-swell.

If these soils are used for construction, they must be artificially drained and protected from ponding. Deposits of organic material need to be removed and replaced with mineral soil backfill. In many places the organic material is too deep to remove economically and pilings are needed to penetrate and stabilize the organic material.

Areas that do not contain organic material can be made more suitable for dwellings, septic tank absorption fields, and streets and roads by using suitable fill material. The fill needs to be high enough so that footings, seepage beds, and roadbeds are constructed above the water table. Sanitary facilities need to be connected to community treatment facilities. Sewage lagoons and reservoirs are limited by seepage and standing water. The organic material is not suitable for embankments. However, dugout ponds are possible in areas that are underlain by clayey materials. These areas typically have a dependable high water table.

These soils are unsuited to most types of recreation. Ponded areas can be used for boating, fishing, and wildlife observation. If drained, these soils are poorly suited to playgrounds, picnic areas, camp areas, and hiking. They remain wet for long periods after rains. Trafficability is poor, and sod is easily damaged. Paths, trails, and roads are difficult to maintain.

These soils are in capability unit VIIIw.

923B—Urban land-Markham-Ashkum complex, 1 to 7 percent slopes. This map unit consists of Urban land and areas of undulating to gently rolling Markham soils and nearly level Ashkum soils. It is on till plains and moraines. Areas of this unit are commonly blocky in shape and are generally several hundred acres in size.

This unit is 30 to 50 percent Urban land, 20 to 30 percent moderately well drained Markham soils, and 15 to 25 percent poorly drained Ashkum soils. The Urban land and Markham and Ashkum soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of the unit is covered by homes, light commercial and industrial development, and pavements. The landscape has not been radically altered by cuts and fills, but the structures obscure the soil so that identification is not feasible.

Typically, the Markham soil has a surface layer of black or very dark grayish brown silt loam about 8 inches thick. The subsurface layer is dark grayish brown silt loam about 4 inches thick. The subsoil is about 28 inches thick. The upper part of the subsoil is brown, firm silty clay loam; the middle part is mixed brown, dark yellowish brown, and light olive brown, very firm silty clay; and the lower part is light olive brown, mottled, very firm, calcareous silty clay loam. The underlying material to a depth of about 60 inches is light olive brown, mottled, very firm, calcareous silty clay loam. Small pebbles and stones are common in the subsoil and underlying material.

Typically, the Ashkum soil has a surface layer of black silty clay loam about 11 inches thick. The subsoil is about 36 inches thick. The upper part of the subsoil is very dark gray, mottled, firm silty clay; the middle part is gray, mottled, very firm silty clay; and the lower part is mixed gray and dark yellowish brown, very firm, silty clay loam. The underlying material to a depth of about 60 inches is mixed gray and dark yellowish brown, very firm silty clay loam and has a few pebbles and stones.

Included in mapping and making up 10 to 20 percent of the unit are areas of Orthents, clayey and Dumps. The Orthents, clayey consist of fine textured soil that has been radically altered by construction. The Dumps are low lying areas filled with mixed refuse materials.

Most areas of the Ashkum soils have been artificially drained through sewer systems, gutters, drainage tile, and ditches along streets and roads. The Ashkum soils that are not drained have a periodic high water table at a depth of 1 foot or less. The Markham soils have a perched water table above the slowly permeable material for brief periods during spring. Also this soil is occasionally flooded for brief periods in spring.

Permeability is moderately slow to slow in the soils of this unit. Reaction is commonly neutral or slightly acid in the surface layer. It is strongly acid or neutral in the upper part of the subsoil and mildly alkaline or moderately alkaline in the lower part. Shrink-swell potential is moderate.

The Markham and Ashkum soils are used for lawns and gardens, building sites, recreation areas, and openland. They have fair potential for lawns and gardens and for trees and shrubs. They have fair to poor potential for most urban and recreational uses.

These soils are suited to grasses, flowers, vegetables, trees, and shrubs. They are somewhat high in clay content and are slow to dry out in spring. Low lying areas are difficult to work and need effective drainage for the survival and good growth of plants. Perennial plants selected for planting in low areas should have a fairly high tolerance for wetness. Soil erosion is a serious hazard on the sloping Markham soils, unless permanent plant cover is maintained. Plants on the Markham soils need supplemental watering in summer to keep them in good condition.

This unit has moderate to severe limitations for building. Excavating the soil is somewhat difficult because of the relatively high clay content. Excavations in the Ashkum soil fill with water and are slow to dry out. The risk of encountering unstable organic material in low areas is considerable. The Markham and Ashkum soils have low strength and moderate shrink-swell potential;

consequently, foundations and footings are subject to cracking. Slight to moderate grading is needed for lots and local streets.

The Markham soils are better suited to building than Ashkum soils. The Ashkum soils must be artificially drained and protected from flooding. Dwellings on Ashkum soils should be constructed without basements. Replacement of base material in all soils helps prevent structural damage caused by frost action and shrink-swell. All sanitary facilities need to be connected to community sewer and treatment facilities. If septic tank absorption systems are used, the seepage beds will function if constructed in loamy till material above the water table. The upper layer of the Markham soil needs to be replaced and the Ashkum soil needs to be covered with a suitable base material, if local roads and streets are to function properly.

The Markham soils are better suited to recreational uses than the Ashkum soils. Some leveling is needed in places for playgrounds, athletic fields, and other play areas. The Ashkum soils remain wet for long periods after rains, and turf is easily damaged. Heavily traveled areas generally need special surfacing.

This map unit is not assigned to a capability subclass.

924—Urban land-Milford-Martinton complex. This map unit consists of Urban land and areas of nearly level Milford and Martinton soils on lake plains. Areas of this unit commonly are blocky in shape and several hundred acres in size.

This unit is 30 to 50 percent Urban land, 25 to 35 percent poorly drained Milford soils, and 10 to 20 percent somewhat poorly drained Martinton soils. The Urban land and Milford and Martinton soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of this unit is covered by homes, light commercial and industrial development, and pavements. The landscape has not been radically altered by cuts and fills, but the structures so obscure or alter the soil that identification is not feasible.

Typically, the Milford soil has a surface layer of black, very firm heavy silty clay loam about 13 inches thick. The subsoil is about 23 inches thick. The upper part of the subsoil is very dark gray, mottled, very firm heavy silty clay loam; the middle part is mixed dark gray and yellowish brown, very firm heavy silty clay loam; and the lower part is gray, mottled, very firm silty clay loam. The underlying material to a depth of about 60 inches is gray, mottled, calcareous silty clay loam. In some places, the surface layer and subsoil contain more clay than is typical.

Typically, the Martinton soil has a surface layer of silt loam about 12 inches thick. The upper part is black, and the lower part is very dark grayish brown. The subsoil is about 33 inches thick. The upper part of the subsoil is dark brown, mottled, firm silty clay loam; the middle part is mixed dark grayish brown to yellowish brown, mottled, very firm silty clay; and the lower part is light olive brown, mottled, very firm silty clay loam. The underlying material to a depth of about 60 inches is olive brown, mottled, very firm, calcareous silty clay loam.

Included in mapping and making up 10 to 20 percent of the unit are areas of Orthents, clayey and areas of soils that have a brown mottle-free subsoil. Orthents, clayey consist of fine textured soils that have been altered by construction. The soils with a brown subsoil are on the higher, better drained positions.

Most areas of this map unit are artificially drained through sewer systems, gutters, drainage tile and, to a lesser extent, by ditches along streets and roads. The undrained Milford soils have a periodic water table at a depth of 1 foot or less, and the undrained Martinton soils have a water table at a depth of 1 to 3 feet or less. The Milford soils are occasionally flooded for brief periods in spring.

Permeability is moderately slow to slow, and organic matter content is high in the Milford and Martinton soils. Reaction is neutral to slightly acid in the surface layer. It is slightly acid to mildly alkaline in the upper part of the subsoil and moderately alkaline in the lower part. Shrink-swell potential is moderate to high.

The Martinton soil is better suited to grasses, flowers, vegetables, trees, and shrubs than the Milford soil. The Milford soil is high in clay content and difficult to work. It also needs good artificial drainage for plants. Perennial plants suitable for planting need a fairly high tolerance for wetness. Soil erosion is minimal on this unit, unless the soils are left bare and exposed for a considerable time or are used as a watercourse.

This unit has severe limitations for building. Soil areas used for this purpose must be artificially drained and low areas protected from flooding. Excavating the soils is difficult because of the relatively high clay content and because excavations fill with water.

Dwellings and small buildings should be constructed without basements. Foundations and roadbeds for streets need to be designed to prevent damage by frost action and by shrink-swell. Generally the base material needs to be replaced for proper functioning of foundations and roadbeds. All sanitary facilities need to be connected to community sewer and treatment facilities. If onsite sewage disposal systems are used, the seepage beds need to be constructed above the water table and in suitable fill material.

Most areas of this unit are poorly suited for recreation. The small included areas at higher elevations can be selected for new playgrounds and other intensive play areas. Special drainage is needed for development of the low lying Milford soil. Play areas and walkways generally require special surfacing because the turf is easily damaged when wet.

This map unit is not assigned to a capability subclass.

925B—Urban land-Frankfort-Bryce complex, 1 to 7 percent slopes. This map unit consists of Urban land and undulating to gently rolling Frankfort soils and nearly level Bryce soils. It mainly is on till plains and moraines. Areas of this unit commonly are blocky in shape and 40 to 800 acres in size.

This unit is 30 to 50 percent Urban land, 20 to 30 percent somewhat poorly drained Frankfort soils, and 15 to 25 percent poorly drained Bryce soils. The Urban land and Frankfort and Bryce soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of the unit is covered by homes, light commercial and industrial development, and pavements. The landscape has not been radically altered by cuts and fills, but the structures so obscure or alter the soil that identification is not feasible.

Typically, the Frankfort soil has a surface layer of very dark gray silty clay loam about 8 inches thick. Where undisturbed, the subsurface layer is dark gray or dark grayish brown and is about 5 inches thick. The very firm subsoil is about 22 inches thick. The upper part of the subsoil is silty clay with dark gray faces of peds and dark brown, mottled interiors of peds; the middle part is dark grayish brown, very firm silty clay; and the lower part is brown, calcareous, very firm silty clay with many gray and greenish mottles. The underlying material to a depth of about 60 inches is mixed brown and greenish gray, mottled, calcareous silty clay.

Typically, the Bryce soil has a surface layer of black silty clay about 17 inches thick. The subsoil is about 31 inches thick. The upper part of the subsoil is very dark gray, mottled, very firm silty clay; the middle part is mixed gray and yellowish brown, mottled, very firm silty clay; and the lower part is mixed gray and grayish brown, mottled, very firm silty clay. The underlying material to a depth of about 60 inches is mixed gray and grayish brown, calcareous silty clay.

Included in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, clayey, Dumps, and areas of soils that have a brown subsoil that is not mottled. Orthents, clayey consist of soil that has been altered by construction; Dumps are low lying areas filled with mixed refuse materials; and the soils with a brown, mottle-free subsoil are on the elevated, better drained positions.

Most of the wet areas of this map unit, predominantly the Bryce soil, are artificially drained. Drainage is through sewer systems, gutters, ditches along roads, and to a lesser extent, drainage tile. The undrained Bryce soil has a periodic water table at a depth of 1 foot or less. The Bryce soil is occasionally flooded for a long period in spring. The undrained Frankfort soil has a periodic water table at a depth of 1 to 3 feet.

Permeability is slow in the Frankfort and Bryce soils. Reaction is commonly slightly acid or neutral in the surface layer, medium acid to neutral in the upper part of the subsoil and mildly alkaline to moderately alkaline in the lower part of the subsoil. Shrink-swell potential for both soils is moderate.

The Frankfort and Bryce soils are used for lawns, gardens, building sites, recreation areas, and openland. They have fair to poor potential for lawns and gardens and for trees and shrubs. They have poor potential for most urban uses.

The soils in this map unit have severe limitations for grasses, flowers, vegetables, trees, and shrubs. They are high in clay content and are very slow to dry out in spring. Low lying areas need effective drainage for the survival and good growth of plants. Perennial plants that are selected for planting should have a fairly high tolerance for wetness and clayey soils. Special precautions are needed to prevent waterlogging of roots. The hazard of soil erosion is severe on the gently rolling areas of Frankfort soils, unless permanent plant cover is maintained.

This unit has severe limitations for building. Low areas need effective artificial drainage and protection from flooding. Excavating the soil is difficult because of the high clay content. Excavations fill with water in low areas and are very slow to dry out. The soils lack adequate strength and stability because of shrink-swell and frost action; consequently, foundations, walks, and pavements are subject to cracking. Slight to moderate grading is needed for lots and for local streets and roads.

Dwellings and small buildings should be constructed without basements. Base material for foundations, footings, and roadbeds needs to be replaced or overlain with suitable material. All sanitary facilities need to be connected to community sewer and treatment facilities. If onsite sewage disposal systems are used, the seepage beds will function if constructed above the water table in suitable fill material.

This map unit has fair to poor potential for most recreational uses. The Frankfort soils on higher elevations can be selected for new play areas, even though they are slow to dry out after rains. Where plant cover is sparse or inadequate, the soils are muddy and slippery after a rain. Heavily traveled areas generally need special surfacing.

This map unit is not assigned to a capability subclass.

926B—Urban land-Drummer-Barrington complex, 1 to 7 percent slopes. This unit consists of Urban land and areas of nearly level Drummer soils and undulating to gently rolling Barrington soils. It is on outwash plains and on benches near streams through the survey area. Areas of this unit commonly are blocky in shape and 30 to 500 acres in size.

This unit is 30 to 50 percent Urban land, 20 to 30 percent poorly drained Drummer soils, and 15 to 25 percent well drained and moderately well drained Barrington soils. The Urban land areas and Drummer and Barrington soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of the unit is covered by buildings and pavements that obscure the soils so that identification is not feasible.

Typically, the Drummer soil has a surface layer of black silty clay loam about 15 inches thick. The subsoil is about 41 inches thick. The upper part of the subsoil is very dark gray, mottled, firm silty clay loam; the middle part is dark gray and olive gray, mottled, firm silty clay loam; and the lower part is mixed gray, light olive brown and yellowish brown, friable silt loam with some layers of loam and sandy loam. The underlying material to a depth of about 60 inches is yellowish brown, mottled layers of calcareous silt loam, loam, and sandy loam.

Typically, the Barrington soil has a surface layer of silt loam about 14 inches thick. The upper part is black and the lower part is very dark grayish brown. The subsoil is about 27 inches thick. The upper part of the subsoil is brown and dark yellowish brown, firm silty clay loam; the middle part is dark yellowish brown, friable silty clay loam that increases in sand as depth increases, and the lower part is light olive brown, mottled, friable layers of silt loam and very fine sandy loam that contains some lime. The underlying material to a depth of about 60 inches is mixed gray and light yellowish brown, calcareous layers of silt loam and sandy loam. In some places the surface layer is lighter colored than typical.

Included in mapping and making up 10 to 20 percent of the unit are areas of Orthents, loamy and Dumps. Orthents, loamy consist of areas radically altered by construction; and Dumps consist of low lying areas that have been filled with mixed refuse materials.

Most areas of the Drummer soils have been artificially drained. Drainage is through sewer systems, gutters, drainage tile, and ditches along local streets and roads. The Drummer soils that are not drained have a periodic high water table at a depth of 1 foot or less. Drummer soils are occasionally flooded for brief periods during spring. The Barrington soils have a periodic water table below a depth of 3 to 5 feet.

Permeability is moderate in the soils of this unit. Reaction is neutral to slightly acid in the surface layer and upper part of the subsoil and neutral to moderately alkaline in the lower part of the subsoil. Shrink-swell potential is moderate.

The Drummer and Barrington soils are used for lawns, gardens, building sites, recreation areas, and openland. They have very good potential for lawns and gardens and for trees and shrubs. The Drummer soils have poor potential for most engineering and recreational uses, whereas the better drained Barrington soils have good potential.

These soils are well suited to grasses, flowers, vegetables, trees, and shrubs. However, the low lying Drummer soils are difficult to work and are slow to dry out after rains. They need effective drainage for the survival and good growth of plants. Perennial plants selected for planting should have a fairly high tolerance for wetness. On the higher lying Barrington soil plants commonly need supplemental watering. Soil erosion is a concern on the Barrington soils unless permanent plant cover is maintained.

The Drummer soils on low lying areas are poorly suited to most building. The better drained Barrington soils are better suited to most uses than the Drummer soils. Both soils lack strength and suitability for many uses because of frost action and shrink-swell. Excavating these soils is somewhat difficult because of caving of sidewalls and because water accumulates in the Drummer soils. Slight to moderate grading is needed for lots and local streets and roads.

Sites in low lying positions must be artificially drained and protected from occasional brief flooding, and dwellings in these areas need to be constructed without basements. Foundations and footings need to be below annual frost depth, and placed in suitable base material. All sanitary facilities need to be connected to community sewers and treatment facilities. Onsite sewage disposal systems on the Drummer soils function if the seepage beds are constructed above the water table. Local streets and roads function properly if the soils are covered with suitable base material, and if low areas are drained.

The Barrington soils can be used for playgrounds and other recreation areas. Some areas of the Barrington soil need slight leveling, otherwise limitations are few. The Drummer soils remain wet for long periods after rains. Special surfacing is needed in some heavily used play areas and walkways.

This map unit is not assigned to capability subclass.

1107—Sawmill silty clay loam, wet. This nearly level, poorly drained soil is on flood plains along rivers and streams. It is frequently flooded for brief periods during spring. Vegetation mainly is cattails, marsh grasses, and willows. Areas of this soil are long or elliptical in shape and are generally 10 to 200 acres in size.

Typically, the surface layer is black silty clay loam about 30 inches thick. The subsoil is about 19 inches thick. The upper part of the subsoil is gray, mottled, firm silty clay loam; the middle part is mixed gray and strong brown, firm silty clay loam; and the lower part is gray, firm clay loam. The underlying material to a depth of about 60 inches is mixed gray and yellowish brown layers of loam, sandy loam, and silty clay loam that contain some gravel. In some places, the surface layer is silt loam or loam because of recent deposits washed from surrounding slopes. Also, the underlying material is extremely variable in texture and is gravel, silty clay, or rock at a depth of 40 inches or more in places.

Included with this soil in mapping are a few small areas of poorly drained Drummer or Will soils on the higher positions. The included soils make up 1 to 10 percent of the unit.

Most areas of this soil are not artificially drained because suitable outlets are difficult to locate. Water is ponded on the surface for extended periods during much of the year.

Water and air movement through this soil is moderate to moderately slow. Available water capacity is high. Reaction is slightly acid to mildly alkaline in the upper part of the subsoil and mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer varies, depending on past management, but is commonly neutral. Organic matter content is high. The surface layer is compact and rather difficult to work. Because the surface layer is fairly high in clay, it is sticky when wet and becomes hard and cloddy when dry.

Most areas of this soil are idle and in grasses, weeds, or scrub brush. Very few areas are used for urban development because of flooding and wetness. However, the trend in land use is toward urbanization. This soil is unsuited to crops, unless drained, and has very poor potential for most urban uses.

Providing protection from flooding and improving drainage so that tilled crops can be grown generally are not feasible. Drainage outlets are difficult to establish.

Many types of wetland wildlife, such as migratory waterfowl and furbearers, are attracted to areas of this soil. Water is generally available to provide suitable habitat, and many kinds of aquatic plants produce food and cover in abundance.

If this soil is used for urban development, it needs to be protected from flooding and drained. Dwellings need to be constructed on stable fill, and basements need to be constructed above the water table. Installing drainage systems and use of suitable fill material increase suitability for streets and roads. All sanitary facilities need to be connected to community sewers and treatment facilities. Sewage lagoons are limited by flooding. Protection from flooding increases the suitability for lagoons.

This soil is unsuited to most recreational uses. Even when drained, it remains wet for very long periods after rains or floods. Paths, trails, and roads are difficult to maintain. Trafficability is very poor, and sod is easily damaged.

This soil is in capability subclass Vw.

1330—Peotone silty clay loam, wet. This nearly level, very poorly drained soil is in depressions. It is frequently ponded for long periods during winter, spring, and part of summer. Vegetation is cattails, swamp grasses, and willows. Areas of this soil are commonly circular or elliptical in shape and 2 to 25 acres in size.

Typically, the surface layer is black silty clay loam about 25 inches thick. The subsoil is about 28 inches thick. The upper part of the subsoil is black, mottled, very firm heavy silty clay loam; the middle part is gray, mottled, firm silty clay loam; and the lower part is gray, mottled, friable silt loam with thin layers of friable silty clay loam. The underlying material to a depth of about 60 inches is gray, mottled layers of silty and loamy material. In some places, the surface is friable silt loam because of recent deposits washed from surrounding slopes. Also, in some areas the underlying material has more clay.

Included with this soil in mapping are a few small areas of unstable Muskego and Houghton soils and poorly drained Ashkum soils. The Muskego and Houghton soils are in the low positions, and the Ashkum soil is in positions similar to the Peotone soil. The included soils make up 2 to 10 percent of the unit.

Most areas of this soil are not artificially drained. Some areas are drained by tile and surface inlets or, to a lesser extent, by surface ditches. In places the drainage systems are blocked by construction. Drainage is difficult in many areas because of the lack of suitable outlets.

Water and air movement through this soil is moderately slow. Available water capacity is high. Reaction is neutral to moderately alkaine in the subsoil. Reaction in the surface layer varies, depending on past management but is commonly neutral. Organic matter content is high. The surface layer is commonly compact and rather difficult to work. Because the surface layer is high in clay, it is sticky when wet and becomes hard and cloddy when dry.

Most areas of this soil are idle and used as openland and habitat for wildlife. Some areas have been filled and are used for urban development. This soil is unsuited for crops, unless drained, and has very poor potential for most urban uses.

If this soil is artificially drained, corn and soybeans can be grown. A suitable drainage system is needed to remove excess water, but drainage outlets are difficult to establish in most places. For the most part, draining the soil for crops is not feasible.

This soil is sometimes used for permanent pasture.

Many types of wetland wildlife, such as migratory waterfowl and furbearers, are attracted to this soil. Water is frequently ponded, and many kinds of food and cover plants are produced in abundance. Food and cover plants for openland wildlife such as pheasant, rabbit, and meadowlark do poorly on this soil.

This soil is very poorly suited to most urban uses. It is subject to continuous or frequent water saturation and is ponded much of the year. It also lacks sufficient stability because of high frost heave and shrink-swell. Excavating the soil is difficult because of wetness and the relatively high clay content; also the risk of encountering organic material is very high.

Areas of this soil used for urban development must be drained, and drainage is difficult. Use for dwellings, septic tank absorption fields, and local streets and roads can be improved by backfilling with suitable material. Such fills need to be high enough so that dwellings with basements, septic tank seepage beds, and roadbeds can be constructed above the water table. Contamination of ground water and septic system failures are likely unless special precautions are taken. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities. Sewage lagoons are limited by ponding.

This soil is unsuited to most recreational uses. Even where drained, it remains wet for long periods after rains. Trafficability is very poor, and sod is easily damaged. Paths, trails, and roads are very difficult to maintain.

This soil is in capability subclass Vw.

1516—Faxon silty clay loam, wet. This level, poorly drained soil is on flood plains and benches along the Des Plaines River valley. It is moderately deep to bedrock. It is commonly flooded for a long period in spring. Areas of this soil are long and wide in shape and are commonly 30 to several hundred acres in size.

Typically, the surface layer is very dark gray and dark gray silty clay loam about 20 inches thick. The subsoil is about 10 inches thick. It is dark gray, mottled, friable silty clay loam. Light gray and pale brown limestone is at a depth of about 30 inches. In some places, limestone is more than 30 inches deep but is commonly 20 to 40 inches. Also some areas are underlain by cobblestone and flagstone.

Included with this soil in mapping are a few small areas of very shallow Romeo soils and deep Sawmill soils. These included soils make up 1 to 15 percent of the unit.

Most areas of this soil are not drained because suitable outlets are difficult to find and because of the underlying bedrock. The water table is continuously near the surface during wet seasons.

Water and air movement through this soil is moderate, and surface runoff is slow to ponded. Available water capacity is moderate. Reaction is neutral to moderately alkaline in the subsoil. Reaction in the surface layer is commonly mildly alkaline. Organic matter content is high. The surface layer is somewhat difficult to work and tends to become cloddy when dry if worked when too wet. Root development is restricted below a depth of about 30 inches by bedrock.

Most areas of this soil are openland in grasses, weeds, and brush. Some areas are in preserves and are a haven for wildlife. Very few areas are used for urban development because of frequent flooding and wetness. Most areas are not suited to crops and have very poor potential for most urban uses.

Protecting this soil from flooding and improving drainage adequately so that row crops can be grown generally are not feasible. Drainage outlets are very difficult to establish because the soil is low lying. Where drainage is established and protection from periodic flooding is provided, potential for row crops is good, particularly where bedrock is below a depth of 3 feet.

Many types of wetland wildlife, such as migratory waterfowl and furbearers, are attracted to areas of this soil. Water is generally available to provide suitable habitat, and many kinds of aquatic plants produce food and cover in adundance. Food and cover plants for openland wildlife such as pheasant, rabbit, and meadowlark do poorly on this soil.

This soil is unsuited to most urban uses. It commonly has a water table near the surface and is subject to flooding for long periods throughout the year. Flooding damages buildings and roads and fills excavations with water. Excavating this soil is limited by wetness and depth to bedrock. This soil also lacks sufficient stability because of high frost heave and moderate shrink-swell potential.

Areas of this soil used for urban development must be drained and protected from flooding. Basements must be constructed above the water table. Installing utility lines, sewers, and the like require cutting through bedrock in places. Installing drainage systems and providing suitable base material increase suitability for streets and roads. All sanitary facilities need to be connected to community sewers and treatment facilities. Sewage lagoons are limited by flooding.

This soil is unsuited to most recreational uses. Even when drained, it remains wet for very long periods after rains or floods. Paths, trails, and roads are difficult to maintain. Trafficability is very poor, and sod is easily damaged.

This soil is in capability subclass Vw.

1903—Muskego and Houghton mucks, wet. These nearly level, very poorly drained soils are in depressions on uplands and along streams. They formed in fibrous plant remains deposited in swampy areas. The vegetation is chiefly water plants such as cattails, reeds, and sedges (fig. 19). These soils are frequently flooded for long periods from fall to spring. Areas of this unit are commonly circular or elliptical in shape and 2 to 100 acres in size.

These soils are similar in behavior, and they are so intermingled that it was not practical to separate them on the soil map. Mapped areas can consist entirely of one soil, or of both soils. About 65 percent of this unit is Muskego muck and 35 percent is Houghton muck.

Typically, the Muskego soil has a surface layer of black muck about 27 inches thick. The underlying material is very dark grayish brown coprogenous earth.

Typically, the Houghton soil has a surface layer of black muck about 16 inches thick. The next layer is dark brown muck about 11 inches thick. Below this is black muck about 32 inches thick. The underlying material to a depth of 65 inches is gray loamy sand and sand.

Included with these soils in mapping are some small areas of Muskego and Peotone soils, ponded, Ashkum silty clay loam, and Dumps. The Muskego and Peotone soils, ponded, generally are in the center of depressions;

the Ashkum silty clay loam is a more stable mineral soil near the edges; and Dumps are fill material along the edges. The included soils make up 1 to 25 percent of the unit.

Most areas of these soils have not been drained, or systems have failed. They have a continuous or frequent water table near the surface. If these soils are drained, subsidence and lack of alignment in structures can cause systems to function poorly or fail. Because of the difficulty in locating suitable outlets, many areas are difficult to drain, even by ditching. Where drained, these soils are subject to subsidence and are very unstable. They are highly compressible when loaded.

Water and air movement through these soils is variable. It is moderate to rapid in the upper part of the profile and slow to rapid in the lower part. Available water capacity is very high. Reaction is commonly neutral in the upper part and mildly alkaline or neutral in the lower part. Organic matter makes up most of the soil. If drained and cultivated, the surface layer is friable and easy to work.

Most areas of these soils are idle and used as openland or as habitat for wetland wildlife. However, the trend in land use is toward urban development. Areas accumulate fill material around the edges and many areas are eventually built on. These soils have very poor potential for crops, unless drained, and have very poor potential for most urban uses, even if drained.

These soils must be drained, generally by open ditches, before they can be successfully used for crops. Drainage outlets are extremely difficult to establish in most places because these soils are low lying. Overdraining can result in wind erosion and fire. Where the soils are drained, corn, vegetables, and bluegrass sod can be grown.

Some areas of these soils can be used for pasture. Pasture can be improved by installing surface drains, applying fertilizer, and seeding to grasses that tolerate wetness.

Many kinds of wetland wildlife, such as migratory waterfowl and furbearers, are attracted to areas of these soils. Water is frequently ponded, and many kinds of food and cover plants are produced in abundance. Food and cover plants for openland wildlife such as pheasant, rabbit, and meadowlark do poorly on these soils.

These soils are unsuited to most urban uses. They are highly compressible when loaded, and foundations, walks, and roads are subject to subsidence and cracking. In addition, maintenance costs for roads, utility lines, and sewers are very high because of the continuous or frequent water saturation and because of the need to keep structures in alignment.

If these soils are used for urban development, the organic material must be removed and replaced with suitable mineral soil material. Backfilling is generally unsatisfactory, unless all the organic material is removed. In many places, the organic material is too deep to remove economically, and pilings are needed to penetrate the organic material to attain stability (*23*). Generally, areas need drainage and protection from flooding before construction. Pumps are needed to remove excess water. In some places during construction, equipment needs to be floated on planks to avoid bogging down; in addition, the sidewalls of excavations need to be supported to prevent cave-in. Foundations for buildings, basements, septic tank seepage beds, and roadbeds must be constructed in suitable stabilized fill to avoid failure. In addition, they need to be constructed above the periodic water table to prevent costly maintenance and to avoid ground water contamination.

Many areas of these soils are dug out for private lakes or flood-control reservoirs that are used for recreation, such as boating and fishing. These soils are very poorly suited for playgrounds, picnic and camp areas, and hiking. Even when drained, they remain wet for very long periods after rains. Trafficability is poor, and sod is easily damaged.

These soils are in capability subclass Vw.

2049—Urban land-Watseka complex. This map unit consists of Urban land and areas of nearly level, somewhat poorly drained Watseka soils on low beach ridges of the former lake plain. Areas of this map unit are about 30 to 500 acres in size.

This unit is 40 to 60 percent Urban land and 25 to 45 percent Watseka soils. The Urban land and Watseka soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of this unit is mostly buildings and pavements that obscure the soils so that identification is not feasible. The landscape has not been radically altered by cuts and fills.

Typically, the Watseka soil has a surface layer of black loamy fine sand about 11 inches thick. The subsoil is light olive brown, mottled, very friable loamy fine sand about 14 inches thick. The underlying material to a depth of about 60 inches, is mixed, light olive brown, grayish brown and gray, mottled, loose sand. In some areas the surface layer is thinner and lighter colored than typical and the subsurface layer is grayish brown. Also, in some areas a compact, clayey material is below a depth of about 30 inches.

Included with this unit in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, loamy and a few small areas of poorly drained Gilford soils and well drained Oakville soils. The Orthents, loamy are altered or disturbed loamy soil material; the Gilford soils are in depressions; and the Oakville soils are on higher sand ridges.

Most areas of this unit are artificially drained by sewer systems and drainage tile and by gutters and ditches along streets and roads. Undrained Watseka soils have a periodic water table at a depth of 1 to 3 feet.

Water and air movement through the soil is rapid, and available water capacity is low. Reaction is commonly neutral or slightly acid in the surface layer and strongly acid to slightly acid in the subsoil. Organic matter content is moderate. The sandy surface layer is very friable and easy to work. Shrink-swell is very low.

The Watseka soil is used for lawns, gardens, parks, building sites, recreation areas, and openland. It has fair potential for lawns, gardens, trees, and shrubs. It has fair to poor potential for urban uses and fair potential for recreation areas.

The Watseka soil is moderately suited to grasses, flowers, vegetables, trees, and shrubs. Excess drainage can lower the water table too much and cause additional stress for plants. Plants that are selected for planting need tolerance for periodic wetness and drought. Supplemental water can be provided by periodic sprinkling or watering.

Dwellings should be constructed without basements, and tile is needed to remove excess water. Special blindings and filters prevent seepage of sand into the tile lines. Sidewalls of excavations need to be supported to prevent cave-ins. Pumps can be used to remove excess water from excavations and prevent liquification of sand. Where possible, sanitary facilities need to be connected to community sewers and treatment facilities to avoid possible ground water contamination. If septic systems are used, they need to be constructed above the water table and in medium textured fill material. If properly drained, local streets and roads function properly.

In this unit the small included areas of Oakville soils are the best for recreational areas. This soil produces good turf, but vegetation can be damaged if foot traffic is heavy when the surface layer is wet. Play areas and walkways need special surfacing in places.

This map unit is not assigned to a capability subclass.

2107—Urban land-Sawmill complex. This map unit consists of Urban land and areas of nearly level, poorly drained Sawmill soils on flood plains. Areas of this unit are commonly 5 to about 65 acres in size.

This unit is 40 to 60 percent Urban land and 25 to 45 percent Sawmill soils. The Urban land and Sawmill soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of this unit is mostly buildings and pavements that obscure the soils so that identification is not feasible. Cuts and fills have not radically altered the landscape.

Typically, the Sawmill soil has a surface layer of silty clay loam about 30 inches thick. It is black in the upper part and very dark gray in the lower part. The subsoil is about 19 inches thick. The upper part of the subsoil is gray, mottled, firm silty clay loam; the middle part is mixed gray and strong brown, firm silty clay loam; and the lower part is gray clay loam that contains some gravel. The underlying material to a depth of about 60 inches is dark gray and yellowish brown layers of sandy loam and loam. In some areas the underlying material is gravel and sand, or it is silty clay loam.

Included with this unit in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, clayey and Dumps. The Orthents, clayey are mainly fills of mixed, clayey soil material. The Dumps are fills of mixed soil material and refuse.

Most areas of this unit are artificially drained by sewer systems and drainage tiles and by gutters and ditches along streets and roads. Undrained areas have a periodic water table near the surface. Sawmill soils are frequently flooded for brief periods during spring.

Permeability in the Sawmill soil is moderate to moderately slow, and available water capacity is high. Reaction is slightly acid to mildly alkaline in the upper part of the subsoil and mildly alkaline or moderately alkaline in the lower part. Reaction in the surface layer is commonly neutral. Organic matter content is high. The surface layer is rather compact and difficult to work. It is sticky when wet and becomes hard and cloddy when dry. Shrink-swell potential is moderate.

The Sawmill soil is used for lawns, gardens, building sites, parks, recreation areas, and openland. It has poor potential for lawns, gardens, trees, and shrubs unless drained. It has very poor potential for building and poor potential for recreation areas.

Several methods of artificial drainage can be used on this soil. The best method depends on conditions at the site. Plants that are selected for planting need a fairly high tolerance for wetness. Soil erosion generally is not a concern unless construction sites are left bare and exposed for a considerable time, or are used for drainageways.

This soil is unsuited to most urban uses because of frequent flooding (fig. 20) and a periodic high water table near the surface. Flooding damages buildings and roads, and excavations fill with water. This soil also has low strength and poor stability because of frost heave and shrink-swell.

If this soil is used for building, it must be drained and protected from flooding. Dwellings with basements should be constructed above the water table. Use of fill material and covering with suitable base material increase suitability for streets and roads. To function properly, septic tank absorption fields need a seepage bed constructed in loamy mounded fill above floodwater level and the water table. Where possible, all sanitary facilities need to be connected to community sewers and treatment facilities.

This soil is poorly suited to most recreational uses. It remains wet for long periods after rains or floods, even where drained. This soil can generally produce good turf, but the sod is easily damaged when wet if foot traffic is heavy. Where plant cover is sparse or is not adequate, the soil becomes muddy and very slippery when wet. Surfacing of play areas and walkways is needed in many areas. Playgrounds and athletic fields need to be covered with suitable base material.

This map unit is not assigned to a capability subclass.

2194B—Urban land-Morley complex, 2 to 7 percent slopes. This map unit consists of Urban land and areas of well drained Morley soils. It is on undulating to gently rolling till plains or moraines. Areas of this unit commonly are 25 to 300 acres in size.

This unit is 40 to 60 percent Urban land and 25 to 45 percent Morley soils. The Urban land and Morley soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of this unit is mostly covered with buildings and pavements. The structures so obscure or alter the soils that their identification is not feasible. However, cuts and fills have not radically altered the landscape.

Typically, the surface layer in the Morley soil is very dark gray silt loam about 2 inches thick. The subsurface layer is dark brown to brown silt loam about 5 inches thick. The subsoil is about 27 inches thick. The upper part of the subsoil is dark brown, firm silty clay loam; the middle part is dark yellowish brown, very firm silty clay; and the lower part is yellowish brown, mottled, firm silty clay loam. The underlying material to a depth of about 60 inches is yellowish brown, mottled, calcareous silty clay loam. The subsoil and underlying material contain a few small pebbles and stone. In some places the surface layer and upper part of the subsoil have more sand than typical. Also, in some areas the underlying material is silty clay or is smooth silty clay loam with a few thin bands of silt loam and sandy loam.

Included with this unit in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, clayey, somewhat poorly drained Blount soils, and poorly drained Ashkum soils. The Orthents, clayey are soils that are mixed or altered by grading or by cutting and filling and that contain clayey material; the Blount soils are on broad ridges or in shallow depressions; and the Ashkum soils are in low concave positions.

Some areas of this unit are drained by small drainageways or by gutters and ditches along the streets. The Morley soils have a perched water table above the slowly permeable material for brief periods during spring.

Permeability is moderately slow to slow in the Morley soil. Available water capacity is moderate. Organic matter content is moderately low. Reaction in the surface layer is commonly slightly acid, and in the subsoil it is strongly acid to medium acid in the upper part and moderately alkaline in the lower part. Root development is hindered below a depth of about 34 inches by the moderately fine textured glacial till. Shrink-swell is moderate.

The Morley soil is used for lawns, gardens, parks, building sites, recreation areas, and openland. It has good potential for lawns, gardens, trees, and shrubs. It has fair potential for most urban uses and for recreation areas.

The Morley soil is suited to grasses, flowers, vegetables, trees, and shrubs. However, planting is sometimes delayed because the clayey subsoil is slow to dry out. When planting trees and shrubs, special precautions need to be taken to increase water uptake and prevent waterlogging of roots.

The Morley soil does not absorb a high amount of water, so plants need supplemental water in the summer. The best method for sprinkling or watering depends on the type of plant and the area. Soil erosion and sedimentation are concerns in construction, especially where the soil is left bare and exposed for a considerable time.

The Morley soil can be used for most building and recreation purposes. Excavating this soil is somewhat difficult because of the relatively high clay content and density of the underlying material. Only slight grading is needed for lots and for local streets and roads. The surface layer and subsoil need to be replaced with suitable base material if foundations, walks, and local streets and roads are to function properly. Septic systems generally function poorly in the Morley soil. All sanitary facilities need to be connected to community sewer and treatment facilities. Septic systems can be improved by enlarging the seepage field and diverting water from the field.

Some leveling is needed in places for construction of playgrounds, athletic fields, and other intensive play areas. The moderately slow to slow permeability somewhat limits use. The clayey subsoil is slow to dry out. Areas that have no plant cover are muddy and slippery when wet, and are readily compacted. They are dusty when dry.

This map unit is not assigned to a capability subclass.

2194D—Urban land-Morley complex, 7 to 15 percent slopes. This map unit consists of urban land and areas of well drained Morley soils. It is on strongly sloping to moderately steep sides of morainic ridges or on breaks along drainageways. Areas of this unit commonly are 20 to 350 acres in size.

This unit is 40 to 60 percent Urban land and 25 to 45 percent Morley soils. The Urban land and Morley soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of this unit is mostly covered with buildings and pavements. The structures so obscure or alter the soils that their identification is not feasible. However, cut and fills have not radically altered the landscape.

Typically, the surface layer in the Morley soil is very dark gray silt loam about 2 inches thick. The subsurface layer is brown silt loam about 5 inches thick. The subsoil is about 20 inches thick. The upper part of the subsoil is dark brown, very firm silty clay, and the lower part is mixed brown and yellowish brown, firm, calcareous silty clay loam. The underlying material to a depth of about 60 inches is brown, mottled, calcareous silty clay loam. The subsoil and underlying material contain some pebbles and a few small stones. In some places the surface layer and subsoil have more sand than typical. In some areas the underlying material has more clay, or it is smooth silty clay loam with a few thin bands of silt loam and sandy loam.

Included with this unit in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, clayey and poorly drained Ashkum soils. The Orthents, clayey are mixed or altered by grading, or by cutting and filling, and contain some clayey material. The Ashkum soils are in low, concave positions.

Some areas of this unit are drained by small drainageways or by gutters and ditches along the streets. The Morley soils have a perched water table above the slowly permeable material for brief periods during spring.

Permeability is moderately slow to slow in the Morley soil. Available water capacity is moderate. Organic matter content is moderately low. Reaction in the surface layer is commonly slightly acid, and in the subsoil it is strongly acid or medium acid in the upper part and moderately alkaline in the lower part. Root development is hindered below a depth of about 27 inches by the moderately fine textured glacial till. Shrink-swell is moderate.

The Morley soil is used for lawns, gardens, parks, building sites, recreation areas, and openland. It has fair potential for lawns, gardens, trees, and shrubs. It has fair potential for most urban uses and poor potential for recreation.

The Morley soil is suited to grasses, flowers, vegetables, trees, and shrubs. However, planting is delayed in some seasons because the clayey subsoil is slow to dry out.

The Morley soil can be used for most building and recreation purposes. Excavating this soil is somewhat difficult because of the relatively high clay content and density of the underlying material. Moderate grading is needed for lots and for local streets and roads (fig. 21). The surface layer and subsoil need to be replaced with a suitable base material if foundations, walks, and local streets and roads are to function properly. Erosion can be reduced on construction sites by maintaining plant cover. Debris basins help to reduce sedimentation. Septic systems generally function poorly in the Morley soil. In some moderately steep areas, the effluent can flow downslope and break out at the surface. All sanitary facilities need to be connected to community sewer and treatment facilities. Septic systems generally can be improved by enlarging the seepage field and diverting water from the field.

Extensive leveling is commonly needed on this unit for playgrounds, athletic fields, and other intensive play areas. Leveling generally exposes the underlying material and makes maintenance of plant cover difficult. The moderately slow to slow permeability somewhat limits use. The compacted soil is slow to dry out. Areas that have no plant cover are muddy and slippery when wet.

This map unit is not assigned to a capability subclass.

2290B—Urban land-Warsaw complex, 1 to 7 percent slopes. This map unit consists of Urban land and areas of well drained Warsaw soils. It is on undulating to gently rolling outwash plains or on benches along streams. Areas generally are 20 to 350 acres in size.

This unit is 40 to 60 percent Urban land and 25 to 45 percent Warsaw soils. The Urban land and Warsaw soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of this unit is mostly covered with buildings and pavements. The structures so obscure or alter the soils that their identification is not feasible. Cuts and fills have not radically altered the landscape.

Typically, the surface layer in the Warsaw soil is silt loam about 14 inches thick. It is black in the upper part and dark brown in the lower part. The subsoil is about 17 inches thick. The upper part of the subsoil is dark yellowish brown, firm silty clay loam, and the lower part is dark brown, firm gravelly clay loam. The underlying material to a depth of approximately 60 inches is mixed yellowish brown and dark yellowish brown calcareous gravel and sand. In some areas the surface layer is thinner and lighter colored than typical. In some places loose gravel and sand are more than 40 inches deep.

Included with this unit in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, loamy and somewhat poorly drained Kane soils. The Orthents, loamy are soils that are mixed by grading or by cutting and filling and that are mainly loamy or silty material. The Kane soils are in depressions.

Some areas of this unit receive run-on water from adjacent higher soils.

Permeability is moderate in the upper part of the Warsaw soils and very rapid in the underlying material. Available water capacity and organic matter content are moderate. Reaction in the surface layer is neutral or slightly acid and is medium acid to neutral in the subsoil. Root development is restricted below a depth of about 30 inches by the calcareous gravel and sand.

The Warsaw soil is used for lawns, gardens, parks, building sites, recreation areas, and openland. It has good potential for lawns, gardens, trees, and shrubs. It has fair potential for most urban uses and good potential for recreation.

The Warsaw soil is suited to grasses, flowers, vegetables, trees, and shrubs. Lack of available water during prolonged dry periods is a concern of many homeowners. Therefore, varieties selected for planting need tolerance for periodic drought. Supplemental water is needed periodically in summer to keep plants in good condition. The best method of sprinkling or watering depends on the plant and the area. Soil erosion and siltation are concerns in construction when the soil is disturbed and left bare or exposed for considerable time.

The Warsaw soil has few limitations for most building and recreational uses. Excavating the soil is somewhat difficult because of caving of the sidewalls and presence of gravel in the underlying material. Only slight grading is needed for lots and for local streets and roads. Septic tank absorption fields generally function well on the Warsaw soil. However, ground water contamination is possible because of the rapidly permeable underlying material. Where possible, all sanitary facilities need to be connected to community sewers and treatment facilities. The upper part of the Warsaw soil needs replacing with suitable base material to prevent frost action on sidewalks and pavements.

This unit is suited to a wide range of recreational activities. Some leveling is needed in places for playgrounds, athletic fields, and other intensive play areas. The Warsaw soil is suited to many kinds of plants and can support a firm turf that withstands heavy foot traffic.

This unit is not assigned to a capability subclass.

2741B—Urban land-Oakville complex, 2 to 7 percent slopes. This map unit consists of Urban land and areas of well drained Oakville soils. It is in the southeastern part of Cook County on undulating to gently rolling beach ridges. Areas of this unit are about 20 to 400 acres in size.

This unit is 40 to 60 percent Urban land and 25 to 45 percent Oakville soils. The Urban land and Oakville soils are so intricately mixed or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of the unit is mostly covered by buildings and pavements that so obscure or alter the underlying soils that their identification is not feasible. Cuts and fills have not radically altered the landscape.

Typically, the surface layer in the Oakville soil is fine sand about 6 inches thick. It is black in the upper part and very dark grayish brown in the lower part. The subsurface layer is mixed yellowish brown and brown fine sand about 7 inches thick. The subsoil is about 36 inches thick. The upper part of the subsoil is yellowish brown fine sand, and the lower part is brownish yellow medium sand. The underlying material to a depth of about 60 inches is mixed yellowish brown and light yellowish brown medium and fine sand. In some places the surface layer is thicker and darker colored than typical. In some areas the subsoil and underlying material contain bands of sandy loam and silt loam or have a high content of gravel.

Included with this unit in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, loamy and poorly drained Gilford soils. The Orthents, loamy are in areas of altered or disturbed soil material, and the Gilford soils are in depressions.

Permeability is very rapid in the Oakville soil, and available water capacity is low. Reaction is neutral or slightly acid in the surface layer and strongly acid to slightly acid in the subsoil. Organic matter content is low or moderately low. The sandy surface layer is very friable and easy to work. The shrink-swell is low.

The Oakville soil is used for lawns, gardens, parks, building sites, recreation areas, and openland. It has poor potential for lawns, gardens, trees, and shrubs. It has good potential for some urban uses and poor potential for most recreational uses.

Because available water capacity is low, the Oakville soil is poorly suited to grasses, flowers, vegetables, trees, and shrubs. Selected species for planting need tolerance for drought. Supplemental water is needed periodically in summer to keep plants in good condition. The best method of sprinkling or watering depends on the kind of plant and the area. Soil blowing is a concern if the plant cover is disturbed and the soil is left bare or exposed.

The Oakville soil has few limitations for building sites. Excavating the soil is difficult because of caving of the loose sand in sidewalls. Slight grading is needed for lots and for local streets and roads. Septic tank absorption fields generally function well on the Oakville soil. However, pollution of ground water is possible because of the rapidly permeable underlying material. Where possible, all sanitary facilities need to be connected to community sewers and treatment facilities. The Oakville soil is at a higher elevation and is drier than most of the adjacent soils. Consequently, it is suitable for streets and roads.

The Oakville soil is poorly suited to most recreational uses. It is too sandy to maintain a good turf. The soil becomes loose and soft when plant cover is removed. Some leveling is generally needed for playgrounds, athletic fields, and other intensive play areas.

This map unit is not assigned to a capability subclass.

2927—Urban land-Hoopeston-Selma complex. This map unit consists of Urban land and areas of nearly level Hoopeston and Selma soils. Most areas of this unit are on lake plains. Areas of this unit commonly are blocky in shape and 40 to 500 acres in size.

This unit is 30 to 50 percent Urban land, 20 to 30 percent somewhat poorly drained Hoopeston soils, and 15 to 25 percent poorly drained Selma soils. The Urban land and Hoopeston and Selma soils are so intricately mixed, or areas are so small in size that they are not shown separately on the soil map.

The Urban land part of the unit is covered by houses, light commercial and industrial developments, and pavements. The structures obscure or alter the underlying soils so that their identification is not feasible. Cuts and fills have not radically altered the landscape.

Typically, the surface layer in the Hoopeston soil is fine sandy loam about 17 inches thick. It is black in the upper part and very dark grayish brown in the lower part.

The subsoil is about 22 inches thick. The upper part of the subsoil is dark yellowish brown, friable fine sandy loam; the middle part is olive brown, mottled, friable sandy loam; and the lower part is brown, mottled, friable bands of very fine sandy loam and loam. The underlying material to a depth of about 60 inches is grayish brown, mottled, calcareous bands of fine sand and silt loam.

Typically, the Selma soil has a surface layer that is black loam in the upper 9 inches and black clay loam in the lower 5 inches. The subsoil is about 36 inches thick. The upper part of the subsoil is olive and olive gray, mottled, friable clay loam, and the lower part is gray, mottled, friable bands of clay loam and silty clay loam. The underlying material to a depth of about 60 inches is gray and light gray, mottled, calcareous bands of silt loam and sand with a few thin bands of silty clay loam.

Included in mapping and making up 10 to 20 percent of the unit are small areas of Orthents, loamy and well drained Oakville soils. The Orthents, loamy are medium textured and are altered by construction. The Oakville soils are on sandy beach ridges.

Most areas of this unit are artificially drained by sewer systems, gutters, and drainage tile and, to a lesser extent, by ditches along streets and roads. In undrained Hoopeston soils a periodic water table is at a depth of 1 to 3 feet. In undrained Selma soils a periodic water table is at a depth of 1 foot or less. The Selma soils are occasionally flooded for brief periods during spring.

Permeability is moderately rapid in the upper part of the Hoopeston soils and rapid in the lower part. It is moderate in the Selma soil. In both soils organic matter is high. Reaction is neutral or slightly acid in the surface layer and slightly acid to mildly alkaline in the subsoil. Shrink-swell potential is low in the Hoopeston soil and moderate in the Selma soils.

The Hoopeston and Selma soils are used for lawns, gardens, building sites, parks, recreation areas, and openland. They have fair to poor potential for lawns and gardens and poor potential for most urban uses and for recreation areas.

Grasses, flowers, and vegetables generally do well on these soils. Supplemental water is commonly needed on the drier Hoopeston soil. Selected species for planting need tolerance for periodic wetness and drought on the Hoopeston soil and for periodic brief flooding on the low lying Selma soil.

These soils have severe limitations for many building and recreational uses. Low areas need artificial drainage and protection from flooding. Excavating the soils is somewhat difficult because sidewalls cave in and excavations fill with water.

Dwellings and small buildings should be built without basements. The surface layer and subsoil of the low lying Selma soil should be replaced or overlain by suitable base material for foundations and local streets and roads. All sanitary facilities need to be connected to community sewers and treatment facilities. Seepage beds for septic tank systems need to be constructed above the water table.

These soils can produce good turf. However, vegetation can be damaged when the surface layer is wet. Where traffic is heavy, play areas and walkways require special surfacing in places. Low lying areas commonly become muddy and slippery when wet. The somewhat poorly drained Hoopeston soil and the better drained, included Oakville soils are better suited to recreation than other soils in this unit.

This map unit is not assigned to a capability subclass.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment (*21*). Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil (*13*). Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey (*16*). The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Only about 100,463 acres in the survey areas was used for crops and forages in 1974. (*22*). Of this total acreage, 54,289 acres is in Cook County and 46,174 acres is in Du Page County. Of this total, 6,696 acres was used for permanent pasture; 69,779 acres for row crops, mainly corn and soybeans; 8,085 acres for close-grown crops, mainly wheat and oats; 6,386 acres for hay; and the rest was fruit and vegetable crops or other crops or was idle.

The potential of the soils in the survey area for increased production of food is fair. About 5,603 acres in farms was woodland. In addition to the reserve productive capacity represented by this land, food production could also be increased considerably by extending the latest crop production technology to all remaining cropland in the county. This soil survey can greatly facilitate the application of such technology. It can also be used to locate prime farmland.

Acreage in crops and forages has gradually been decreasing as more and more land is used for urban development. Estimates in 1975 were that about 300,000 acres in the survey area were urban and built-up land. Urban land is increasing about 12,000 to 15,000 acres per year. Estimates are that for all practical purposes, farmland will be gone by the year 2000 (*8*).

Soil erosion is the major concern on about two-thirds of the cropland and pasture in the survey area. If the slope is more than 1 percent, erosion is a hazard. Barrington, Grays, Saybrook, Symerton, and Zurich soils, for example, have slopes of 2 to 5 percent.

Loss of the surface layer through erosion is 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 that have a clayey subsoil, such as the Chatsworth, Frankfort, and Nappanee soils. Erosion also reduces productivity on soils that tend to be droughty, such as Rodman gravelly loam and Lorenzo loam. Second, soil erosion on farmland results in sediment entering streams. Control of erosion minimizes the pollution of streams by sediment and improves quality of water for municipal use, for recreation, and for fish and wildlife.

In many sloping fields, preparing a good seedbed and tilling are difficult on clayey spots because the original friable surface soil has been eroded away. Such spots are common in areas of severely eroded Chatsworth and Frankfort soils.

Conservation practices provide protective surface cover, reduce runoff, and increase infiltration. Following are some erosion control practices suitable for the survey area.

A cropping system that keeps plant cover on the soil for extended periods can hold soil erosion losses to an amount that will not reduce the productive capacity of the soil. On livestock farms, which require pasture and hay, legume and grass forage crops in the cropping system reduce erosion on sloping land and also provide nitrogen and improve tilth for the following crop.

Terraces, contour farming, conservation tillage, and crop residue management are effective in controlling erosion on most soils in the survey area. The combination of practices to adequately control erosion depends on the soil characteristics and topography.

Wind erosion is a hazard on the sandy Oakville and Watseka soils and on the muck soils—Muskego and Houghton soils. Maintaining plant cover, surface mulch, and rough surfaces through proper tillage minimizes wind erosion on these soils. Windbreaks of adapted plants are effective in reducing wind erosion on muck soils.

Information for the design of erosion control practices for each kind of soil is contained in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil drainage is the major management need on about one-third of the acreage used for crops and forages in the survey area. Some soils are naturally so wet that the production of crops is generally not possible without artificial drainage. These are the poorly drained and very poorly drained Ashkum, Bryce, Drummer, Gilford, Harpster, Milford, Peotone, Selma, Thorp, and Will soils. Also in this category are the organic soils—Muskego and Houghton soils.

Unless artificially drained, the somewhat poorly drained soils are so wet that crops are damaged during some years. In this category are the Beecher, Blount, Del Rey, Elliott, Frankfort, Hoopeston, Kane, Lisbon, Martinton, Mokena, Mundelein, Nappanee, Swygert, Watseka, Wauconda, and Wesley soils.

Markham, Morley, and Varna soils have good natural drainage most of the year, but they tend to dry out somewhat slowly after rains. Small areas of wetter soils along drainageways and in swales are commonly included in areas of the well drained and moderately well drained areas of Barrington, Saybrook, Symerton, and Zurich soils, especially those that have slopes of 2 to 5 percent. Artificial drainage is needed in some of these wetter areas.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained and very poorly drained soils used for intensive row cropping. Drains have to be more closely spaced in soils that have slow permeability than in the more permeable soils. Tile drainage is very slow in Frankfort, Nappanee, and Swygert soils. Finding adequate outlets for tile drainage systems is difficult in many areas of Bryce, Faxon, Peotone, and Sawmill soils.

Organic soils oxidize and subside when the pore space is filled with air; therefore, special drainage systems are needed to control the depth and the period of drainage. Keeping the water table at the level required by crops during the growing season and raising it to the surface during other parts of the year minimize the oxidation and subsidence of organic soils. Information on drainage design for the Muskego and Houghton soils is contained in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil fertility varies in the soils of the uplands in the survey area. The light colored soils such as Kidder, Miami, and Morely soils are more acid and less fertile than the productive dark colored soils such as Andres, Lisbon, and Mundelein soils. The soils on flood plains, such as Sawmill, are neutral to mildly alkaline and are naturally higher in plant nutrients than most upland soils. Ashkum, Bryce, and Drummer soils, in low swales and drainageways, are generally neutral and are very high in plant nutrients.

The organic Muskego and Houghton soils are generally neutral. These soils commonly require special fertilizers because they are low in boron and other trace elements.

Some soils on uplands are naturally strongly acid and require applications of ground limestone to raise the pH sufficiently for good growth of alfalfa and other crops that grow only on near neutral soils. Natural available phosphorus and potash are low in most of these soils. On all soils additions of lime and fertilizer need to be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Soil tilth is important in the germination of seeds and in the infiltration of water. Soils that have tilth are granular and porous.

A few soils that are used for crops in the survey area have a silt loam surface layer that is light in color and low in content of organic matter. Structure is generally weak, and intense rainfall causes the formation of crust on the surface. The crust is hard when dry and is nearly impervious to water. It reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material help improve soil structure and reduce crust formation.

In the survey area, fall plowing is generally not good on light colored soils that have a silt loam surface layer. This is because of the surface crust that forms during winter and spring. Many fall plowed soils are nearly as dense and hard at spring planting as they were before they were plowed. Also, about two-thirds of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall.

The dark colored Ashkum, Bryce, and Milford soils are clayey, and tilth is a concern because the soils commonly stay wet until late in spring. If they are wet when plowed, they tend to be very cloddy when dry and to be difficult to prepare into good seedbeds.

Field crops suited to the soils and climate of the survey area include many that are not commonly grown. Corn and, to an increasing extent, soybeans are the row crops. Wheat and oats are the common close-growing crops.

Special crops grown commercially in the survey area are vegetables and nursery plants. Sweet corn, tomatoes, radishes, onions and cabbage are grown in the large lake plain between South Holland and Sauk Village. Numerous other small vegetable farms throughout the survey area grow sweet corn, tomatoes, peppers, and other vegetables and small fruits.

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

Latest information for special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from the Illinois Agricultural Experiment Stations were also used (*24*).

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

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

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment (*19*). The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. The class and subclass are defined in the following paragraphs. A survey area may not have soils of all classes.

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 landforms have limitations that nearly preclude their use for commercial crop production.

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

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

The capability subclass is identified in the description of each soil mapping unit in the section "Soil maps for detailed planning."

Wooded area management

Dr. George H. Ware, ecologist and dendrologist, the Morton Arboretum, and Elmer Werhane, district forester, Illinois Department of Conservation helped prepare this section.

In 1967, approximately 39,000 acres of forest were in the survey area (*25*). In contrast to other parts of the State, the acreage in woodland in the survey area is increasing somewhat. This is because of very active acquisition and reforestation of new lands.

Orginally, only a small acreage of the survey area was covered with hardwood of good quality. The native vegetation was primarily prairie with scattered groves of trees. Some groves, such as Downers Grove, were quite extensive. The hardwoods were mainly along streams, on slopes along tributaries, or on higher, well drained knobs.

The largest wooded areas in the survey area are on the Blount and Morley soils. Trees in these areas are bur oak, northern red oak, black oak, white oak, Hills oak, sugar maple, white ash, American basswood, and red elm.

Windbreaks and environmental plantings

Windbreaks are established to protect livestock, buildings, and yards from wind and snow. Windbreaks also help protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broad-leaved and coniferous species 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 depending on erodibility of the soil. They protect cropland and crops from wind, hold 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. A healthy planting stock of suitable species planted properly on a well prepared site and maintained in good condition can insure a high degree of plant survival.

Table 6 shows the height that locally grown trees and shrubs are expected to reach on various kinds of soil in 20 years. The estimates in table 6, based on measurements and observation of established plantings that have been given adequate care, can be used as a guide in planning windbreaks and screens. Additional information about planning windbreaks and screens and the planting and care of trees can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from nurserymen.

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers (*16*).

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines (*3*), and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 7 shows, for each kind of soil, the degree and kind of limitations for building site development; table 8, for sanitary facilities; and table 10, for water management. Table 9 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

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

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping are indicated in table 7. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 7 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 7 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Lawns and landscaping require soils that are suitable for the establishment and maintenance of turf for lawns and ornamental trees and shrubs for landscaping. The best soils are firm after rains, are not dusty when dry, and absorb water readily and hold sufficient moisture for plant growth. The surface layer should be free of stones. If shaping is required, the soils should be thick enough over bedrock or hardpan to allow for necessary grading. In rating the soils, the availability of water for sprinkling is assumed.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, and sewage lagoons. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 8 shows the degree and kind of limitations of each soil for such uses. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 9 by ratings of good, fair, or poor. The texture, thickness, and organic matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 13 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 9 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 13.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 10 soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

Only about 5 percent of the survey area is used for recreation. The rapidly increasing metropolitan population has placed a severe burden on the existing recreation facilities. The competition for land for homes, for commercial and industrial development, for highways, and a multitude of other uses commonly leaves only the less desirable tracts for recreational use. The wide range of activity and the seasonal nature of recreation, however, makes possible the use of many of these areas for what is becoming an important part of American life.

In Cook and Du Page Counties the Lake Michigan shoreline is the greatest natural recreation area. Lake beaches and adjacent parks are well suited to high density outdoor recreation. Other facilities include golf courses, playgrounds, athletic fields, swimming pools, and camping and picnicking areas. Because a large acreage is already used for recreational facilities and because more facilities are needed understanding soil properties and limitations is important. This soil survey can be used in comprehensive regional planning and in individual site selection.

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 8, and interpretations for dwellings without basements and for local roads and streets, given in table 7.

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

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

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

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

Wildlife habitat

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

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

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are orchardgrass, bluegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and ragweed.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, ash, cherry, black walnut, apple, hawthorn, dogwood, hickory, blackberry, and sumac. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and honeysuckle.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, white cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, or foliage used by wildlife or that provide cover and shade for some species of wildlife. Major soil properties that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and moisture. Examples of shrubs are viburnum, sumac, elderberry, and hazel.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, pondweed, cattail, cordgrass and rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include warblers, ruffed grouse, woodcock, thrushes, woodpeckers, deermice, squirrels, gray fox, raccoon, white-tailed deer, and chipmunks.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, and beaver.

Wildlife areas

In this section four wildlife areas in the survey area are briefly described, broad land-use planning map units in the wildlife areas are given, and plants and animals common to the areas are mentioned.

Wildlife Area 1 is on the Urban land-Frankfort-Bryce, Urban land-Markham-Ashkum, Urban land-Milford, Urban land-Drummer-Barrington, and Urban land-Selma-Oakville map units. The soils are level to gently rolling and well drained to poorly drained.

Although this area is dominated by urban development, open space made up of idle land, forest preserve, and some cropland is present. Wildlife in this area is predominantly species that have become adapted to urban conditions. Residential areas have such species as fox squirrel, gray squirrel, rabbit, robin, cardinal, song sparrow, mourning dove, and blue jay. Pigeons, starlings, English sparrows, and Norway rats are more commonly found in commercial and industrial districts. Open areas support ring-necked pheasant, bobwhite quail, squirrels, many nongame species and, in the few remaining wetlands, waterfowl and shorebirds.

Wildlife Area 2 is on the Fox-Wauconda-Sawmill and Faxon-Kankakee-Rockton map units. The soils are level to gently sloping and well drained to poorly drained. They are on bottom lands and terraces along major streams. The bottom land soils are subject to flooding.

Because of flooding, ponding, and poor drainage this area has poor potential for urban development or cropland and, consequently, is used largely for open space and forest preserve. The cropland, idle land with grasses and shrubs, wooded areas, and wetlands provide excellent habitat for a variety of such wildlife as white-tailed deer, squirrels, waterfowl, furbearers, bobwhite quail, ring-necked pheasant, nongame birds and mammals, reptiles, and amphibians.

Wildlife Area 3 is on the Frankfort-Bryce, Morley-Ashkum, Markham-Ashkum, Milford-Martinton, Kidder-Miami, Drummer-Lisbon-Saybrook, Drummer-Mundelein-Barrington, Warsaw-Fox-Will, Watseka-Oakville, and

Selma-Hoopeston-Wesley map units. The soils are level to steep and well drained to poorly drained. They are on uplands.

This area has a large amount of open space made up of cropland, woodland, residential estates, forest preserves, idle land, and some wetland. This area is good wildlife habitat and has species composition similar to that of wildlife area 2. The wetland and woodland are especially valuable as habitat.

Wildlife Area 4 is on the following soils: Muskego and Houghton mucks; Muskego and Peotone, ponded; Sawmill, wet; Peotone, wet; Faxon, wet; Muskego and Houghton mucks, wet. These soils are commonly wet or ponded and support wetland vegetation such as cattail, sedge, bulrush, arrowhead, and pondweed or woody shrubs such as dogwood, winterberry, bunchberry, and willow.

This area is highly productive and supports many waterfowl, shore birds, wading birds, song birds, reptiles, amphibians, and fur bearers. It also furnishes protective cover for upland species such as pheasant and white-tailed deer. Some rare or unusual animals that depend on the wetland habitat are the yellow-headed blackbird, blue-spotted salamander, black-crowned night heron, American bittern, and black tern.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features and engineering test data.

Engineering properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 13 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 13 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 soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material (*9*). Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 16. The estimated classification, without group index numbers, is given in table 13. Also in table 13 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Ranges in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 14 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 15 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation (*18*). Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snowmelts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Engineering test data

The results of analyses of engineering properties of several typical soils of the survey area are given in table 16.

The data presented are for soil samples that were collected from carefully selected sites. The soil profiles sampled are typical of the series discussed in the section "Soil series and morphology." The soil samples were analyzed by the Illinois State Department of Transportation.

The methods used in obtaining the data are listed by code in the next paragraph. Most of the codes, in parentheses, refer to the methods assigned by the American Association of State Highway and Transportation Officials (*1*). The codes for Unified classification, are those assigned by the American Society for Testing and Materials (*2*).

The methods and codes are AASHTO classification (M-145-66); Unified classification (D-2487-69); mechanical analysis (T88-57); liquid limit (T89-60); plasticity index (T90-56); and moisture-density, method A (T99-57).

Soil series and morphology

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

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*17*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Andres series

The Andres series consists of deep, somewhat poorly drained, moderately slowly permeable soils on till plains or lake plains. These soils formed in loamy outwash and the underlying silty clay loam till or lakebed sediment. Slope ranges from 0 to 3 percent.

Andres soils are similar to Elliott, Martinton, and Mokena soils and are commonly adjacent to Symerton soils in the landscape. Elliott and Martinton soils have a fine textured B2t horizon. Mokena soils contain more clay in the lower part of the B horizon and in the C horizon. Symerton soils are better drained and have steeper slopes.

Typical pedon of Andres silt loam, in a cultivated field about 4 miles southwest of the village of Barrington, in Cook County, 1,440 feet east and 40 feet south of the northwest corner sec. 20, T. 42 N., R. 9 E:

Ap—0 to 9 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; weak very fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—9 to 15 inches; very dark brown (10YR 2/2) light silty clay loam; moderate coarse granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

B1t—15 to 18 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; many very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

B21t—18 to 23 inches; mixed brown (10YR 4/3) and dark yellowish brown (10YR 4/4) silty clay loam; few fine faint dark grayish brown (10YR 4/2) and few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; firm; a slight amount of fine sand; common fine roots; many very dark grayish brown (10YR 3/2) organic coats on faces of peds; few very fine dark iron and manganese concretions; slightly acid; gradual smooth boundary.

IIB22t—23 to 27 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silty clay loam; few fine faint dark grayish brown (10YR 4/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; a high content of fine to coarse sand; common fine roots; many very dark grayish brown (10YR 3/2) and dark grayish (10YR 4/2) clay films on faces of peds; few very fine dark iron and manganese concretions; mildly alkaline; gradual smooth boundary.

IIB31—27 to 31 inches; mixed dark brown (10YR 3/3), 80 percent, and black (10YR 2/1), 20 percent, light clay loam; common fine distinct yellowish brown (10YR 5/6) and grayish brown (10YR 4/2) mottles; weak medium and coarse subangular blocky structure; friable; common fine roots; common very dark grayish brown (10YR 3/2) clay films on faces of peds; common coarse sand and very fine pebbles; mildly alkaline; abrupt smooth boundary.

IIIB32—31 to 38 inches; pale olive (5Y 6/3) silty clay loam; many medium and coarse distinct gray (5Y 6/1) and yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; very firm; few fine roots; discontinuous gray (5Y 6/1) and greenish gray (5GY 6/1) coatings on faces of peds; slight effervescence; moderately alkaline; gradual wavy boundary.

IIIC—38 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium and coarse distinct gray (5Y 6/1) and yellowish brown (10YR 5/6) mottles; massive; very firm; few fine roots to 43 inches; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 47 inches. Depth to free carbonates ranges from 30 to 41 inches and commonly is less than the thickness of the solum. Thickness of the overlying loamy outwash ranges from 31 to 47 inches. The mollic epipedon ranges from 13 to 20 inches in thickness. Mottles with chromas of 2 or less are at a depth of 13 to 23 inches.

The A horizon has value of 2 or 3. It commonly has a value of 2 in the upper part and 3 in the lower part. It commonly is silt loam in the upper part and light silty clay loam in the lower part but ranges to loam. The B2 horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4. It is clay loam or silty clay loam that contains a high amount of sand. It averages 30 to 35 percent clay in the upper 20 inches of the horizon. The C horizon is silty clay loam till or lakebed sediment, and the lakebed sediment commonly contains thin layers of silt loam and silty clay.

Ashkum series

The Ashkum series consists of deep, poorly drained, moderately slowly permeable soils in low lying areas on till plains or moraines. These soils formed in a thin layer of silty material and the underlying silty clay loam till. Slope ranges from 0 to 3 percent.

Ashkum soils are similar to Milford and Peotone soils and are commonly adjacent to Elliott, Markham, and Varna soils in the landscape. Milford soils formed in lakebed sediment and are stratified in the lower part of the B horizon and in the C horizon. Peotone soils have mollic epipedons more than 24 inches thick. The somewhat poorly drained Elliott soils and the moderately well and well drained Markham and Varna soils are at a higher elevation. Markham and Varna soils typically have steeper slopes.

Typical pedon of Ashkum silty clay loam, about 2 miles south of the village of Hanover Park, in Du Page County, 2,200 feet north and 50 feet east of center of sec. 13, T. 40 N., R. 9 E:

Ap—0 to 8 inches; black (N 2/0) heavy silty clay loam; weak very fine granular structure; firm; neutral; abrupt smooth boundary.

A12—8 to 11 inches; black (N 2/0) light silty clay; moderate medium granular structure; firm; neutral; clear smooth boundary.

B1—11 to 15 inches; very dark gray (10YR 3/1) light silty clay; common fine faint dark grayish brown (10YR 4/2) and few fine distinct olive brown (2.5Y 4/4) mottles; moderate medium subangular blocky structure; firm; common black (10YR 2/1) organic coats on faces of peds; neutral; clear smooth boundary.

B21g—15 to 28 inches; gray (5Y 5/1) light silty clay; many fine and medium distinct yellowish brown (10YR 5/8) mottles; moderate fine and medium prismatic structure parting to strong medium angular blocky; firm; few thin very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine dark iron and manganese concretions; few fine pebbles; mildly alkaline; gradual smooth boundary.

IIB22g—28 to 37 inches; mixed gray (5Y 5/1) and yellowish brown (10YR 5/6) light silty clay; common fine distinct strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to strong coarse angular blocky; very firm; few thin dark gray (10YR 4/1) clay films on faces of peds; few fine dark iron and manganese concretions; few pebbles; mildly alkaline; gradual smooth boundary.

IIB3g—37 to 47 inches; mixed gray (5Y 5/1) and dark yellowish brown (10YR 4/4) silty clay loam, greenish gray (5GY 5/1) exteriors of peds; common fine distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; very firm; few thin very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine and medium pebbles and a few shale fragments; weak effervescence; moderately alkaline; clear wavy boundary.

IIC—47 to 60 inches; mixed gray (5Y 5/1) and dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; massive; very firm; few fine and medium pebbles and a few shale fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 37 to 57 inches. Depth to free carbonates ranges from 26 to 46 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 26 to 37 inches. The mollic epipedon ranges from 11 to 17 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 or less. It is dominantly heavy silty clay loam in the upper part and light silty clay in the lower part, but it can be only one texture or both. The B2 horizon commonly has hue of 5.Y or 2.5Y, value of 4 or 5, and chroma of 2 or less. It is silty clay or heavy silty clay loam and averages between 35 and 45 percent clay in the upper 20 inches. The B2 horizon is neutral or mildly alkaline. The B3 horizon is mildly alkaline or moderately alkaline.

Barrington series

The Barrington series consists of deep, well drained, moderately permeable soils on outwash plains on uplands. These soils formed in silty material and the underlying stratified loamy outwash. Slope ranges from 1 to 7 percent.

Barrington soils are commonly adjacent to Drummer and Mundelein soils in the landscape and are similar to Saybrook soils. Drummer soils are poorly drained and are in low lying areas. Mundelein soils are somewhat poorly drained and are generally at a lower elevation or in less sloping areas. Saybrook soils are slightly less permeable and have no stratification in the B3 and C horizons.

Typical profile of Barrington silt loam, 2 to 5 percent slopes, in a nursery about 5 miles southwest of the village of Barrington, in Cook County, 1,418 feet south and 45 feet west of the northeast corner sec. 33, T. 42 N., R. 9 E:

Ap—0 to 9 inches; black (10YR 2/1) silt loam; very dark grayish brown (10YR 3/2) crushed; moderate fine and medium granular structure; very friable; a slight amount of fine sand; neutral; abrupt smooth boundary.

A3—9 to 14 inches; very dark grayish brown (10YR 3/2) silt loam; moderate very fine and fine subangular blocky structure; friable; many very dark brown (10YR 2/2) organic coats on faces of peds; a slight amount of fine sand; neutral; clear smooth boundary.

B21t—14 to 20 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common thin dark brown (10YR 3/3) clay films on faces of peds; a slight amount of fine sand; neutral; gradual smooth boundary.

B22t—20 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; common thin dark brown (10YR 3/3) clay films on faces of peds; a slight amount of fine sand; neutral; gradual smooth boundary.

B31t—27 to 33 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) light silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; common thin brown (10YR 4/3) clay films on faces of peds; a slight amount of fine sand; weak effervescence in upper part and strong effervescence in lower part; mildly alkaline; clear smooth boundary.

IIB32—33 to 41 inches; light olive brown (2.5Y 5/4) stratified silt loam, 80 percent, and very fine sandy loam, 15 percent; many fine and medium gray (5Y 6/1) and common medium distinct strong brown (7.5YR 5/8) mottles; weak medium prismatic structure; friable; strong effervescence; mildly alkaline; gradual wavy boundary.

IIC—41 to 60 inches; mixed gray (5Y 6/1) and light yellowish brown (2.5Y 6/4) stratified silt loam, 75 percent, and very fine sandy loam, 25 percent; many medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 31 to 43 inches. Depth to free carbonates ranges from 26 to 40 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 24 to 33 inches. The mollic epipedon ranges from 10 to 15 inches in thickness. Mottles with chroma of 2 or less are at a depth of 33 to 60 inches or more.

A B1 horizon is in some pedons. The B2 horizon mainly has value of 4 or 5 in the lower part, but in some pedons has mottles with chromas of 2 or less in the lower part. This horizon is silty clay loam, but is commonly higher in content of sand as depth increases. The B3 horizon is stratified light silty clay loam to fine sand. It is neutral to moderately alkaline. The C horizon is silt loam to fine sand. It is mildly alkaline or moderately alkaline.

Beecher series

The Beecher series consists of deep, somewhat poorly drained, slowly permeable soils on till plains on uplands. These soils formed in a thin layer of silty material and the underlying silty clay loam till. Slope ranges from 0 to 3 percent.

Beecher soils are similar to Frankfort, Markham, and Wauconda soils and are commonly adjacent to Markham soils in the landscape. Frankfort soils contain more clay in the B2t and C horizons. Markham soils are better drained and typically have steeper slopes. Wauconda soils do not have a fine, textured B2 horizon, are more permeable, and have stratified B3 and C horizons.

Typical pedon of Beecher silt loam, in idle field about 1.5 miles northwest of the village of Streamwood, in Cook County, 300 feet north and 120 feet east of the southwest corner sec. 15, T. 41 N., R. 9 E:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, very dark grayish brown (10YR 3/2) crushed, gray (10YR 5/1) dry; weak fine granular structure; friable; many roots; slightly acid; abrupt smooth boundary.

A2—7 to 11 inches; mixed dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) silt loam, dark grayish brown (10YR 4/2) crushed; weak thick platy structure; friable; many roots; neutral; clear wavy boundary.

B21t—11 to 14 inches; dark grayish brown (2.5Y 4/2) light silty clay, few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate and strong fine angular and subangular blocky structure; firm; many roots; common clean light gray (10YR 7/2) silt grains and many dark gray (10YR 4/1) clay films on faces of peds; medium acid; clear wavy boundary.

IIB22t—14 to 21 inches; light olive brown (2.5Y 5/4) light silty clay; common fine distinct yellowish brown (10YR 5/6) and many medium faint dark grayish brown (2.5Y 4/2) mottles; moderate medium prismatic structure parting to strong fine and medium angular blocky; very firm; common roots; continuous thick very dark gray (10YR 3/1) clay films on faces of peds; few pebbles; medium acid; gradual smooth boundary.

IIB23t—21 to 30 inches; light olive brown (2.5Y 5/4) heavy silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few medium distinct olive gray (5Y 5/2) mottles; moderate coarse prismatic structure parting to medium and coarse angular blocky; very firm; common roots; many thick black (10YR 2/1) to very dark gray (10YR 3/1) clay films on faces of peds; few pebbles; mildly alkaline; clear wavy boundary.

IIB3t—30 to 39 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium faint olive yellow (2.5Y 6/6) and common medium distinct olive gray (5Y 5/2) and light gray (5Y 6/1) mottles; weak coarse prismatic structure; firm; few roots; common thin black (10YR 2/1) and gray (10YR 5/1) clay films on faces of peds; few pebbles; weak effervescence, strong in lower part of horizon; gradual smooth boundary.

IIC—39 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium and coarse distinct olive gray (5Y 5/2) and yellowish brown mottles; massive; very firm; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 32 to 45 inches. Depth to free carbonates ranges from 25 to 32 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 9 to 18 inches.

The Ap horizon has chroma of 1 or 2. An A1 horizon is in some pedons. It has value of 2 or 3 and chroma of 1 or 2. It is 6 to 9 inches thick. The A2 horizon has value of 4 or 5. The B2 horizon has hue of 2.5Y or 10YR and value of 4 or 5. It has chroma of 3 or 4 in at least 1 layer above a depth of 30 inches. It contains 35 to 52 percent clay. It is neutral to moderately alkaline in the lower part. The B3 horizon has weak or strong effervescence and is mildly or moderately alkaline. The C horizon has strong or violent effervescence.

Blount series

The Blount series consists of deep, somewhat poorly drained, slowly permeable or moderately slowly permeable soils on till plains on uplands. These soils formed in a thin layer of silty material and the underlying silty clay loam till. Slope ranges from 0 to 3 percent.

Blount soils are similar to Beecher, Del Rey, Morley, and Nappanee soils and are commonly adjacent to Beecher and Morley soils in the landscape. Beecher soils have an epipedon that has mollic colors and is 6 to 9 inches thick. Del Rey soils have less uniform texture in the lower part of the B horizon and in the C horizon, they have no coarse fragments, and they formed in lakebed sediment. Morley soils are better drained, have steeper slopes, and are at a higher elevation than Blount soils. Nappanee soils contain more clay in the B and C horizons.

Typical pedon of Blount silt loam, about 2 miles west of the village of Woodridge, in Du Page County, 230 feet north and 975 feet west of center of sec. 34, T. 38 N., R. 10 E:

A1—0 to 5 inches; dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; medium acid; abrupt smooth boundary.

A2—5 to 11 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; moderate medium platy structure parting to moderate medium granular; very friable; medium acid; clear wavy boundary.

B1—11 to 14 inches; dark brown (10YR 4/3) light silty clay loam; moderate fine subangular blocky structure; friable; common clean light gray (10YR 7/1) silt grains on faces of peds; very strongly acid; clear wavy boundary.

IIB21t—14 to 20 inches; grayish brown (2.5Y 5/2) silty clay; many fine distinct brown (10YR 4/3) mottles; strong fine and medium angular blocky structure; firm; many moderately thick very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine dark iron and manganese concretions; few very small pebbles; very strongly acid; clear smooth boundary.

IIB22t—20 to 30 inches; grayish brown (2.5Y 5/2) light silty clay; many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate coarse angular blocky; very firm; continuous moderately thick very dark gray (10YR 3/1) clay films on faces of peds; common fine dark iron and manganese concretions; few small pebbles; neutral; gradual smooth boundary.

IIB3—30 to 37 inches; dark grayish brown (2.5Y 4/2) silty clay loam; many medium distinct olive brown (10YR 4/4) and gray (5Y 6/1) mottles; moderate coarse prismatic structure parting to weak coarse angular blocky; very firm; common thin very dark gray (10YR 3/1) clay films on faces of peds; few small pebbles; weak effervescence; mildly alkaline; clear wavy boundary.

IIC—37 to 60 inches; olive brown (2.5Y 4/4) silty clay loam; common coarse distinct gray (5Y 6/1) mottles; massive; firm; few small pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 26 to 45 inches. Depth to free carbonates ranges from 21 to 37 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 9 to 18 inches.

The A1 horizon has value of 2 to 4 and chroma of 1 or 2. It is 2 to 5 inches thick. An Ap horizon is in some pedons. It ranges from 6 to 8 inches in thickness. It has value of 4 and chroma of 2. The A2 horizon has value of 4 or 5. The B2 horizon has matrix hue of 2.5Y or 10YR and chroma of 2 to 4. It has ped exteriors that have value of 3 to 5 and chroma of 1 or 2. The B2 horizon is silty clay or heavy silty clay loam and commonly contains 40 to 45 percent clay in the upper part. It is neutral to moderately alkaline in the lower part. The C horizon is predominantly silty clay loam but includes clay loam. It has strong or violent effervescence and is mildly or moderately alkaline.

Bryce series

The Bryce series consists of deep, poorly drained, slowly permeable soils in low lying areas of till plains and moraines on uplands. These soils formed in clayey sediments from surrounding slopes and glacial till. Slope ranges from 0 to 3 percent.

Bryce soils are similar to Ashkum soils and are commonly adjacent to Frankfort, Nappanee, and Swygert soils in the landscape. Ashkum soils contain less clay throughout the profile. Frankfort, Nappanee, and Swygert soils are somewhat poorly drained and are at a higher elevation. Frankfort and Nappanee soils do not have a mollic epipedon. In addition, Nappanee soils have an A1 horizon less than 5 inches thick or an Ap horizon that has value of more than 3.

Typical pedon of Bryce silty clay, in an idle field about 2 miles south of the village of Orland Park, in Cook County, 1,400 feet south and 60 feet west of the northeast corner sec. 21, T. 36 N., R. 12 E:

Ap—0 to 10 inches; black (10YR 2/1) light silty clay; weak very fine granular structure; firm; neutral; abrupt smooth boundary.

A12—10 to 17 inches; black (N 2/0) silty clay; strong medium granular structure; very firm; neutral; clear smooth boundary.

B1—17 to 23 inches; very dark gray (10YR 3/1) heavy silty clay; few fine distinct olive brown (2.5Y 4/4) mottles; weak medium prismatic structure parting to strong fine angular blocky; very firm; many black (10YR 2/1) krotovinas; many black (10YR 2/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

B22g—23 to 32 inches; mixed gray (5Y 5/1) and yellowish brown (10YR 5/6) silty clay; many medium distinct light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure parting to strong medium angular blocky; very firm; many black (10YR 2/1) krotovinas; common moderately thick dark gray (5Y 4/1) coatings on faces of peds; few fine pebbles and shale fragments; mildly alkaline; clear smooth boundary.

B3g—32 to 48 inches; mixed grayish brown (2.5Y 5/2) and gray (5Y 5/1) silty clay; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium and coarse angular blocky; very firm; many black (10YR 2/1) krotovinas; common black (10YR 2/1) and very dark gray (10YR 3/1) coatings on vertical faces of peds; few fine pebbles and shale fragments; weak effervescence; mildly alkaline; gradual wavy boundary.

Cg—48 to 60 inches; mixed grayish brown (2.5Y 5/2) and gray (5Y 5/1) silty clay; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; very firm; few fine pebbles and shale fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 51 inches. Depth to free carbonates ranges from 32 to 47 inches and commonly is less than the thickness of the solum.

The A horizon has value of 2 or 3 and chroma of 0 or 1. It is dominantly silty clay but ranges to heavy silty clay loam. The B2g horizon is commonly medium or heavy silty clay but ranges to clay. It is an average 42 to 50 percent clay. It is neutral or mildly alkaline. The C horizon is heavy silty clay loam or silty clay. It is mildly alkaline or moderately alkaline.

Chatsworth series

The Chatsworth series consists of deep, moderately well drained, very slowly permeable soils on moraines or on side slopes of stream valleys. These soils formed in silty clay glacial till. Slope ranges from 7 to 15 percent.

Chatsworth soils are similar to Frankfort soils and are commonly adjacent to Frankfort, Nappanee, and Swygert soils in the landscape. Frankfort, Nappanee, and Swygert soils have an argillic horizon. In addition, Frankfort soils have an Ap horizon that has value of 3 or less. Swygert soils have a mollic epipedon.

Typical pedon of Chatsworth silty clay, 7 to 15 percent slopes, severely eroded, in a cultivated field about 1 mile west of the village of Tinley Park, in Cook County, 200 feet north and 1,330 feet east of the southwest corner sec. 26, T. 36 N., R. 12 E:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay; moderate medium subangular blocky structure; very firm; common very fine roots; few pebbles and shale fragments; mildly alkaline; abrupt smooth boundary.

B2—6 to 18 inches; mixed dark grayish brown (2.5Y 4/2) and yellowish brown (10YR 5/4) silty clay; many fine prominent greenish gray (5G 6/1) and many fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium and coarse angular blocky; very firm; common thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; few very fine roots; few pebbles and shale fragments; slight effervescence; mildly alkaline; gradual wavy boundary.

C—18 to 60 inches; brown (10YR 5/3) silty clay; many medium and coarse prominent greenish gray (5G 6/1) and many fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; massive; very firm; gray (5Y 6/1) to greenish gray (5G 6/1) coatings on pressure faces; few pebbles and shale fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 10 to 20 inches. Depth to free carbonates ranges from 3 to 6 inches.

The Ap horizon has value of 3 or 4. It is dominantly silty clay but ranges to silty clay loam. An A1 horizon is in some pedons. It has value of 3 and chroma of 2 and is about 4 inches thick. It is silt loam or silty clay loam. The B2 horizon is mildly alkaline or moderately alkaline.

Del Rey series

The Del Rey series consists of deep, somewhat poorly drained, slowly permeable soils on uplands. These soils formed in stratified silty sediment deposited in glacial lakes. Slope ranges from 0 to 3 percent.

Del Rey soils are similar to Blount, Nappanee, and Frankfort soils and are commonly adjacent to Martinton and Milford soils in the landscape. Blount soils formed in dense glacial till and do not have stratification in the B and C horizons. Nappanee soils contain more clay in the B and C horizons. Martinton and Milford soils have a mollic epipedon. In addition, Milford soils are poorly drained and typically are at a slightly lower elevation.

Typical pedon of Del Rey silt loam, in an idle field about 2 miles southeast of the city of Palos Heights, in Cook County, 2,050 feet north and 220 feet west of the southeast corner sec. 6, T. 36 N., R. 13 E:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; many fine roots; neutral; abrupt smooth boundary.

B21t—8 to 12 inches; dark yellowish brown (10YR 4/4) light silty clay; many fine distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to strong fine angular blocky; firm; many fine roots; common clean gray (10YR 7/1) dry, silt grains on faces of peds; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; few very small dark iron and manganese concretions; slightly acid; clear smooth boundary.

B22t—12 to 30 inches; mixed grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6) light silty clay; common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to strong and moderate fine and medium angular blocky; very firm; common fine roots; many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds to a depth of 18 inches, many moderately thick dark gray (5Y 4/1) and olive gray (5Y 5/2) clay films below 18 inches; 1 1/2 inch layers of clay loam at depths of 21 and 28 inches; common small dark iron and manganese concretions; slightly acid; gradual smooth boundary.

B23t—30 to 38 inches; gray (5Y 5/1) heavy silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to strong medium and coarse angular blocky; very firm; few fine roots; many moderately thick dark gray (5Y 4/1) clay films on faces of peds; mildly alkaline; clear wavy boundary.

B3—38 to 46 inches; gray (5Y 5/1) silty clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse angular and subangular blocky; firm; few fine roots; common moderately thick dark gray (5Y 4/1) and gray (5Y 5/1) clay films on faces of peds; common white (10YR 8/1) soft masses of calcium carbonate; violent effervescence; moderately alkaline; gradual smooth boundary.

C—46 to 60 inches; gray (5Y 5/1) light silty clay loam and clay loam, stratified with some layers of silt loam and sand; many medium and coarse distinct yellowish brown (10YR 5/6 and 5/8) mottles; massive; firm in silty clay loam layers and friable in silt loam and clay loam layers; weak effervescence; moderately alkaline.

The thickness of the solum ranges from 33 to 46 inches. Depth to free carbonates ranges from 28 to 39 inches and commonly is less than the thickness of the solum.

A1 and A2 horizons are in some pedons. The A1 horizon has value of 3 and chroma of 1 or 2. It is 3 to 5 inches thick. The A2 horizon has value of 4 or 5 and chroma of 2. It is 4 to 7 inches thick. The B2 horizon has value of 4 to 6 and chroma of 1 to 4. It has chroma of 2 or less in mottles or on exteriors of peds at a depth of 10 to 13 inches. The B2 horizon has clay content of 38 to 45 percent. It is medium acid to neutral in the upper part and slightly acid to mildly alkaline in the lower part. The C horizon is uniform silty clay loam or stratified silt loam to silty clay and commonly has thin layers of sand.

Drummer series

The Drummer series consists of deep, poorly drained, moderately permeable soils on outwash plains or till plains on uplands. These soils formed in silty material and the underlying loamy glacial till or stratified loamy outwash. Slope ranges from 0 to 2 percent.

Drummer soils are similar to Harpster soils and are commonly adjacent to Harpster, Mundelein, and Peotone soils in the landscape. Harpster soils have a calcic horizon. Mundelein soils have thinner sola, have an argillic horizon, and are at a slightly higher elevation. Peotone soils have a mollic epipedon more than 24 inches thick.

Typical pedon of Drummer silty clay loam, in a cultivated field about 3.5 miles west of the city of Naperville, in Du Page County, 1,400 feet south and 100 feet east of the northwest corner sec. 22, T. 38 N., R. 9 E:

Ap—0 to 8 inches; black (N 2/0) silty clay loam; weak fine granular structure; firm; neutral; abrupt smooth boundary.

A12—8 to 15 inches; black (10YR 2/1) silty clay loam; moderate medium granular structure; firm; neutral; clear smooth boundary.

B1—15 to 19 inches; very dark gray (10YR 3/1) silty clay loam; common fine faint dark grayish brown (2.5Y 4/2) and few fine distinct olive brown (2.5Y 4/4) mottles; moderate very fine subangular blocky structure; firm; common black (10YR 2/1) organic coatings on faces of peds; common black (10YR 2/1) krotovinas; neutral; gradual smooth boundary.

B21g—19 to 27 inches; dark gray (10YR 4/1) silty clay loam; many fine distinct yellowish brown (10YR 5/4 and 5/6) and few fine distinct strong brown (7.5YR 5/8) mottles; moderate fine prismatic structure parting to moderate fine and medium angular blocky; firm; common thin very dark gray (10YR 3/1) and dark gray (10YR 4/1) coatings on faces of peds; common black (10YR 2/1) krotovinas; neutral; gradual smooth boundary.

B22g—27 to 40 inches; olive gray (5Y 5/2) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and common fine distinct strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium and coarse angular blocky; firm; few thin dark gray (10YR 4/1) coatings on faces of peds; common black (10YR 2/1) krotovinas; mildly alkaline; gradual smooth boundary.

B31g—40 to 46 inches; mottled yellowish brown (10YR 5/4, 5/6, and 5/8), gray (5Y 5/1), and light olive brown (2.5Y 5/4) heavy silt loam; common fine distinct strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few thin dark gray (10YR 4/1) coatings on faces of peds; a slight amount of fine and medium sand; mildly alkaline; abrupt smooth boundary.

IIB32g—46 to 56 inches; yellowish brown (10YR 5/4 and 5/6) stratified silt loam, loam and fine sandy loam; many fine and medium distinct gray (5Y 5/1) and common medium and coarse strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; friable; few pebbles; weak effervescence; mildly alkaline; gradual smooth boundary.

IIC—56 to 60 inches; yellowish brown (10YR 5/4 and 5/6) stratified silt loam, loam, and fine sandy loam; many fine and medium distinct gray (5Y 5/1) and common medium and coarse strong brown (7.5YR 5/8) mottles; massive; friable; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 41 to 56 inches. Depth to free carbonates ranges from 40 to 47 inches and commonly is less than the thickness of the solum. The mollic epipedon ranges from 12 to 22 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 0 or 1. The B2 horizon averages 32 to 35 percent clay. It is slightly acid or neutral in the upper part and neutral or mildly alkaline in the lower part. The B3 horizon is stratified. It is predominantly silt loam, loam, and sandy loam but ranges to clay loam and silty clay loam. It is neutral or mildly alkaline. The C horizon is stratified. It ranges from sandy loam to silty clay loam and has thin strata of gravelly loam.

Elliott series

The Elliott series consists of deep, somewhat poorly drained, moderately slowly permeable soils on till plains on uplands. These soils formed in a thin layer of silty material and silty clay loam glacial till. Slope ranges from 1 to 3 percent.

Elliott soils are similar to Ashkum soils and are commonly adjacent to Ashkum, Markham, and Varna soils in the landscape. Ashkum soils do not have an argillic horizon and are in depressions. Markham soils do not have a mollic epipedon, do not have chroma of 2 or less in the upper part of the B2t horizon, and have steeper slopes. Varna soils do not have chroma of 2 or less in the upper part of the B2t horizon and are at a higher elevation.

Typical pedon of Elliott silt loam in an idle field about 2 miles northwest of the village of Downers Grove, in Du Page County, 250 feet north and 2,130 feet east of the southwest corner sec. 30, T. 39 N., R. 10 E:

Ap—0 to 8 inches; black (10YR 2/1) heavy silt loam; moderate medium granular structure; friable; many roots; medium acid; abrupt smooth boundary.

A12—8 to 11 inches; black (10YR 2/1) and very dark gray (10YR 3/1) heavy silt loam; moderate coarse granular structure; friable; common roots; medium acid; clear smooth boundary.

B1—11 to 15 inches; very dark grayish brown (10YR 3/2) silty clay loam; many fine faint dark grayish brown (10YR 4/2) mottles; moderate very fine subangular blocky structure; friable; common roots; common very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles; medium acid; clear smooth boundary.

IIB21t—15 to 22 inches; dark grayish brown (10YR 4/2) light silty clay; common fine distinct yellowish brown (10YR 5/4) mottles; weak fine prismatic structure parting to moderate and strong very fine and fine subangular blocky; firm; common roots; continuous moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; few pebbles; slightly acid; gradual smooth boundary.

IIB22t—22 to 31 inches; light olive brown (2.5Y 5/4) heavy silty clay loam; many fine distinct yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure parting to strong medium and coarse angular blocky; firm; few roots; many moderately thick very dark grayish brown (2.5Y 3/2) and very dark gray (10YR 3/1) clay films on faces of peds; few pebbles and shale fragments; neutral; gradual smooth boundary.

IIB3—31 to 37 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium and coarse distinct gray (5Y 6/1) and many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse angular and blocky; firm; few roots; common moderately thick very dark gray (10YR 3/1) clay films on faces of peds; few pebbles and shale fragments; weak effervescence; moderately alkaline; gradual wavy boundary.

IIC—37 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium distinct gray (5Y 6/1) and yellowish brown (10YR 5/6) mottles; massive; firm; few pebbles and shale fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 26 to 41 inches. Depth to free carbonates ranges from 22 to 40 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 11 to 18 inches. The mollic epipedon ranges from 11 to 17 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 or 2. An A3 horizon is in some pedons. It has value of 3 and chroma of 1 or 2. It is heavy silt loam or light silty clay loam. The B2t horizon has chroma of 2 or less in mottles or on the exterior of peds at a depth of 11 to 21 inches. This horizon is heavy silty clay loam to heavy silty clay and is an average 38 to 44 percent clay. It is slightly acid or neutral in the upper part and neutral or mildly alkaline in the lower part. The B3 horizon is medium to heavy silty clay loam. It is mildly alkaline or moderately alkaline.

Faxon series

The Faxon series consists of moderately deep, poorly drained, moderately permeable soils on flood plains. These soils formed in a layer of silty material 20 to 40 inches thick that is underlain by bedrock. Slope ranges from 0 to 2 percent.

The Faxon soils in this survey area typically contain less sand than is described in the range for the series. This difference does not alter the usefulness or behavior of these soils.

Faxon soils are commonly near Romeo and Sawmill soils in the landscape and are similar to Romeo soils. Romeo soils have a lithic contact at a depth of less than 10 inches. Sawmill soils formed in deeper alluvium and do not have a lithic contact within a depth of 40 inches.

Typical pedon of Faxon silty clay loam, wet, about 1 mile north of the village of Lemont, in Cook County, 1,600 feet east and 175 feet south of the northwest corner sec. 20, T. 37 N., R. 11 E:

A1—0 to 12 inches; very dark gray (10YR 3/1) silty clay loam, very dark grayish brown (10YR 3/2) crushed; moderate medium granular structure; friable; many fine roots; mildly alkaline; gradual smooth boundary.

A3—12 to 20 inches; very dark gray (10YR 3/1) to dark gray (10YR 4/1) silty clay loam; common fine distinct brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; friable; many fine roots; few very small dark iron and manganese concretions; slight effervescence; mildly alkaline; gradual smooth boundary.

Bg—20 to 30 inches; dark gray (10YR 4/1) silty clay loam; common medium faint yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common fine roots; many brown (7.5YR 4/4) stains and iron and manganese concretions; slight effervescence; mildly alkaline; abrupt smooth boundary.

IIR—30 inches; light gray (10YR 7/2) and pale brown (10YR 7/3) level bedded dolomite limestone; weak effervescence; moderately alkaline.

Thickness of the solum and the overlying stream alluvium ranges from 20 to 32 inches. Thickness of the mollic epipedon ranges from 11 to 20 inches.

The A horizon has values of 2 or 3 and chroma of 0 or 2. The B horizon has value of 4 or 5 and chroma of 1 or 2. It is commonly neutral or mildly alkaline. It has slight effervescence in some pedons.

Fox series

The Fox series consists of well drained soils that are moderately deep over sand and gravel. These soils are on outwash plains on uplands and on benches along streams. They are moderately permeable in the upper part and very rapidly permeable in the underlying sand and gravel. They formed in silty and loamy material over lying sand and gravel. Slope ranges from 2 to 6 percent.

Fox soils are similar to Lorenzo soils and are commonly adjacent to Lorenzo, Rodman, and Will soils in the landscape. Lorenzo soils have a mollic epipedon, a thinner solum, and have steeper slopes. Rodman soils do not have an argillic horizon and have steep slopes. Will soils have a mollic epipedon and are in depressions.

Typical pedon of Fox silt loam, 2 to 6 percent slopes, about 1 mile north of the city of Warrenville in the Black-well Forest Preserve, in Du Page County, 2,240 feet south and 90 feet west of center of sec. 22, T. 39 N., R. 9 E:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine and medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

A2—8 to 11 inches; brown (10YR 4/3) silt loam; weak medium platy structure; common fine roots; strongly acid; clear smooth boundary.

B1t—11 to 14 inches; dark yellowish brown (10YR 4/4) light silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; common thin brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

B21t—14 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; common fine roots; continuous thin brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

IIB22t—20 to 28 inches; dark yellowish brown (10YR 3/4) clay loam; moderate medium and coarse subangular blocky structure; firm; few fine roots; continuous thick dark brown (7.5YR 3/2) clay films on faces of peds; medium acid; clear wavy boundary.

IIB3—28 to 36 inches; dark yellowish brown (10YR 3/4) sandy clay loam; weak coarse subangular blocky structure; friable; very few fine roots; common moderately thick dark brown (7.5YR 3/2) clay films on faces of peds; mildly alkaline; abrupt wavy boundary.

IIIC—36 to 60 inches; dark yellowish brown (10YR 4/4) weakly stratified sand and gravel; single grain; loose; slight effervescence; moderately alkaline.

The thickness of the solum and depth to calcareous gravel and sand range from 24 to 39 inches. Thickness of the overlying silty material ranges from 14 to 20 inches.

An A1 horizon is in some pedons. It has value of 2 or 3 and chroma of 1 or 2. Some pedons do not have an A2 horizon. The B2 hoizon has hue of 10YR or 7.5YR and chroma of 3 or 4. It is predominantly silty clay loam in the upper part but ranges from silty clay loam to clay loam in the lower part. The B2 horizon is strongly acid to slightly acid in the upper part and medium acid to neutral in the lower part. The B3 horizon is clay loam or sandy clay loam. It has a high content of gravel in some pedons. It is neutral or mildly alkaline. The C horizon is dominantly gravel or stratified gravel and sand.

Frankfort series

The Frankfort series consists of deep, somewhat poorly drained, slowly permeable soils on glaciated uplands. These soils formed in silty clay glacial till. Slope ranges from 1 to 10 percent.

Frankfort soils are similar to Beecher soils and are commonly near Bryce, Nappanee, and Swygert soils in the landscape. Beecher soils contain less clay in the solum and underlying material. Bryce soils are poorly drained, and both Bryce and Swygert soils have a mollic epipedon. Nappanee soils have an ochric epipedon.

Typical pedon of Frankfort silty clay loam, 1 to 5 percent slopes, in an idle field near the village of Northbrook, in Cook County, 2,500 feet east and 1,450 feet south of the northwest corner sec. 6, T. 42 N., R. 12 E:

Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, very dark grayish brown (10YR 3/2) crushed; moderate medium angular blocky structure parting to weak very fine granular; firm; a moderate content of fine and medium sand; few pebbles; slightly acid; abrupt smooth boundary.

B21t—8 to 16 inches; dark brown (10YR 4/3) heavy silty clay; dark gray (10YR 4/1) exteriors of peds; few fine distinct yellowish brown (10YR 5/6) mottles; strong medium prismatic structure parting to strong fine and medium angular blocky; very firm; many moderately thick dark gray (10YR 4/1) clay films on faces of peds; few small pebbles and shale fragments; slightly acid; clear smooth boundary.

B22t—16 to 19 inches; dark grayish brown (10YR 4/2) silty clay; common fine distinct olive gray (5Y 5/2) and many fine distinct yellowish brown (10YR 5/6) mottles; strong medium prismatic structure parting to strong medium and coarse angular blocky; very firm; many moderately thick very dark gray (10YR 3/1) clay films on faces of peds; few small pebbles and shale fragments; mildly alkaline; clear wavy boundary.

B3—19 to 30 inches; brown (10YR 5/3) silty clay; many fine and medium greenish gray (5GY 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate coarse blocky; very firm; moderate medium thick gray (10YR 4/1) coatings on vertical faces of peds; common fine white masses of carbonate in lower part of horizon; few small pebbles and shale fragments; slight effervescence to a depth of 24 inches and strong effervescence below 24 inches; moderately alkaline; gradual wavy boundary.

C—30 to 60 inches; mottled brown (10YR 5/3) and greenish gray (5GY 5/1) silty clay; many fine distinct yellowish brown (10YR 5/6) mottles; massive; very firm; common fine white masses and filaments of lime; few small pebbles and shale fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 28 to 42 inches, and depth to free carbonates ranges from 17 to 29 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is predominantly silty clay loam but is silt loam in some pedons. This horizon is 6 to 8 inches thick. A B1 horizon is in some pedons. It is silty clay loam or silty clay. The B2 horizon has chroma of 1 or 2 in the matrix or on the exteriors of peds. It is silty clay or clay and ranges in clay content from 50 to 60 percent. The B2 horizon is neutral to medium acid in the upper part and slightly acid to mildly alkaline in the lower part. The C horizon is heavy silty clay loam to clay and ranges in clay content from 36 to 55 percent.

Gilford series

The Gilford series consists of deep, very poorly drained soils on broad flats and former glacial lakes. These soils are adjacent to beach ridges and in narrow swales between the ridges. They formed in sandy and loamy glacial outwash. They are moderately rapidly permeable in the upper part and rapidly permeable in the lower part. Slope is less than 1 percent.

Gilford soils are commonly near Hoopeston and Selma soils. Hoopeston soils are somewhat poorly drained. Selma soils contain more clay in the solum.

Typical pedon of Gilford fine sandy loam, in the village of Markham, in Cook County, 2,200 feet north and 110 feet west of the southeast corner sec. 24, T. 36 N., R. 13 E:

Ap—0 to 8 inches; black (N 2/0) fine sandy loam; weak fine and medium granular structure; friable; neutral; abrupt smooth boundary.

A12—8 to 11 inches; very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; friable; neutral; clear wavy boundary.

B1—11 to 16 inches; very dark grayish brown (2.5Y 3/2) fine sandy loam; moderate medium subangular blocky structure; friable; neutral; clear wavy boundary.

B21g—16 to 22 inches; dark gray (10YR 4/1) fine sandy loam; few fine faint yellowish brown (10YR 5/6) and olive brown (2.5Y 4/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; many thin, very dark gray (10YR 3/1) and dark gray (10YR 4/1) coats on faces of peds; neutral; abrupt wavy boundary.

B22g—22 to 27 inches; dark gray (5Y 4/1) sandy clay loam to heavy sandy loam; common fine distinct yellowish brown (10YR 5/6) and olive brown (2.5Y 4/4) mottles; weak medium prismatic structure parting to moderate angular blocky and subangular blocky; friable; common thin black (10YR 2/1) and very dark gray (10YR 3/1) coats on faces of peds; neutral; abrupt wavy boundary.

B31g—27 to 31 inches; dark gray (5Y 4/1) and gray (5Y 5/1) loamy sand; many fine and medium distinct yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure; friable; few thin very dark gray (10YR 3/1) coats on faces of peds; neutral; clear wavy boundary.

B32g—31 to 36 inches; gray (5Y 5/1) and light olive gray (5Y 5/2) loamy sand; many medium distinct olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure; very friable; neutral; gradual wavy boundary.

C—36 to 60 inches; olive gray (5Y 5/2) fine sand; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; single grain; loose; neutral.

The thickness of the solum ranges from 23 to 38 inches. Thickness of the mollic epipedon ranges from 12 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 0 to 2. It is dominantly fine sandy loam but ranges to loam, loamy sand, and loamy fine sand. The B2g horizon has value of 4 or 5 and chroma of 1 or 2. It commonly is fine sandy loam but ranges to loamy fine sand, sandy loam, and sandy clay loam.

Grays series

The Grays series consists of deep, moderately well drained, moderately permeable soils on outwash plains on the uplands and on benches along streams. These soils formed in silty material and stratified silt and sand. Slope ranges from 2 to 5 percent.

Grays soils are similar to Barrington soils and are commonly adjacent to Barrington, Wauconda, and Zurich soils in the landscape. Barrington soils have a mollic epipedon. Wauconda soils have mottles that have chroma of 2 or less throughout most of the B horizon. Zurich soils have an Ap horizon that has value of 4 or more, or they have an A1 horizon less than 6 inches thick.

Typical pedon of Grays silt loam, 2 to 5 percent slopes, in an idle field 1 mile southwest of the city of West Chicago, in Du Page County, 1,800 feet east of center of sec. 8, T. 39 N., R. 9 E:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

A2—9 to 13 inches; brown (10YR 4/3) silt loam; weak thick platy structure parting to moderate medium granular; common thin dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear wavy boundary.

B1t—13 to 16 inches; dark yellowish brown (10YR 4/4) light silty clay loam; weak medium subangular blocky structure parting to moderate medium granular; friable; many thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear wavy boundary.

B21t—16 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; many thin dark brown (10YR 4/3) clay films on faces of peds; neutral; gradual wavy boundary.

B22t—24 to 30 inches; olive brown (2.5Y 4/4) silty clay loam; few fine faint grayish brown (2.5Y 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium and coarse angular blocky structure; firm; common moderately thick dark brown (10YR 4/3) clay films on faces of peds; few fine dark masses of iron and manganese; neutral; gradual wavy boundary.

IIB3—30 to 35 inches; light olive brown (2.5Y 5/4) light silty clay loam; many medium faint grayish brown (2.5Y 5/2) and common fine distinct yellowish brown (10YR 5/8) mottles; weak medium and coarse prismatic structure; friable; few thin brown (10YR 5/3) clay films on faces of peds; common fine dark masses of iron and manganese; moderate amount of fine and medium sand; slight effervescence at depth of 33 inches; mildly alkaline; clear wavy boundary.

IIC—35 to 60 inches; mixed yellowish brown (10YR 5/6) and grayish brown (2.5Y 5/2) stratified silt loam, 70 percent, and very fine sandy loam, 30 percent; few fine distinct yellowish brown (10YR 5/8) mottles; massive; friable; many medium soft white masses of calcium carbonate in upper part of horizon; common fine dark masses of iron and manganese; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 35 to 45 inches. Depth to free carbonates ranges from 29 to 38 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 25 to 40 inches.

The Ap horizon has value of 2 or 3. An A1 horizon is in some pedons. It is 6 to 10 inches thick. It has value of 2 or 3 and chroma of 1 or 2. The B2t horizon has hue of 10YR or 7.5YR in the upper part and 10YR, 7.5Y, or 2.5Y in the lower part. In some pedons the lower part of this horizon does not have mottles with chroma of 2 or less. The B3 horizon is light silty clay loam, light clay loam, or silt loam. It is neutral to moderately alkaline. The C horizon is predominantly stratified silt loam to fine sand but ranges to thin strata of light clay loam, silty clay, loam, and sand.

Griswold series

The Griswold series consists of deep, well drained, moderately permeable soils on till plains and moraines on uplands. These soils formed in sandy loam glacial till that has a thin mantle of loess. Slope ranges from 2 to 10 percent.

The Griswold soils in this survey area commonly contain more gravel and small stones in the lower part of the B horizon than is described in the range for the series. This difference does not alter the usefulness or behavior of these soils.

Griswold soils are similar to Kidder, La Rose, and Warsaw soils. Kidder soils do not have mollic epipedons. La Rose soils are slightly less permeable because they contain less sand in the lower part of the B horizon and in the C horizon. Warsaw soils formed in more permeable stratified gravel and sand.

Typical pedon of Griswold silt loam, 5 to 10 percent slopes, eroded, in a cultivated field 120 feet east of the Kane County line and 150 feet south of Penny Road, in Cook County, 1,275 feet north and 120 feet east of the southwest corner sec. 19, T. 42 N., R. 9 E:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam; friable; moderate medium and coarse granular structure; many roots; a moderate amount of fine and medium sand; less than 2 percent cobblestones by volume; neutral; abrupt smooth boundary.

B1t—7 to 10 inches; dark brown (10YR 3/3) clay loam; weak fine subangular blocky structure; friable; many roots; many thin dark brown (7.5YR 3/2) clay films on faces of peds; less than 5 percent pebbles and cobblestones by volume; neutral; clear smooth boundary.

B2t—10 to 19 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common roots; many dark brown (7.5YR 3/2) clay films on faces of peds; about 20 percent pebbles and cobblestones by volume; mildly alkaline; abrupt wavy boundary.

B3—19 to 25 inches; mixed yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) heavy loam; weak medium subangular blocky structure; friable; few roots; approximately 35 percent pebbles and cobblestones by volume; weak effervescence; mildly alkaline.

C—25 to 60 inches; yellowish brown (10YR 5/4) sandy loam; massive; very friable; approximately 35 percent pebbles and cobblestones by volume; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 39 inches. Depth to free carbonates ranges from 19 to 35 inches and is commonly less than the thickness of the solum. The mollic epipedon ranges from 9 to 15 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 2 or 3. An A3 horizon is in some pedons. The B2t horizon is clay loam in the upper part and clay loam or gravelly clay loam in the lower part. It has average clay content of 25 to 30 percent. The B2t horizon commonly is 25 to 45 percent coarse fragments in the lower part. It is medium acid to neutral in the upper part and slightly acid to mildly alkaline in the lower part. The B3 horizon is light clay loam to cobbly loam. The C horizon is sandy loam to cobbly loam.

Harpster series

The Harpster series consists of deep, poorly drained, moderately permeable soils on outwash plains and till plains on uplands. These soils contain free carbonates throughout the profile. They formed in calcareous silty material and the underlying stratified silts and sands. Slope ranges from 0 to 2 percent.

Harpster soils are similar to Drummer soils and are commonly adjacent to Drummer, Mundelein, and Peotone soils in the landscape. Drummer soils do not have a calcic horizon. Mundelein soils have an argillic horizon and are at a slightly higher elevation. Peotone soils have a mollic epipedon more than 24 inches thick.

Typical pedon of Harpster silty clay loam, in a cultivated field about 4 miles southwest of the city of Naperville, in Du Page County, 195 feet south and 85 feet west of the northeast corner sec. 33, T. 36 N., R. 9 E:

Apca—0 to 8 inches; very dark gray (10YR 3/1) light silty clay loam; weak fine granular structure; friable; few very small snail shells; violent effervescence; moderately alkaline; abrupt smooth boundary.

A12ca—8 to 15 inches; very dark gray (10YR 3/1) light silty clay loam; many fine faint dark grayish brown (2.5Y 4/2) mottles; weak fine and medium granular structure; friable; few very small snail shells; violent effervescence; moderately alkaline; clear smooth boundary.

B1—15 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine faint olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure parting to moderate very fine subangular blocky; friable; many very dark gray (10YR 3/1) organic coatings on faces of peds; common very dark gray (10YR 3/1) krotovinas; weak effervescence; moderately alkaline; clear smooth boundary.

B21g—21 to 26 inches; olive gray (5Y 5/2) silty clay loam; many fine distinct yellowish brown (10YR 5/8) mottles; weak fine prismatic structure parting to moderate medium angular blocky; firm; common thin dark gray (10YR 4/1) coatings on faces of peds; common very dark gray (10YR 3/1) krotovinas; weak effervescence; moderately alkaline; gradual smooth boundary.

B22g—26 to 33 inches; mixed light olive gray (5Y 6/2) and dark gray (10YR 4/1) silty clay loam; many fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to weak coarse subangular blocky; firm; common thin dark gray (10YR 4/1) coatings on faces of peds; common dark gray (10YR 3/1) krotovinas; weak effervescence; moderately alkaline; gradual smooth boundary.

IIB3gca—33 to 44 inches; light olive gray (5Y 6/2) and light gray (5Y 6/1) stratified silt loam and very fine sandy loam; moderate fine and medium distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few thin dark gray (10YR 4/1) coatings on faces of peds; few white (10YR 8/1) lime concretions; strong effervescence, violent in concretions; moderately alkaline; gradual wavy boundary.

IIC—44 to 60 inches; light olive gray (5Y 6/2) and light gray (5Y 6/1) stratified silt loam and very fine sandy loam; many coarse distinct yellowish brown (10YR 5/8) mottles; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 32 to 44 inches. Depth to the underlying stratified material ranges from 31 to 44 inches. The mollic epipedon ranges from 12 to 17 inches in thickness.

The A horizon is predominantly silty clay loam but ranges to heavy silt loam. The B horizon has weak to violent effervescence. The B3 horizon is commonly stratified silt loam to sandy loam but also contains strata of light silty clay loam to clay sandy clay loam. The C horizon is stratified silt loam, loam, very fine sandy loam, and clay loam.

Hoopeston series

The Hoopeston soil consists of deep, somewhat poorly drained soils on lake plains and outwash plains. These soils formed in loamy textured outwash material. They are moderately rapidly permeable in the upper part and rapidly permeable in the lower part. Slope ranges from 0 to 2 percent.

Hoopeston soils are similar to Mundelein, Watseka, and Wesley soils. Mundelein soils have a fine-silty control section and have finer texture throughout the profile. Watseka soils have a coarser texture and have less clay in the B horizon. Wesley soils have a finer texture in the lower part of the B horizon and in the C horizon.

Typical pedon of Hoopeston fine sandy loam, in Cook County, 600 feet north and 110 feet east of center of sec. 13, T. 36 N., R. 13 E:

A11—0 to 9 inches; black (10YR 2/1) fine sandy loam; moderate fine and medium granular structure; friable; many fine and medium roots; neutral; clear wavy boundary.

A12—9 to 13 inches; black (10YR 2/1) fine sandy loam; weak coarse granular structure; friable; many fine and medium roots; neutral; clear wavy boundary.

A3—13 to 17 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine subangular blocky structure; friable; common fine and medium roots;

many very dark gray (10YR 3/1) organic coats on peds; neutral; clear wavy boundary.

B21—17 to 23 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common fine and medium roots; discontinuous thin very dark grayish brown (2.5Y 3/2) to dark grayish brown (2.5Y 4/2) coatings on faces of peds; neutral; clear wavy boundary.

B22—23 to 30 inches; olive brown (2.5Y 4/4) heavy sandy loam; common fine distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to moderate and coarse subangular blocky; friable; common fine roots; many thin olive gray (5Y 4/2) clay films on faces of peds; neutral; clear wavy boundary.

B3—30 to 39 inches; brown (10YR 5/3) stratified very fine sandy loam, 80 percent, and loam, 20 percent; many medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak coarse prismatic structure; friable; few fine roots; slight effervescence; mildly alkaline; gradual smooth boundary.

C—39 to 60 inches; grayish brown (10YR 5/2); stratified fine sand, 60 percent, and silt loam, 40 percent; common medium distinct yellowish brown (10YR 5/6 and 5/4) mottles; massive; firm; few fine roots; strong effervescence; mildly alkaline.

The thickness of the solum and depth to free carbonates range from 30 to 42 inches. The thickness of the mollic epipedon ranges from 12 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 0 to 2. It is dominantly fine sandy loam but ranges to loamy fine sand, sandy loam, and loam. The B2 horizon has value of 4 or 5 and mostly chroma of 3 or 4, but chromas of 2 or less are in mottles at a depth of 12 to 24 inches. The B2 horizon is sandy loam, fine sandy loam, loam, and thin layers of sandy clay loam. It is slightly acid to mildly alkaline. The C horizon is predominantly fine sand and silt loam but ranges to loamy sand and sandy loam. It is mildly alkaline or moderately alkaline.

Houghton series

The Houghton series consists of deep, very poorly drained, moderately slowly permeable to moderately rapidly permeable organic soils. These soils are in depressions on lake plains, outwash plains, till plains, and moraines. They formed in herbaceous organic deposits. Slope ranges from 0 to 2 percent.

Houghton soils are similar to Muskego and Peotone soils. Muskego soils are underlain by less stable and less permeable coprogenous earth (sedimentary peat). Peotone soils are fine textured mineral soils that occur in positions similar to those of Houghton soils.

Typical pedon of a Houghton muck in an area of Muskego and Houghton mucks, in an idle field about 1 mile north of the village of Palos Park, in Cook County, 300 feet north and 1,370 feet east of the southwest corner sec. 15, T. 37 N., R. 12 E:

Oa1—0 to 7 inches; black (N 2/0) sapric material with a trace of fiber; moderate fine and medium granular structure; very friable; about 45 percent mineral soil; neutral; clear wavy boundary.

Oa2—7 to 16 inches; black (5YR 2/1) and dark brown (7.5YR 3/2) broken face sapric material, dark reddish brown (5YR 2/2) rubbed; about 10 percent fiber, less than 5 percent rubbed; weak thick platy structure; very friable; about 10 percent mineral soil; neutral; clear wavy boundary.

Oa3—16 to 27 inches; dark brown (7.5YR 3/2) and black (10YR 2/1) broken face sapric material, dark reddish brown (5YR 2/2) rubbed; about 25 percent fiber, about 5 percent rubbed; very weak thick platy structure; very friable; about 5 to 10 percent mineral soil; neutral; gradual wavy boundary.

Oa4—27 to 50 inches; black (10YR 2/1) with about 10 percent dark reddish brown (5YR 2/2) broken face, black (10YR 2/1) rubbed sapric material; about 5 to 10 percent fiber, a trace rubbed; massive; very friable; less than 5 percent mineral soil; neutral; gradual smooth boundary.

Oa5—50 to 59 inches; black (10YR 2/1) laminated sapric material; 10 to 15 percent fiber, about 5 percent rubbed; very friable; 5 to 10 percent mineral soil; neutral; massive; abrupt smooth boundary.

IIC—59 to 65 inches; gray (N 5/0) loamy sand and sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grained; loose; weak effervescence; moderately alkaline.

The thickness of the organic layer ranges from 51 inches to many feet.

The organic material has value of 2 or 3 and chroma of 0 to 2. It is predominantly sapric material but has layers of hemic material less than 10 inches thick. In some pedons it contains small woody fragments. It is neutral or slightly acid.

Kane series

The Kane series consists of somewhat poorly drained soils on uplands and stream terraces. These soils formed in 20 to 40 inches of loamy material over stratified gravel and sand. They are moderately permeable in the upper part and rapidly permeable in the lower part. Slope ranges from 0 to 3 percent.

Kane soils are similar to Mundelein soils and are commonly adjacent to Warsaw and Will soils in the landscape. Mundelein soils contain more silt in the A and B2 horizons, and they do not have gravel and sand in the underlying material. Warsaw soils are better drained, have typically steeper slopes, and are at a higher elevation than Kane soils. Will soils are more poorly drained and are in depressions.

Typical pedon of Kane silt loam, about 1 mile west of the village of Woodridge, in Du Page County, 860 feet north and 250 feet east of the southwest corner sec. 23, T. 38 N., R. 10 E:

Ap—0 to 7 inches; black (10YR 2/1) silt loam; weak fine granular structure; friable; neutral; abrupt smooth boundary.

A12—7 to 10 inches; mixed black (10YR 2/1) and very dark gray (10YR 3/1) heavy silt loam; moderate fine granular structure; friable; many roots; neutral; clear smooth boundary.

A3—10 to 13 inches; very dark gray (10YR 3/1) heavy silt loam; weak very fine and fine subangular blocky structure; friable; many roots; few thin dark brown (10YR 4/3) clay films on faces of peds; few fine dark iron and manganese stains; slightly acid; clear smooth boundary.

B21t—13 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; many dark brown (10YR 4/3) clay films on faces of peds; common roots; few fine and medium dark iron and manganese concretions; slightly acid; few pebbles; clear smooth boundary.

IIB22t—18 to 25 inches; light olive brown (2.5Y 5/4) clay loam; weak medium subangular blocky structure; common fine and medium faint yellowish brown (10YR 5/6) and common fine distinct dark grayish brown (10YR 4/2) mottles; firm; few dark brown (10YR 4/3) clay films on faces of peds; common roots; common fine dark iron and manganese concretions; neutral; many pebbles; gradual smooth boundary.

IIB3—25 to 29 inches; brown (10YR 5/3) light clay loam; very weak medium subangular blocky structure; few fine faint yellowish brown (10YR 5/8) and dark grayish brown (10YR 4/2) mottles; friable; many pebbles; slight effervescence; mildly alkaline; gradual smooth boundary.

IIIC—29 to 60 inches; mixed grayish brown (10YR 5/2) to brown (10YR 5/3) gravel and sand; single grain; loose; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 29 to 37 inches. Depth to free carbonates ranges from 20 to 35 inches and commonly is less than the thickness of the solum. Thickness of the overlying loamy material ranges from 29 to 36 inches. The mollic epipedon ranges from 10 to 14 inches in thickness.

The A horizon has chroma of 1 or 2. The B2 horizon has chroma of 3 or 4, but has mottles with chromas of 2 or less at a depth of 10 to 14 inches. This horizon is slightly acid or neutral in the upper part and neutral or mildly alkaline in the lower part. The IIB3 horizon is clay loam or sandy loam and typically is high in gravel. It is mildly alkaline or moderately alkaline. The C horizon is gravel or gravel and sand. It is mildly alkaline or moderately alkaline.

Kankakee series

The Kankakee series consists of well drained or moderately well drained, moderately rapidly permeable soils on high benches along streams. These soils formed in outwash that is loamy in the upper part and cobbly loam and sandy loam in the lower part. Slope ranges from 2 to 7 percent.

Kankakee soils are similar to Lorenzo soils and commonly are in positions in the landscape similar to Lorenzo, Rockton, and Warsaw soils. Lorenzo and Warsaw soils are underlain by gravel and do not have cobbly material in the lower part of the B horizon and in the C horizon. Rockton soils have a lithic contact at a depth of 20 to 40 inches.

Typical pedon of Kankakee loam, 2 to 7 percent slopes, in an idle field about 1.5 miles northwest of the village of Lemont, in Cook County, 1,430 feet south and 1,300 feet east of the northwest corner sec. 19, T. 37 N., R. 11 E.

Ap—0 to 8 inches; black (10YR 2/1) loam; very dark brown (10YR 2/2) crushed; moderate fine and medium granular structure; friable; many roots; mildly alkaline; abrupt smooth boundary.

A3—8 to 11 inches; very dark brown (10YR 2/2) loam, very dark grayish brown (10YR 3/2) crushed; moderate medium and coarse granular structure; friable; many roots; mildly alkaline; clear wavy boundary.

B21t—11 to 16 inches; brown (10YR 4/3) light clay loam; moderate fine subangular blocky structure; friable; common roots; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few pebbles; mildly alkaline; abrupt wavy boundary.

IIB22t—16 to 22 inches; dark yellowish brown (10YR 4/4) very cobbly heavy loam; weak and moderate medium subangular blocky structure; friable; common roots; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; about 50 percent cobblestones, a few flagstones; mildly alkaline; clear wavy boundary.

IIB3—22 to 28 inches; yellowish brown (10YR 5/4) cobbly sandy loam; weak coarse subangular blocky structure; very friable; few roots; few thin brown (10YR 4/3) clay films on faces of peds; approximately 40 percent cobblestones, a few flagstones; slight effervescence; moderately alkaline; gradual wavy boundary.

IIC—28 to 60 inches; mixed yellowish brown (10YR 5/4) and light brownish gray (2.5Y 6/2) cobbly sandy loam; common medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; very friable; few roots to depth of 32 inches; approximately 35 percent cobblestones, common flagstones; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 23 to 40 inches. Depth to free carbonates ranges from 18 to 35 inches. Thickness of the mollic epipedon ranges from 8 to 16 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is dominantly loam but ranges to sandy loam. The B2 horizon has value of 4 or 5 and chroma of 4 to 8. It has mottles in the lower part of some pedons. It is predominantly clay loam in the upper part but ranges to loam and sandy loam. It is cobbly or very cobbly loam or sandy loam in the lower part. The C horizon has value of 5 or 6 and chroma of 4 to 8. It has mottles in some pedons. It is cobbly sandy loam or cobbly loam and in some pedons has many flagstones.

Kidder series

The Kidder series consists of deep, well drained soils on glacial till plains and moraines. These soils formed in a thin layer of silty material and the underlying loamy glacial till. They are moderately permeable in the upper part and moderately rapidly permeable in the lower part. Slope ranges from 2 to 15 percent.

The Kidder soils in this survey area commonly contain more gravel in the lower part of the B horizon and in the C horizon than is described in the range for the series. This difference does not alter the usefulness or behavior of these soils.

The Kidder soils are similar to Fox and Miami soils. Fox soils are underlain by more permeable gravel and sand. Miami soils contain less sand in the B and C horizons.

Typical pedon of Kidder silt loam, 4 to 7 percent slopes, eroded, in a cultivated field in the village of Barrington Hills, in Cook County, 1,370 feet west and 775 feet north of the southeast corner sec. 7 T. 42 N., R. 9 E:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak very fine granular structure; friable; many fine roots; less than 2 percent pebbles and cobblestones by volume; neutral; abrupt smooth boundary.

B21t—8 to 12 inches; brown (7.5YR 4/4) silty clay loam; moderate very fine subangular blocky structure; firm; common fine roots; continuous moderately thick dark brown (7.5YR 3/2) clay films on faces of peds; a moderate amount of medium sand; less than 2 percent pebbles and cobblestones by volume; slightly acid; clear smooth boundary.

IIB22t—12 to 18 inches; brown (7.5YR 4/4) clay loam; moderate fine and medium subangular blocky structure; firm; common fine roots; continuous thick dark brown (7.5YR 3/2) clay films on faces of peds; approximately 10 percent pebbles and cobblestones by volume; slightly acid; abrupt wavy boundary.

IIB31t—18 to 27 inches; brown (10YR 4/3) and dark brown (7.5YR 3/2) gravelly loam; weak coarse subangular blocky structure; friable; few fine roots; common moderately thick dark brown (7.5YR 3/2) clay films on faces of peds; approximately 50 percent coarse fragments by volume with about 40 percent dolomite cobblestones; mildly alkaline; gradual wavy boundary.

IIB32t—27 to 39 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/4) gravelly loam; very weak coarse subangular blocky structure; friable; few fine roots; few thin dark brown (7.5YR 3/2) clay films on faces of peds; approximately 50 percent coarse fragments with about 40 percent dolomite cobblestones; weak effervescence; mildly alkaline; gradual wavy boundary.

IIC—39 to 60 inches; yellowish brown (10YR 5/4) gravelly sandy loam; massive; friable; approximately 45 percent coarse fragments with about 30 percent dolomite cobblestones; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 40 inches. Depth to free carbonates ranges from 22 to 39 inches. The silty upper material ranges from 7 to 14 inches in thickness.

The Ap horizon has value of 3 or 4 moist and 6 dry and chroma of 2 or 3. An A2 horizon is in some pedons. It has value of 4 or 5 and chroma of 3. It is silt loam but commonly has a moderate amount of sand and some pebbles. The B2 horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. It is slightly acid or medium acid in the upper part and slightly acid or neutral in the lower part. The B3 horizon is mildly alkaline or moderately alkaline. It is loam or clay loam. The B3 and C horizons are 35 to 50 percent coarse fragments, chiefly dolomitic cobblestones.

La Rose series

The La Rose series consists of deep, well drained, moderately permeable soils on gently rolling till plains on uplands. These soils formed in loamy glacial till. Slope ranges from 5 to 10 percent.

La Rose soils are commonly adjacent to Drummer, Lisbon, and Saybrook soils in the landscape and are similar to Saybrook soils. Drummer soils contain less sand in the B2 horizon and are in depressions. Lisbon and Saybrook soils contain less sand in the upper part of the B2 horizon, have a thicker solum, and are at a lower elevation than La Rose soils. In addition, Lisbon soils have chroma of 2 or less in the upper part of the B horizon.

Typical pedon of La Rose silt loam, 5 to 10 percent slopes, eroded, in a cultivated field in the village of Barrington Hills, in Cook County, 750 feet west and 2,180 feet south of the northeast corner sec. 17, T. 42 N., R. 9 E:

Ap—0 to 8 inches; very dark brown (10YR 2/2) heavy silt loam; moderate fine and medium granular structure; friable; many roots; few pebbles and cobblestones; mildly alkaline; abrupt smooth boundary.

B2t—8 to 14 inches; brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common roots; many thin very dark grayish brown (10YR 3/2) organic coats on faces of peds; a few very dark gray (10YR 3/1) worm casts; a high amount of fine and medium sand; a few pebbles and cobblestones; mildly alkaline; clear wavy boundary.

B3—14 to 18 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; few roots; few thin dark brown (10YR 3/3) organic coats on faces of peds; a high amount of fine and medium sand; few pebbles and cobblestones; weak effervescence; moderately alkaline; clear wavy boundary.

C—18 to 60 inches; yellowish brown (10YR 5/4) silt loam; massive; firm; a high amount of fine and medium sand; common pebbles and cobblestones; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 17 to 23 inches. Depth to free carbonates ranges from 12 to 20 inches and commonly is less than the thickness of the solum. The mollic epipedon ranges from 6 to 13 inches in thickness.

The Ap horizon has value of 2 or 3. The B2t horizon has value of 4 or 5 and chroma of 3 or 4. It is silty clay loam high in sand or is clay loam. This horizon is slightly acid to mildly alkaline. The B3 horizon is loam, clay loam, or silt loam and is high in sand. It contains free carbonates and is mildly alkaline or moderately alkaline. The C horizon is loam or silt loam. It has strong or violent effervescence.

Lisbon series

The Lisbon series consists of deep, somewhat poorly drained, moderately permeable soils on till plains on uplands. These soils formed in silty material and the underlying loamy glacial till. Slope ranges from 0 to 3 percent.

Lisbon soils are similar to Drummer and Mundelein soils and are commonly adjacent to Saybrook soils in the landscape. Drummer soils are in depressions, have a thicker solum and do not have an argillic horizon. Mundelein soils have stratification and are more friable in the lower part of the B horizon and in the C horizon. Saybrook soils are at a higher elevation and do not have mottles in chroma of 2 or less within 6 inches of the mollic epipedon.

Typical pedon of Lisbon silt loam, in a cultivated field about 6 miles southwest of the city of Naperville, in Du Page County, 50 feet south and 1,200 feet west of center of sec. 32, T. 38 N., R. 9 E:

Ap—0 to 8 inches; black (10YR 2/1) silt loam; weak very fine granular structure; friable; many roots; neutral; abrupt smooth boundary.

A12—8 to 11 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium and coarse granular structure; friable; common roots; many thin black (10YR 2/1) and very dark brown (10YR 2/2) organic coats on faces of peds; neutral; clear smooth boundary.

B1t—11 to 15 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; common roots; continuous moderately thick dark grayish brown (2.5Y 4/2) and very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B21t—15 to 20 inches; brown (10YR 4/3) silty clay loam; common fine faint dark grayish brown (2.5Y 4/2) mottles; moderate fine subangular blocky structure; firm; common roots; continuous moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; gradual smooth boundary.

B22t—20 to 26 inches; brown (10YR 4/3) silty clay loam; many fine faint dark grayish brown (10YR 4/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; common roots; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; very dark gray (10YR 3/1) organic coatings lining pores; mildly alkaline; abrupt smooth boundary.

IIB3—26 to 31 inches; light olive brown (2.5Y 5/4) light silty clay loam; many fine faint yellowish brown (10YR 5/6) and common fine distinct gray (N 6/0) mottles; weak medium prismatic structure parting to weak medium and coarse subangular blocky; friable; few roots; common thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; dark gray (10YR 3/1) organic coats on root channels; high amount of medium sand; few pebbles; weak effervescence; moderately alkaline; clear wavy boundary.

IIC—31 to 60 inches; light olive brown (2.5Y 5/4) heavy silt loam; many medium distinct yellowish brown (10YR 5/6) and common fine distinct gray (N 6/0) mottles; massive; friable and firm; high content of fine to coarse sand; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 31 to 40 inches. Depth to carbonates ranges from 27 to 35 inches and commonly is slightly less than the thickness of the solum. Thickness of the overlying silty material ranges from 25 to 39 inches. The mollic epipedon ranges from 10 to 15 inches in thickness.

The B2t has chroma of 2 or less at a depth ranging from 10 to 15 inches. It is silty clay loam. It has an average 32 to 35 percent clay. It is slightly acid or neutral in the upper part and neutral to mildly alkaline in the lower part. The B3 horizon ranges from light silty clay loam or silt loam that is high in sand to light clay loam and loam. It is neutral to moderately alkaline. The C horizon is heavy silt loam that is high in sand or is heavy loam.

Lorenzo series

The Lorenzo series consists of well drained soils that are shallow over sand and gravel on uplands or on benches along streams. These soils are moderately rapidly permeable in the upper loamy material and rapidly or very rapidly permeable in the underlying sand and gravel. Slope ranges from 5 to 15 percent.

Lorenzo soils are similar to Rodman soils and are commonly adjacent to Rodman, Warsaw, and Waupecan soils in the landscape. Rodman soils do not have an argillic horizon and have steeper slopes. Warsaw soils have a thicker solum. Waupecan soils have a thicker solum and contain more silt in the control section.

Typical pedon of Lorenzo loam, 10 to 15 percent slopes, eroded, in a cultivated field about 6 miles southwest of Barrington, in Cook County, 460 feet north and 1,680 feet east of the southwest corner sec. 30, T. 42 N., R. 9 E:

Ap—0 to 7 inches; very dark brown (10YR 2/2) loam; moderate fine and medium granular structure; friable; many roots; neutral; abrupt smooth boundary.

B2t—7 to 12 inches; brown (7.5YR 4/4) gravelly clay loam; weak fine and medium subangular blocky structure; firm; many roots; many thin dark brown (7.5YR 3/2) clay films on faces of peds; common very dark brown (10YR 2/2) worm channel fillings; neutral; clear wavy boundary.

B3t—12 to 16 inches; dark yellowish brown (10YR 4/4) gravelly clay loam; weak medium and coarse subangular blocky structure; friable; common roots; mildly alkaline; gradual wavy boundary.

C—16 to 60 inches; dark yellowish brown (10YR 4/4) gravel and sand; single grain; loose; few roots to depth of 24 inches; weak effervescence; moderately alkaline.

The thickness of the solum ranges from 15 to 21 inches. Depth to free carbonates ranges from 12 to 20 inches and is slightly less than the thickness of the solum. The mollic epipedon ranges from 7 to 11 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is dominantly loam but ranges to silt loam. The B2t horizon has value of 4 or 5 and chroma of 3 or 4. It is neutral to moderately alkaline. The B3 horizon is clay loam to very gravelly loam. It is neutral to moderately alkaline. The C horizon varies considerably in the proportion of sand and gravel.

Markham series

The Markham series consists of deep, moderately well drained, moderately slowly permeable or slowly permeable soils. These soils are on till plains and moraines on uplands. They formed in a thin layer of silty material and the underlying silty clay loam glacial till. Slope ranges from 2 to 10 percent.

Markham soils are similar to Beecher soils and are commonly adjacent to Beecher, Morley, and Varna soils in the landscape. Beecher soils contain mottles that have chroma of 2 or less throughout the profile. Morley soils have an Ap horizon that has value of 4 or more. Varna soils have a mollic epipedon.

Typical pedon of Markham silt loam, 2 to 5 percent slopes, about 3.5 miles northeast of the city of Elgin, in Cook County, 510 feet north and 2,450 feet east of the southwest corner sec. 3, T. 41 N., R. 9 E:

Ap—0 to 8 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) crushed, gray (10YR 5/1) dry; moderate fine granular structure; friable; many roots; neutral; clear smooth boundary.

A2—8 to 12 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; some mixing of very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1); weak thick platy structure parting to moderate fine and medium granular; friable; common roots; slightly acid; clear wavy boundary.

B1t—12 to 15 inches; brown (10YR 4/3) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common roots; many very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) coatings and a few clear light gray (10YR 7/1) silt grains on faces of peds; neutral; clear smooth boundary.

IIB21t—15 to 22 inches; brown (10YR 4/3) silty clay; strong very fine and fine angular and subangular blocky structure; firm; common roots; thin continuous dark brown (10YR 3/3) clay films on faces of peds; few pebbles and shale fragments; neutral; gradual smooth boundary.

IIB22t—22 to 28 inches; mixed dark yellowish brown (10YR 4/4) and light olive brown (2.5Y 5/4) light silty clay; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; very firm; common roots; thick continuous very dark gray (10YR 3/1) and black (10YR 2/1) clay films on faces of peds and lining root channels; few pebbles and shale fragments; mildly alkaline; clear wavy boundary.

IIB3—28 to 40 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; very firm; few roots; few moderately thick very dark gray (10YR 3/1) clay films on faces of peds and lining root channels; few pebbles and shale fragments; strong effervescence; moderately alkaline; gradual wavy boundary.

IIC—40 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; massive; very firm; few pebbles and shale fragments; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 42 inches. Depth to free carbonates ranges from 13 to 28 inches and is less than the thickness of the solum. Thickness of the overlying silty material typically is 8 to 15 inches and ranges from 0 to 18 inches.

The A horizon has color of 2 or 3 and chroma of 1 to 2. An A1 horizon is in some pedons. It has value of 2 or 3 and chroma of 1 or 2. It is 6 to 8 inches thick. Some cultivated pedons do not have an A2 horizon. The B2t horizon is heavy silty clay loam or silty clay, or both. It is an average 35 to 45 percent clay. The B2t horizon is strongly acid to slightly acid in the upper part and medium acid to moderately alkaline in the lower part. The B3 horizon is light to medium silty clay loam. It is mildly alkaline or moderately alkaline.

Martinton series

The Martinton series consists of deep, somewhat poorly drained soils in glacial lakebeds on uplands. These soils formed in silt loam and silty clay loam lakebed sediment. They are moderately slowly permeable in the upper part and slowly permeable in the lower part. Slope ranges from 0 to 3 percent.

Martinton soils are similar to Del Rey, Elliott, Milford, and Mundelein soils and are commonly adjacent to Milford soils in the landscape. Del Rey soils do not have a mollic epipedon. Elliott soils contain more sand and coarse fragments in the lower part of the B horizon and in the C horizon and formed in more dense glacial till. Milford soils are more poorly drained and are in depressions. Mundelein soils contain less clay in the B and C horizons.

Typical pedon of Martinton silt loam, in a cultivated field adjacent to the village of South Barrington, in Cook County, 1,825 feet north and 62 feet east of center of sec. 34, T. 42 N., R. 9 E:

Ap—0 to 9 inches; black (10YR 2/1) silt loam; dark gray (10YR 4/1) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

A3—9 to 12 inches; very dark grayish brown (10YR 3/2) heavy silt loam; moderate very fine and fine subangular blocky structure; friable; medium acid; clear smooth boundary.

B21t—12 to 18 inches; dark brown (10YR 4/3) silty clay loam; many fine faint dark grayish brown (10YR 4/2) mottles; moderate very fine and fine subangular blocky structure; firm; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

B22t—18 to 25 inches; mixed dark yellowish brown and dark grayish brown (10YR 4/2) heavy silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; strong very fine angular blocky structure; firm; few fine pores; many moderately thick dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1) clay films on faces of peds and on linings of root channels; neutral; gradual smooth boundary.

B23t—25 to 33 inches; yellowish brown (10YR 5/4) silty clay; many fine faint dark grayish brown (10YR 4/2) and common fine distinct brownish yellow (10YR 6/8) mottles; moderate fine and medium prismatic structure parting to moderate and strong medium angular blocky; very firm; common fine pores; many moderately thick black (10YR 2/1) organic and clay films on faces of peds and as linings of root channels; mildly alkaline; gradual smooth boundary.

B3—33 to 45 inches; light olive brown (2.5Y 4/4) silty clay loam; many fine faint brownish yellow (10YR 6/6) and few medium distinct gray (5Y 5/1) mottles; weak medium prismatic structure parting to weak medium and coarse angular blocky; very firm; common fine pores; few thin dark gray (10YR 4/1) clay films on faces of peds and as linings of root channels; weak effervescence in upper part of horizon, strong in lower part; moderately alkaline; gradual wavy boundary.

C—45 to 60 inches; olive brown (2.5Y 4/4) silty clay loam; medium distinct brownish yellow (10YR 7/8) and common medium distinct gray (5Y 5/1) mottles; massive; very firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 33 to 46 inches. Depth to free carbonates ranges from 24 to 40 inches and commonly is less than the thickness of the solum. The mollic epipedon is commonly 11 to 16 inches in thickness but ranges from 10 to 21 inches.

The A1 and Ap horizons have value of 2 or 3 and chroma of 1 or 2. A B1 horizon is in some pedons. It has value of 3 or 4 and chroma of 1 or 2. It is silty clay loam or light silty clay. The B2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It has chroma of 2 or less in mottles or on exteriors of peds at a depth of 13 to 21 inches. The B2 horizon is heavy silty clay loam or silty clay. It is slightly acid or neutral in the upper part and neutral to mildly alkaline in the lower part. The B3 horizon is silty clay loam to heavy silt loam. It is mildly alkaline to moderately alkaline. The C horizon is uniform silty clay loam or stratified silt loam to silty clay with some thin layers of fine sandy loam. It is mildly alkaline or moderately alkaline.

Miami series

The Miami series consists of deep, well drained soils on till plains and moraines on uplands. Permeability is moderate in the surface layer and subsoil and moderately slow in the underlying material. These soils formed in a thin layer of silty material and the underlying loamy glacial till. Slope ranges from 2 to 10 percent.

Miami soils are similar to Kidder, McHenry, and Morley soils. Kidder and McHenry soils contain more sand and coarse fragments in the B3 and C horizons. Morley soils have a fine textured B2t horizon.

Typical pedon of Miami silt loam, 2 to 5 percent slopes, in a cultivated field about 2 miles northwest of the village of Lemont, in Du Page County, 900 feet south and 285 feet east of the northwest corner sec. 18, T. 37 N., R. 11 E:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

IIB21t—8 to 15 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine angular and subangular blocky structure; firm; common clean light gray (10YR 7/2) and very pale brown (10YR 7/3) silt grains on faces of peds; many thin dark brown (10YR 4/3) clay films on faces of peds; few very fine dark iron and manganese concretions; few pebbles; moderate content of fine and medium sand; medium acid; clear smooth boundary.

IIB22t—15 to 25 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; continuous thin dark brown (7.5YR 3/2) clay films on faces of peds; common fine yellowish red (5YR 4/6) soft masses of iron oxide; common pebbles and small stones; slightly acid; clear smooth boundary.

IIB3—25 to 30 inches; yellowish brown (10YR 5/4) light clay loam; common medium faint yellowish brown (10YR 5/6) mottles; very weak coarse subangular blocky structure; friable; few thin dark brown (7.5YR 3/2) clay films on faces of peds; common pebbles and small stones and a few shale fragments; weak effervescence; mildly alkaline; clear wavy boundary.

IIC—30 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium faint yellowish brown (10YR 5/6) and grayish brown (2.5Y 5/2) mottles; massive; friable; common pebbles and small stones and few shale fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 36 inches. Depth to free carbonates commonly ranges from 25 to 32 inches. It is less than the thickness of the solum. Thickness of the overlying silty material ranges from 8 to 20 inches.

A1 and A2 horizons are in some pedons. The A1 horizon has value of 2 or 3 and chroma of 1 or 2. It is less than 5 inches thick. The A2 horizon has value of 4 or 5 and chroma of 3 or 4. It is silt loam. The B2 horizon has value of 4 or 5 and chroma of 3 or 4. It is medium acid or slightly acid in the upper part and slightly acid to mildly alkaline in the lower part. The B3 horizon is light clay loam or silty clay loam high in sand. It is mildly alkaline or moderately alkaline. The C horizon is loam or silt loam high in sand.

Milford series

The Milford series consists of deep, poorly drained, moderately slowly permeable soils on lake plains or along drainageways on uplands. These soils formed in silty clay loam lakebed sediment. Slope ranges from 0 to 2 percent.

Milford soils are similar to Ashkum and Bryce soils and are commonly adjacent to Martinton soils in the landscape. Ashkum soils partly formed in glacial till and do not have stratificiation in the lower part of the B horizon and in the C horizon. Bryce soils contain more clay in the Bg horizon. Martinton soils are somewhat poorly drained and are at a slightly higher elevation.

Typical pedon of Milford silty clay loam about 1 mile south of the village of Lansing, in Cook County, 1,650 feet south and 170 feet west of the northeast corner of sec. 7, T. 35 N., R. 15 E:

Ap—0 to 9 inches; black (N 2/0) heavy silty clay loam; weak fine granular structure; very firm; medium acid; abrupt smooth boundary.

A3—9 to 13 inches; black (10YR 2/1) heavy silty clay loam; moderate fine angular blocky structure; very firm; neutral; clear smooth boundary.

B21—13 to 22 inches; very dark gray (N 3/0) heavy silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium prismatic structure parting to strong medium angular blocky; very firm; a moderate amount of fine and medium sand; mildly alkaline; clear smooth boundary.

B22g—22 to 25 inches; mixed dark gray (5Y 4/1) and yellowish brown (10YR 5/6 and 5/8) heavy silty clay loam; moderate medium prismatic structure parting to moderate medium and coarse angular blocky; firm; mildly alkaline; gradual smooth boundary.

B3g—25 to 36 inches; gray (5Y 5/1) stratified heavy silty clay loam and silty clay; many medium prominent yellowish brown (10YR 5/8) and many coarse faint light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure; firm; few small white (10YR 8/1) concretions of calcium carbonate; few thin black (10YR 2/1) and very dark gray (10YR 3/1) organic and clay coatings on faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.

Cg—36 to 60 inches; gray (5Y 5/1) heavy silty clay loam; many coarse distinct light olive brown (2.5Y 5/4) and common medium distinct yellowish brown (10YR 5/6) mottles; massive; very firm; common very dark gray (10YR 3/1) organic stains on fracture faces and on lining of root channels in upper part of horizon; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 60 inches. Depth to free carbonates ranges from 29 to 53 inches and commonly is less than the thickness of the solum. The mollic epipedon ranges from 12 to 22 inches in thickness.

The A horizon has chroma of 0 to 2. It is heavy silty clay loam or light silty clay. The B2g horizon commonly has hue of 5Y but ranges to N, 10YR, and 2.5Y. It has value of 4 or 5 and chroma of 0 to 2. The B2g horizon is heavy silty clay loam or silty clay, or is stratified. It has an average 38 to 42 percent clay. It is neutral or mildly alkaline in the upper part and neutral to moderately alkaline in the lower part. The B3 horizon is silty clay loam to light silty clay. It is neutral to moderately alkaline. The C horizon is uniform silty clay loam or stratified silt loam to silty clay that has occasional thin layers of sandy loam.

Mokena series

The Mokena series consists of deep, somewhat poorly drained soils on till plains or lake plains on uplands. These soils formed in a moderately thick layer of silty and loamy outwash and the underlying clayey glacial till or lakebed sediment. They are moderately slowly permeable in the upper part and slowly permeable in the lower part. Slope ranges from 0 to 3 percent.

Mokena soils are similar to Andres soils and are commonly adjacent to Frankfort and Swygert soils in the landscape. Andres soils contain less clay in the lower part of the B horizon and in the C horizon. Frankfort soils do not have a mollic epipedon and contain more clay in the A horizon and in the upper part of the B horizon. Swygert soils contain more clay in the A horizon and in the upper part of the B horizon.

Typical pedon of Mokena silt loam in a cultivated field about 1 mile northeast of the village of Westhaven, in Cook County, 2,550 feet south and 1,380 feet west of the northeast corner sec. 14, T. 36 N., R. 12 E:

Ap—0 to 10 inches; very dark brown (10YR 2/2) silt loam; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

A12—10 to 14 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

IIB1t—14 to 17 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; continuous moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; a moderate amount of sand; few fine dark iron and manganese concretions; neutral; clear smooth boundary.

IIB21t—17 to 24 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine distinct brownish yellow (10YR 6/6) mottles; moderate fine and medium subangular blocky structure; friable; few thin grayish brown (10YR 5/2) clay films on faces of peds; a high amount of sand; common fine dark iron and manganese concretions; neutral; clear smooth boundary.

IIB22t—24 to 30 inches; light olive brown (2.5Y 5/4) clay loam; common fine distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few thin light brownish gray (10YR 6/2) clay films on faces of peds; common medium dark iron and manganese concretions; neutral; clear smooth boundary.

IIIB3—30 to 43 inches; light yellowish brown (2.5Y 6/4) silty clay; common medium distinct gray (5Y 6/1) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; very firm; few limestone pebbles; strong effervescence; mildly alkaline; clear smooth boundary.

IIIC—43 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay; common medium distinct gray (5Y 6/1) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; very firm; few limestone pebbles and shale fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 53 inches. Depth to free carbonates ranges from 30 to 38 inches and commonly is less than the thickness of the solum. Thickness of silty material that overlies the outwash is 12 to 23 inches, and depth to clayey glacial till or lakebed sediment is 31 to 43 inches. The mollic epipedon is 13 to 16 inches thick.

The A horizon has value of 2 or 3 and chroma of 2 or 1. The B2t horizon has mottles that have chroma of 2 or less at a depth of 13 to 16 inches. The upper part of the B2t horizon is silty clay loam that has a slight to high content of sand, and the lower part ranges from clay loam to silty clay loam that has a high content of sand. The B2t horizon in the upper 20 inches has an average 32 to 35 percent clay. It is neutral to medium acid in the upper part and slightly acid to moderately alkaline in the lower part. The upper part of the B3 horizon is clay loam to loam; the lower part commonly is silty clay but in some pedons it is thin strata of silty clay loam, silt loam, or very fine sand.

Morley series

The Morley series consists of deep, well drained, moderately slowly permeable and slowly permeable soils on uplands. These soils formed in silty clay loam glacial till and, in some places, a thin layer of overlying silty material. Slope ranges from 2 to 35 percent.

Morley soils are commonly adjacent to Ashkum, Blount, and Markham soils in the landscape and are similar to Markham soils. Ashkum soils have a mollic epipedon, do not have an argillic horizon, and are in depressions. Blount soils have mottles with chroma of 2 or less throughout the B horizon. Markham soils have an Ap horizon with value of less than 4.

Typical pedon of Morley silt loam, 2 to 5 percent slopes, about 1 mile north of the village of Lisle, in Du Page County, 1,550 feet north and 1,300 feet east of the southwest corner sec. 36, T. 39 N., R. 10 E:

A1—0 to 2 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak very fine granular structure; friable; neutral; clear irregular boundary.

A2—2 to 7 inches; dark brown (10YR 4/3) silt loam; light gray (10YR 7/2) dry; weak thin and medium platy structure; friable; medium acid; clear wavy boundary.

IIB1t—7 to 11 inches; dark brown (10YR 4/4) light silty clay loam; weak and moderate fine and medium subangular blocky structure; firm; few discontinuous dark brown (10YR 4/3) clay films on faces of peds; clear very pale brown (10YR 7/3) and light gray (10YR 7/1) silt grains on faces of peds; few small pebbles; moderate sand content; strongly acid; clear wavy boundary.

IIB21t—11 to 16 inches; dark yellowish brown (10YR 4/4) silty clay; moderate fine angular blocky structure; very firm; thin continuous dark brown (10YR 4/3) clay films on faces of peds; few small pebbles; slight sand content; strongly acid; clear smooth boundary.

IIB22t—16 to 23 inches; dark yellowish brown (10YR 4/4) silty clay; moderate fine and medium prismatic structure parting to strong medium and coarse angular blocky; very firm; thick dark brown (10YR 3/3) clay films on faces of peds; few pebbles and stones; slightly acid; abrupt wavy boundary.

IIB31—23 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse prismatic structure parting to weak and moderate medium and coarse angular blocky; firm; thick very dark grayish brown (10YR 3/2) clay films on faces of peds; few pebbles and stones; weak effervescence; mildly alkaline; gradual wavy boundary.

IIB32—30 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; few medium faint yellowish brown (10YR 5/6) and few medium distinct olive gray (5Y 5/2) mottles; weak coarse prismatic structure; firm; discontinuous thick very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay films on faces of peds; few pebbles and stones; strong effervescence; moderately alkaline; gradual wavy boundary.

IIC—34 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint yellowish brown (10YR 5/6) and common large distinct grayish brown (2.5Y 5/2) mottles; massive; firm; few pebbles and stones; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 42 inches. Depth to free carbonates ranges from 14 to 37 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 0 to 17 inches but is commonly 7 to 12.

The A1 horizon has chroma of 1 or 2. An Ap horizon is in some pedons. It has color value of 4 and chroma of 2 or 3. It is dominantly silt loam but is silty clay loam in eroded pedons. The B2t horizon has hue of 10YR or 7.5YR in the upper part and 10YR, 7.5YR, or 2.5Y in the lower part. It has mottles in the lower part of some pedons that have chroma of 2 or less. The B2t horizon is commonly silty clay but ranges to heavy silty clay loam and clay. It has an average clay content between 38 and 45 percent. It is strongly acid or medium acid in the upper part and slightly acid or neutral in the lower part.

Mundelein series

The Mundelein series consists of deep, somewhat poorly drained, moderately permeable soils on outwash plains on uplands and on benches along streams. These soils formed in silty material and the underlying stratified silts and sands. Slope ranges from 0 to 3 percent.

Mundelein soils are similar to Barrington soils and are commonly adjacent to Barrington, Drummer, and Wauconda soils in the landscape. Barrington soils are at a higher elevation and do not have mottles with chroma of 2 or less in the upper part of the B horizon. Drummer soils are in depressions and do not have an argillic horizon. Wauconda soils do not have a mollic epipedon.

Typical pedon of Mundelein silt loam, in an idle field about 3 miles southwest of the city of West Chicago, in Du Page County, 1,310 feet north and 1,690 feet east of the southwest corner sec. 20, T. 39 N., R. 9 E:

Ap—0 to 8 inches; black (10YR 2/1) and very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; many roots; slightly acid; abrupt smooth boundary.

A12—8 to 12 inches; very dark gray (10YR 3/1) silt loam; moderate coarse granular structure; friable; many roots; slightly acid; clear wavy boundary.

A3—12 to 17 inches; very dark grayish brown (10YR 3/2) light silty clay loam; moderate very fine subangular blocky structure; friable; common roots; few very dark gray (10YR 3/1) organic coats on faces of peds; few fine dark iron and manganese concretions; neutral; clear smooth boundary.

B21t—17 to 24 inches; dark grayish brown (10YR 4/2) heavy silty clay loam; many fine distinct yellowish brown (10YR 5/6) and common fine faint light brownish gray (2.5Y 6/2) mottles; moderate fine subangular blocky structure; firm; common roots; few fine pores; continuous moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine dark iron and manganese concretions; very dark gray (10YR 3/1) root channels; neutral; gradual smooth boundary.

B22t—24 to 31 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine and medium distinct light brownish gray (2.5Y 6/2) and many fine distinct yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium and coarse angular blocky; firm; few roots; common fine to medium pores in lower part of horizon; many moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine and medium dark iron and manganese concretions; very dark gray (10YR 3/1) root channels; mildly alkaline; clear smooth boundary.

IIB3—31 to 36 inches; mixed light olive brown (2.5Y 5/4) and dark yellowish brown (10YR 4/4) stratified light silty clay loam, light clay loam, and loam; common fine distinct yellowish brown (10YR 5/6 and 5/8) and light brownish gray (2.5Y 6/2) mottles; weak coarse prismatic structure parting to weak coarse angular blocky; friable; few roots; common moderately thick very dark grayish brown (10YR 3/2) clay films on faces of peds; strong effervescence; moderately alkaline; abrupt wavy boundary.

IIC—36 to 60 inches; mottled gray (5Y 6/1), strong brown (7.5YR 5/8), and pale olive (5Y 6/4) stratified silt loam and very fine sand; massive; friable; common fine white (10YR 8/1) calcium carbonate concretions in upper part of horizon; strong effervescence; moderately alkaline; clear smooth boundary.

The thickness of the solum ranges from 31 to 44 inches. Depth to free carbonates ranges from 29 to 38 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 29 to 34 inches. The mollic epipedon ranges from 10 to 18 inches in thickness.

The matrix, mottles, or faces of peds immediately below the mollic epipedon have chroma of 2 or less. The B horizon commonly has hue of 10YR or 2.5Y in the upper part of the horizon and 2.5Y or 5Y in the lower part. It is silty clay loam and has an average 32 to 35 percent clay; however, the content of sand increases in the lower part of the horizon in most pedons. The B horizon is medium acid to neutral in the upper part and slightly acid to mildly alkaline in the lower part. The B3 horizon is stratified light silty clay loam to sandy loam. It is neutral to moderately alkaline. The C horizon is stratified silt loam to fine sand and includes thin strata of loamy sand or sand.

Muskego series

The Muskego series consists of deep, very poorly drained organic soils in depressions. These soils formed in mostly decomposed reeds and sedges underlain by coprogenous earth (sedimentary peat). They are moderately permeable in the upper part and slowly permeable in the lower part. Slope ranges from 0 to 2 percent.

Muskego soils are similar to Houghton soils and are on similar positions in the landscape as Houghton and Peotone soils. Houghton soils do not have coprogenous earth above a depth of 50 inches. Peotone soils are fine textured mineral soils.

Typical pedon of Muskego muck from an area of Muskego and Houghton mucks, in the village of Glen Ellyn, in Du Page County, 1,650 feet north and 176 feet west of the southeast corner sec. 15, T. 39 N., R. 10 E:

Oa1—0 to 5 inches; black (N 2/0) broken face and rubbed sapric material; less than 5 percent fiber rubbed and unrubbed; moderate fine and medium granular structure; friable; about 50 percent mineral material; neutral; clear smooth boundary.

Oa2—5 to 17 inches; black (N 2/0) broken face and rubbed sapric material; less than 5 percent fiber rubbed and unrubbed; moderate fine subangular blocky structure; friable; about 50 percent mineral soil; neutral; clear smooth boundary.

Oa3—17 to 27 inches; black (10YR 2/1) broken face and rubbed sapric material; 5 to 10 percent fiber, less than 5 percent rubbed; weak thick platy structure; friable; about 25 percent mineral soil; neutral; gradual smooth boundary.

Lcol—27 to 35 inches; mixed very dark grayish brown (10YR 3/2) and dark brown (7.5YR 4/4) coprogenous earth; 5 percent fiber in upper part; massive; very friable; percentage of mineral soil varies from 0 to 20 percent in layers; neutral; diffuse smooth boundary.

Lco2—35 to 60 inches; very dark grayish brown (2.5Y 3/2) coprogenous earth; massive; very friable; mildly alkaline.

The thickness of the organic material overlying coprogenous earth is commonly about 24 to 30 inches but ranges from 18 to 50 inches.

The organic material has value of 2 or 3 and chroma of 0 to 2. It is neutral or slightly acid. It is commonly 20 to 60 percent mineral material but ranges from 10 to 75 percent. The coprogenous earth has hue of 2.5Y or 5Y, value of 3 or 4, and chroma of 2. It is massive but commonly parts to platy structure. It is mildly alkaline to slightly acid.

Nappanee series

The Nappanee series consists of deep, somewhat poorly drained, very slowly permeable soils on till plains or moraines on uplands. They formed in a thin layer of silty material and the underlying clayey glacial till. Slope ranges from 1 to 5 percent.

Nappanee soils are similar to Blount soils and are commonly adjacent to Bryce and Frankfort soils in the landscape. Blount soils contain less clay in the B and C horizons. Bryce soils have a mollic epipedon and are in depressions. Frankfort soils have an Ap horizon that has value of 3 or less.

Typical pedon of Nappanee silt loam, 1 to 5 percent slopes, in an idle field in a forest preserve about 1 mile northeast of the village of Wheeling, in Cook County, 60 feet south and 2,300 feet west of the northeast corner sec. 1, T. 42 N., R. 11 E:

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

A2—7 to 9 inches; grayish brown (10YR 5/2) heavy silt loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak thick platy structure parting to moderate fine subangular blocky; friable; many roots; common clean light gray (10YR 7/1) silt grains on faces of peds; medium acid; abrupt wavy boundary.

B1t—9 to 12 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine faint yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; firm; many roots; few grayish brown (10YR 5/2) silt grains and few dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark iron and manganese concretions; medium acid; clear wavy boundary.

IIB2t—12 to 24 inches; dark grayish brown (10YR 4/2) clay; many fine distinct yellowish brown (10YR 5/4) mottles; moderate coarse prismatic structure; very firm; common roots; common moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine dark iron and manganese concretions; slightly acid; gradual wavy boundary.

IIB3—24 to 32 inches; mixed brown (10YR 4/3) and gray (N 5/0) silty clay; few fine faint dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to moderate coarse angular blocky; very firm; few roots; many thin greenish gray (5BG 5/1) coatings on faces of peds; few medium white (10YR 8/1) concretions of calcium carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.

IIC—32 to 60 inches; mixed gray (N 6/0) and grayish brown (10YR 4/2) silty clay; massive; very firm; many medium white (10YR 8/1) concretions and segregated filaments of calcium carbonate; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 39 inches. Depth to free carbonates ranges from 22 to 30 inches and is commonly less than the thickness of the solum. Thickness of the overlying silty material ranges from 9 to 17 inches.

An A1 horizon is in some pedons. It has value of 2 to 4 and chroma of 1 or 2. The B2t horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. It is heavy silty clay or clay and has an average 42 and 55 percent clay. It is strongly acid to slightly acid in the upper part and slightly acid to mildly alkaline in the lower part.

Oakville series

The Oakville series consists of deep, well drained, very rapidly permeable soils on sand ridges. These soils formed in lake-deposited beach ridges, including some that have been reworked by wind. Slope ranges from 2 to 7 percent.

Oakville soils are commonly adjacent to Gilford, Watseka, and Wesley soils in the landscape. Gilford, Watseka, and Wesley soils have a mollic epipedon, are more poorly drained, and are nearly level. In addition, Gilford soils contain more clay in the solum. Wesley soils are underlain by dense silty clay loam lakebed sediment or glacial till.

Typical pedon of Oakville fine sand, 2 to 7 percent slopes, about 1 mile east of the village of Thornton, in Cook County, 2,600 feet north and 1,800 feet east of southwest corner sec. 33, T. 36 N., R. 4 E:

A11—0 to 4 inches; black (10YR 2/1) fine sand; weak fine and medium granular structure; very friable; medium acid; clear smooth boundary.

A12—4 to 6 inches; very dark grayish brown (10YR 3/2) fine sand; weak medium granular structure; very friable; medium acid; clear wavy boundary.

A2—6 to 13 inches; mixed, yellowish brown (10YR 5/4) 60 percent and brown (10YR 4/3) 40 percent, fine sand; weak thick platy structure, very friable; strongly acid, clear wavy boundary.

B2—13 to 33 inches; yellowish brown (10YR 5/6) fine sand; weak coarse subangular blocky structure to depth of 23 inches and massive below; very friable; few dark brown (7.5YR 4/4) iron stains in slightly firm fine to medium lamella; strongly acid; gradual smooth boundary.

B3—33 to 40 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few dark brown (7.5YR 4/4) iron stains in thin lamella; strongly acid; gradual wavy boundary.

C—40 to 60 inches; yellowish brown (10YR 5/4) mixed with light yellowish brown (10YR 6/4) sand and fine sand; single grain; loose; some coarse sand and a few fine pebbles in upper part of horizon; medium acid.

The thickness of the solum ranges from 20 to 40 inches. Free carbonates are at a depth of 40 to 60 inches in some pedons.

The A1 horizon is dominantly fine sand but ranges to loamy fine sand. The B2 horizon has value of 4 or 5 and chroma of 4 to 6. It is fine sand or loamy fine sand and is slightly acid to strongly acid.

Peotone series

The Peotone series consists of deep, very poorly drained soils in depressions on uplands. These soils formed in silty and clayey, water-deposited materials. They are moderately slowly permeable in the upper part and slowly permeable in the lower part. Slope ranges from 0 to 1 percent.

Peotone soils are similar to Ashkum, Drummer, and Sawmill soils and are commonly adjacent to Ashkum soils in the landscape. Ashkum and Drummer soils have a mollic epipedon less than 24 inches thick. In addition Drummer and Sawmill soils do not have fine texture in the B2 horizon. Sawmill soils are adjacent to streams and are frequently flooded.

Typical pedon of Peotone silty clay loam, in a forest preserve about 1 mile northwest of the village of Streamwood, in Cook County, 900 feet north and 560 feet west of the center of sec. 15, T. 41 N., R. 9 E:

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam; dark gray (10YR 4/1) and gray (10YR 5/1) dry; moderate medium granular structure; friable; many roots; neutral; clear smooth boundary.

A12—7 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) and gray (10YR 5/1) dry; moderate medium subangular blocky structure; firm; common roots; neutral; clear smooth boundary.

A3—13 to 25 inches; black (N 2/0) heavy silty clay loam, dark gray (10YR 4/1) dry; strong medium prismatic structure; very firm; common fine roots; neutral; gradual smooth boundary.

B21—25 to 31 inches; black (10YR 2/1) heavy silty clay loam; few fine distinct yellowish brown (10YR 5/8) and olive (5Y 5/3) mottles; moderate medium and coarse prismatic structure; very firm; a slight amount of sand; common roots; neutral; clear smooth boundary.

B22g—31 to 43 inches; gray (5Y 5/1) silty clay loam many fine and medium distinct yellowish brown (10YR 5/6) and common fine prominent strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate coarse angular blocky; firm; common roots; few black (10YR 2/1 krotovinas; mildly alkaline; gradual smooth boundary

B3g—43 to 52 inches; gray (N 5/0 and 6/0) silt loam and light silty clay loam; few fine and medium strong brown (7.5YR 5/8) and common medium distinct olive (5Y 5/4 and 5/3) mottles; weak coarse prismatic structure; friable; few roots; mildly alkaline gradual smooth boundary.

Cg—52 to 68 inches; gray (N 5/0) to light gray (N 6/0) silt loam; many fine and medium distinct light yellowish brown (2.5Y 6/4) and common medium and coarse prominent yellowish brown (10YR 5/8) mottles; massive; firm; thin stratified layers of loam, sandy loam, and silty clay loam; few fine pebbles in sandy loam layers; mildly alkaline.

The thickness of the solum ranges from 41 to more than 60 inches. Depth to free carbonates commonly is 45 inches or more but ranges from 37 to more than 60 inches. The mollic epipedon ranges from 24 to 34 inches in thickness.

The A1 or Ap horizon has hue of 10YR or N, value of 2 or 3, and chroma of 0 or 1. It is dominantly silty clay loam but ranges to light silty clay. The B2 horizon commonly has hue of N but also has hue of 10YR, 2.5Y, or 5Y. It is heavy silty clay loam or light silty clay. The B3 horizon is heavy silt loam to heavy silty clay loam and has thin strata of sandy loam. It is neutral to moderatly alkaline. The C horizon is silt loam to heavy silty clay loam, and has thin stratified layers of sandy loam and loam.

Rockton series

The Rockton series consists of moderately deep, well drained, moderately permeable soils on convex side slopes and ridges on uplands. These soils formed in loamy glacial drift that overlies limestone bedrock. Slope ranges from 2 to 7 percent.

Rockton soils are similar to Griswold and La Rose soils. Griswold and La Rose soils do not have a lithic contact within a depth of 40 inches.

Typical pedon of Rockton loam, 2 to 7 percent slopes, in the village of East Chicago Heights, in Cook County, 1,920 feet east and 132 feet north of center sec. 22, T. 35 N., R. 14 E:

Ap—0 to 10 inches; very dark brown (10YR 2/2) loam; weak very fine granular structure; friable; common very fine roots; medium acid; clear smooth boundary.

A3—10 to 13 inches; dark brown (10YR 3/3) and brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; common very fine roots; many very dark grayish brown (10YR 3/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

B21t—13 to 17 inches; brown (10YR 4/3) loam; moderate fine subangular blocky structure; friable; few very fine roots; continuous thin dark brown (10YR 3/3) clay films on faces of peds; slightly acid; gradual smooth boundary.

B22t—17 to 23 inches; brown (7.5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; friable; few very fine roots; continuous thin dark brown (7.5YR 4/2) clay films on faces of peds; few small pebbles; slightly acid; clear wavy boundary.

IIB23t—23 to 29 inches; brown (7.5YR 4/4) clay; weak fine prismatic structure parting to strong medium subangular blocky; very firm; few very fine roots; continuous moderately thick dark brown (7.5YR 3/2) clay films on faces of peds; few small pebbles; neutral; weak effervescence in lower part; mildly alkaline; clear wavy boundary.

IIR—29 inches; light gray (10YR 6/1) limestone bedrock, sloping beds, weathered and fractured in upper part.

The thickness of the solum and depth to limestone bedrock range from 20 to 40 inches. Thickness of the mollic epipedon ranges from 10 to 13 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is dominantly loam but ranges to silt loam and sandy loam. The B horizon has value of 4 and chroma of 3 or 4. The upper part of the B horizon is loam, sandy clay loam, or clay loam and is slightly acid to strongly acid. The IIB horizon is predominantly silty clay or clay but ranges to clay loam. It is slightly acid to mildly alkaline.

Rodman series

The Rodman series consists of excessively drained, very rapidly permeable soils that are shallow over sand and gravel. These soils are on kames, moraines, and outwash plains on uplands and on benches along streams. They formed in stratified sand and gravel. Slope ranges from 15 to 40 percent.

Rodman soils are similar to Lorenzo soils and are commonly adjacent to Lorenzo, Waupecan, and Warsaw soils in the landscape. Lorenzo, Waupecan, and Warsaw soils have an argillic horizon and a thicker solum. In addition Waupecan soils have silty A and B2t horizons and are deep to gravel. Warsaw soils are moderately deep over gravel.

Typical pedon of Rodman gravelly loam from an area of Rodman soils, 15 to 40 percent slopes, in a wooded area within the village limits of Barrington Hills, in Cook County, 950 feet south and 1,170 feet east of the northwest corner sec. 19, T. 42 N., R. 9 E:

A1—0 to 7 inches; black (N (2/0) gravelly loam; moderate fine and medium granular structure; very friable; common roots; mildly alkaline; clear smooth boundary.

B2—7 to 12 inches; brown (10YR 4/3) gravelly sandy loam; weak fine subangular blocky structure; very friable; few roots; few very dark gray (10YR 3/1) worm casts; common very dark brown (10YR 2/2) organic coats on faces of peds; mildly alkaline; clear wavy boundary.

C—12 to 60 inches; dark yellowish brown (10YR 4/4) sand and very pale brown (10YR 7/3) gravel and sand; single grain; loose; very few fine roots to a depth of about 20 inches; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 9 to 13 inches. Depth to free carbonates ranges from 6 to 13 inches and commonly is less than the thickness of the solum. The mollic epipedon ranges from 6 to 9 inches in thickness.

The A horizon has hue of 10YR or is N and has chroma of 0 or 1. It is dominantly gravelly loam but ranges to gravelly sandy loam. The B horizon is gravelly sandy loam or gravelly loam and is mildly alkaline or neutral. The C horizon varies considerably in sand and gravel content.

Romeo series

The Romeo series consists of very shallow, moderately permeable soils. These soils are on water-swept benches of limestone bedrock on flood plains. Slope ranges from 0 to 2 percent.

Romeo soils are commonly near Faxon and Sawmill soils in the landscape. Faxon soils have a lithic contact at a depth of 20 to 40 inches. Sawmill soils formed in deep alluvium and do not have a lithic contact within a depth of 40 inches.

Typical pedon of Romeo silt loam, in idle land about 1 mile north of the village of Lemont, in Cook County, 1,700 feet east and 620 feet south of the northwest corner sec. 20, T. 37 N., R. 11 E:

A1—0 to 5 inches; black (10YR 2/1) silt loam; moderate fine and granular structure; friable; many fine roots; mildly alkaline; abrupt smooth boundary.

IIR—5 inches; light gray (10YR 7/2) level bedded limestone bedrock; weak effervescence.

The combined thickness of the solum and overlying stream alluvium ranges from 2 to 8 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is commonly silt loam but ranges to loam. It is mildly alkaline or neutral. The underlying limestone bedrock has a high content of dolomite.

Sawmill series

The Sawmill series consists of deep, poorly drained, moderately permeable or moderately slowly permeable soils on flood plains and in some upland drainageways. These soils formed in silty alluvial material. Slope ranges from 0 to 2 percent.

Sawmill soils are similar to Drummer, Milford, and Peotone soils. Drummer soils have a mollic epipedon less than 24 inches thick. Milford soils have a mollic epipedon less than 24 inches thick and have a fine textured B horizon. Peotone soils have a fine textured B horizon and typically are in deep depressions on uplands.

Typical pedon of Sawmill silty clay loam, in a bluegrass meadow about 1 mile north of the village of Lisle, in Du Page County, 1,000 feet south and 2,300 feet west of the northeast corner sec. 3, T. 38 N., R. 10 E:

A11—0 to 8 inches; black (10YR 2/1) silty clay loam; moderate fine and medium granular structure; friable; many roots; neutral; gradual smooth boundary.

A12—8 to 15 inches; black (10YR 2/1) silty clay loam; moderate medium granular structure; friable; common roots; neutral; clear wavy boundary.

A13—15 to 22 inches; black (10YR 2/1) to very dark gray (10YR 3/1) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; firm; common roots; neutral; gradual wavy boundary.

A3—22 to 30 inches; very dark gray (10YR 3/1) heavy silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate fine and medium prismatic structure parting to moderate medium angular blocky; firm; common roots; neutral; gradual wavy boundary.

B21g—30 to 35 inches; gray (N 5/0) silty clay loam; many fine and medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; firm; few roots; common thin very dark gray (10YR 3/1) coatings on faces of peds; neutral; gradual wavy boundary.

B22g—35 to 41 inches; mottled, gray (N 5/0) 30 percent and strong brown (7.5YR 5/8) 70 percent, silty clay loam; weak coarse prismatic structure; firm; few roots; common thin dark gray (10YR 3/1) coatings on faces of peds; many yellow (2.5Y 7/6) and white (10YR 8/2 and 8/1) decomposed limestone pebbles; mildly alkaline; abrupt wavy boundary.

IIB3g—41 to 49 inches; gray (N 5/0) clay loam; massive; firm; weak effervescence; moderately alkaline; clear irregular boundary.

IICg—49 to 70 inches; dark gray (N 4/0) and yellowish brown (10YR 5/4) stratified sandy loam and loam; massive; friable; weak effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 49 inches. The mollic epipedon ranges from 24 to 36 inches in thickness.

The A horizon has hue of 10YR, 2.5Y, or N, value of 2 or 3, and chroma of 1 or 2. The B2g horizon has hue of 10YR, 2.5Y, or N, value of 4 or 5, and chroma of 0 or 1. It is dominantly medium silty clay loam but has some strata of light silty clay loam to silty clay and has an average 29 to 35 percent clay. It is slightly acid or mildly alkaline. The B3 horizon is uniform silty clay loam or clay loam, or it has strata of loam, silt loam, and sandy loam. The C horizon is uniform silty clay loam, or it is stratified sandy loam to silty clay loam. It is neutral to moderately alkaline.

Saybrook series

The Saybrook series consists of deep, moderately well drained, moderately permeable soils on till plains on uplands. These soils formed in a moderately thick layer of silty material and the underlying loamy glacial till. Slope ranges from 2 to 5 percent.

Saybrook soils are similar to Barrington and La Rose soils and are commonly adjacent to La Rose and Lisbon soils in the landscape. Barrington soils have stratification in the lower part of the B horizon and in the C horizon and are more permeable than Saybrook soils. La Rose soils contain more sand in the upper part of the B horizon and are on steeper slopes. Lisbon soils are nearly level and are somewhat poorly drained.

Typical pedon of Saybrook silt loam, 2 to 5 percent slopes, in an idle field within the village of Barrington Hills, in Cook County, 1,700 feet south and 540 feet east of the northwest corner sec. 20, T. 42 N., R. 9 E:

Ap—0 to 7 inches; black (10YR 2/1) and very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; many roots; neutral; abrupt smooth boundary.

A3—7 to 13 inches; very dark grayish brown (10YR 3/2) light silty clay loam, grayish brown (10YR 5/2) and brown (10YR 5/3) dry; moderate very fine and fine subangular blocky structure; friable; many roots; slightly acid; gradual smooth boundary.

B21t—13 to 22 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common roots; continuous thin dark brown (10YR 3/3) organic coats on faces of peds; slightly acid; clear smooth boundary.

B22t—22 to 26 inches; brown (10YR 4/3) silty clay loam; moderate fine prismatic structure parting to medium angular blocky; firm; common roots; continuous moderately thick dark brown (7.5YR 3/2) clay films on faces of peds; a slight amount of coarse sand; neutral; abrupt smooth boundary.

IIB3—26 to 36 inches; mixed dark yellowish brown (10YR 4/4), dark brown (10YR 4/3), and yellowish brown (10YR 5/4) heavy loam; weak medium prismatic structure; friable; few roots; few thin dark brown (7.5YR 3/2) clay films on faces of peds; many pale yellow (2.5Y 8/4) decomposed limestone pebbles; weak effervescence in lower part of horizon; mildly alkaline; gradual wavy boundary.

IIC—36 to 60 inches; yellowish brown (10YR 5/4) loam; massive; friable; common pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 42 inches. Depth to free carbonates commonly ranges from 26 to 38 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 26 to 31 inches. The mollic epipedon ranges from 11 to 19 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The B2 horizon has hue of 10YR in the upper part of the horizon and 10YR or 2.5Y in the lower part. It has value of 4 or 5 and chroma of 3 or 4. In some pedons mottles have chroma of 2 or less beginning at a depth of 20 to 28 inches. The IIB3 horizon is typically heavy loam or silt loam but ranges to light clay loam or light silty clay loam that is high in sand. It is mildly alkaline or moderately alkaline. The C horizon is loam to heavy silt loam.

Selma series

The Selma series consists of deep, poorly drained, moderately permeable soils on outwash and lake plains. These soils formed in loamy calcareous outwash. Slope ranges from 0 to 2 percent.

Selma soils are similar to Drummer, Faxon, and Gilford soils. Drummer soils contain more silt in the solum. Faxon soils have a lithic contact at a depth of less than 40 inches and are on flood plains. Gilford soils contain less clay throughout the profile.

Typical pedon of Selma loam, 150 feet west of the frontage road on north side of I-57 and 20 feet south of 155th Street, near the village of Markham, in Cook County, 2,400 feet north and 2,300 feet west of the southeast corner sec. 14, T. 36 N., R. 13 E:

A11—0 to 9 inches; black (10YR 2/1) loam; moderate medium granular structure; friable; neutral; clear smooth boundary.

A12—9 to 14 inches; black (10YR 2/1) light clay loam; very dark brown (10YR 2/2) crushed; moderate medium and coarse granular structure; friable; neutral; clear wavy boundary.

B1—14 to 17 inches; olive gray (5Y 4/2) clay loam; many fine distinct light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common thin black (10YR 2/1) organic coats on faces of peds; neutral; clear wavy boundary.

B21g—17 to 22 inches; olive (5Y 4/3) clay loam; many fine faint olive gray (5Y 5/2) and many fine distinct light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; discontinuous olive gray (5Y 5/2) coatings on faces of peds; few fine irregular calcium carbonate concretions; few black (10YR 2/1) krotovinas; neutral in fine earth; gradual wavy boundary.

B22g—22 to 33 inches; olive gray (5Y 5/2) clay loam; many fine distinct light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; discontinuous dark gray (5Y 4/1) coatings on peds; few fine and medium irregular calcium carbonate accumulations; mildly alkaline; gradual wavy boundary.

B3g—33 to 50 inches; gray (5Y 5/1) stratified light silty clay loam and clay loam; many fine and medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak coarse angular blocky; friable; discontinuous gray (5Y 5/1) coatings on faces of peds; weak effervescence; mildly alkaline; gradual wavy boundary.

C—50 to 60 inches; gray (5Y 5/1) and light gray (5Y 6/1) stratified sand and silt loam and a thin layer of silty clay loam; medium prominent yellowish brown (10YR 5/8) mottles; massive; friable and firm in silt and silty layers and very friable in sand layers; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 35 to 55 inches. Thickness of the mollic epipedon ranges from 13 to 19 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly loam but ranges to silt loam and clay loam. The B2 horizon has value of 4 or 5 and chroma of 3 or less. It is dominantly clay loam or loam but ranges to sandy clay loam or sandy loam in the lower part. It is neutral or mildy alkaline. The C horizon is predominantly silt loam and sand, but it contains layers of loam and silty clay loam.

Swygert series

The Swygert series consists of deep, somewhat poorly drained, slowly permeable soils on till plains or lake plains. These soils formed in a thin layer of silty material and the underlying clayey glacial till or lakebed sediment. Slope ranges from 1 to 3 percent.

Swygert soils are similar to Bryce soils and are commonly adjacent to Bryce, Frankfort, and Mokena soils in the landscape. Bryce soils do not have an argillic horizon and are in depressions. Frankfort soils do not have a mollic epipedon. Mokena soils do not have a fine textured B2t horizon.

Typical pedon of Swygert silty clay loam, in an idle field about 1 mile west of Tinley Park, in Cook County, 260 feet south and 50 feet east of the northwest corner sec. 25, T. 36 N., R. 12 E:

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam; dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; many roots; neutral; abrupt wavy boundary.

B21t—10 to 13 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine faint olive brown (2.5Y 4/4) mottles; weak fine prismatic structure parting to moderate very fine and fine subangular blocky; firm; common roots; common very dark gray (10YR 3/1) organic coatings and many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; few very small dark iron and manganese concretions; neutral; clear smooth boundary.

B22t—13 to 17 inches; grayish brown (2.5Y 5/2) silty clay; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to strong fine angular blocky; firm; common roots; few very dark gray (10YR 3/1) organic coatings and many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; few very small dark iron and manganese concretions; neutral; clear smooth boundary.

IIB23t—17 to 21 inches; olive gray (5Y 5/2) silty clay; moderate fine distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium prismatic structure parting to strong medium angular blocky; very firm; few roots; few black (10YR 2/1) and very dark gray (10YR 3/1) organic coatings and common thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine pebbles; mildly alkaline; clear wavy boundary.

IIB3—21 to 34 inches; gray (5Y 5/1) silty clay; many fine and medium distinct yellowish brown (10YR 5/4 and 5/6) mottles; weak medium prismatic structure parting to moderate medium and coarse angular blocky; very firm; few roots down vertical faces of peds; common thin gray (N 5/0) clay films on faces of peds; few light concretions of calcium carbonate; few fine pebbles; strong effervescence; moderately alkaline.

IIC—34 to 60 inches; dark grayish brown (2.5Y 4/2) silty clay; many medium distinct yellowish brown (10YR 5/4) and gray (N 5/0) mottles; massive; very firm; few light concretions and segregated filaments of calcium carbonate; few fine pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 27 to 36 inches. Depth to free carbonates ranges from 21 to 30 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 10 to 17 inches. The mollic epipedon ranges from 9 to 15 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is silty clay loam or heavy silt loam. An A3 or a B1 horizon is in some pedons. The B2t horizon has hue of 10YR or 2.5Y in the upper part of the horizon and 2.5Y or 5Y in the lower part. It has value of 4 to 6 and chroma of 2 to 4. All pedons have chroma of 2 or less either in the matrix, on mottles, or on faces of peds. The B2t horizon is silty clay or clay and has an average 45 to 55 percent clay. It is neutral to slightly acid in the upper part and neutral to mildly alkaline in the lower part. The C horizon is heavy silty clay loam or silty clay.

Symerton series

The Symerton series consists of deep, well drained soils on uplands. These soils formed in an moderately thick layer of loamy outwash and the underlying silty clay loam glacial till or lakebed sediment. They are moderately permeable in the upper part and moderately slowly permeable in the lower part. Slope ranges from 2 to 5 percent.

Symerton soils are similar to Andres soils and are commoly adjacent to Andres, Ashkum, and Markham soils in the landscape. Andres soils formed in material similar to that of Symerton soils but have grayish mottles in the upper part of the B2t horizon. Ashkum soils have a fine textured grayish B2 horizon and are in depressions. Markham soils have a fine textured B2t horizon.

Typical pedon of Symerton silt loam, 2 to 5 percent slopes, in a cultivated field adjacent to the village of Hoffman Estates, in Cook County, 630 feet north and 60 feet west of center of sec. 33, T. 42 N., R. 9 E:

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.

A3—8 to 12 inches; dark brown (10YR 3/3) heavy silt loam; moderate coarse granular structure; friable; a moderate content of sand; few fine pebbles; slightly acid; clear smooth boundary.

IIB21t—12 to 18 inches; brown (7.5YR 4/3) clay loam; moderate fine and medium subangular blocky structure; friable; continuous thin dark brown (7.5YR 3/2) clay films on faces of peds; few fine pebbles; slightly acid; gradual smooth boundary.

IIB22t—18 to 24 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; continuous thin dark brown (7.5YR 3/2) clay films on faces of peds; neutral; gradual smooth boundary.

IIB23t—24 to 28 inches; brown (7.5YR 4/4) clay loam; weak medium subangular blocky structure; friable; many moderately thick dark brown (7.5YR 3/2) clay films on faces of peds; neutral; abrupt smooth boundary.

IIIB3—28 to 35 inches; dark brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to weak medium and coarse angular blocky; very firm; few thin dark brown (10YR 3/3) clay films on faces of peds; few shale fragments and dolomite pebbles; weak effervescence; mildly alkaline; clear wavy boundary.

IIIC—35 to 60 inches; dark yellowish brown (10YR 4/4) silty clay loam; massive; very firm; few shale fragments and dolomite pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 45 inches. Depth to free carbonates ranges from 28 to 40 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 12 to 22 inches. Depth to silty clay loam glacial till or lakebed sediment ranges from 24 to 34 inches. The mollic epipedon ranges from 10 to 16 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The B2t horizon commonly has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. In some pedons it has hue of 2.5Y in the lower part of the horizon and has mottles with chroma of 2 or less at a depth as shallow as 20 inches. The B2t horizon is silty clay loam or clay loam in the upper part and in the lower part increases in sand content as depth increases. This horizon has an average 32 to 35 percent clay. It is medium acid to neutral in the upper part and medium acid to mildly alkaline in the lower part. The C horizon is uniform silty clay loam, or it is stratified with thin strata of silt loam, silty clay, and sandy loam.

Thorp series

The Thorp series consists of deep, poorly drained, slowly permeable soils on glacial outwash or till plains. These soils formed in silty material and in the underlying loamy outwash or glacial till. Slopes range from 0 to 1 percent.

Thorp soils are commonly adjacent to Griswold soils in areas of sandy loam till. They are similar to Wauconda soils. Griswold soils contain less clay in the solum, are well drained, and do not have an albic horizon. Wauconda soils are somewhat poorly drained and do not have a mollic epipedon.

Typical pedon of Thorp silt loam, about 5 miles southwest of the village of Barrington, in Cook County, 250 feet south and 2,200 feet west of the northeast corner sec. 30, T. 42 N., R. 9 E:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam; weak very fine and fine granular structure; friable; neutral; abrupt smooth boundary.

A12—9 to 12 inches; very dark gray (10YR 3/1) silt loam; weak medium granular structure; friable; neutral; clear smooth boundary.

A2—12 to 17 inches; dark grayish brown (2.5Y 4/2) silt loam; few fine faint grayish brown (2.5Y 5/2) mottles; weak thick platy structure; friable; many clean, light gray (10YR 7/1), dry silt grains on faces of peds; medium acid; clear wavy boundary.

B1g—17 to 19 inches; dark grayish brown (2.5Y 4/2) light silty clay loam; moderate fine subangular blocky structure; firm; many clean light gray (10YR 7/1), dry silt grains and common thin dark gray (10YR 4/1) clay films on faces of peds; slightly acid; clear smooth boundary.

B21tg—19 to 30 inches; olive gray (5Y 5/2) heavy silty clay loam; few fine distinct yellowish brown (10YR 5/8) and common fine faint gray to light gray (5Y 6/1) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; very firm; many moderately thick dark gray (10YR 4/1) clay films on faces of peds; many fine dark iron and manganese concretions; neutral; gradual smooth boundary.

IIB22tg—30 to 37 inches; olive gray (5Y 5/2) and light olive gray (5Y 6/2) clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium and coarse angular blocky and subangular blocky; firm; common moderately thick very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; many fine dark iron and manganese concretions; neutral; abrupt smooth boundary.

IIB3g—37 to 48 inches; mottled light olive gray (5Y 6/2), yellowish brown (10YR 5/6 and 5/8), and light yellowish brown (2.5Y 6/4) loam; weak coarse subangular blocky structure; friable; few thin very dark gray (10YR 3/1) clay films on faces of peds; few dark iron and manganese concretions; few dolomitic pebbles; slight effervescence at a depth of 42 inches; mildly alkaline; clear wavy boundary.

IIC—48 to 60 inches; mottled light olive gray (5Y 6/2), yellowish brown (10YR 5/6 and 5/8), and light yellowish brown (2.5Y 6/4) stratified loam and silt loam; massive; very friable; many dolomite pebbles; weak effervescence; mildly alkaline.

The thickness of the solum and depth to free carbonates range from 42 to 65 inches. Thickness of the mollic epipedon ranges from 10 to 22 inches.

The A1 horizon has value of 2 or 3 and chroma of 1. The B2 horizon has value of 4 or 5 and chroma of 1 or 2. It is silty clay loam or clay loam and has an average

30 to 35 percent clay. It is slightly acid or neutral. The C horizon is dominantly stratified outwash that has layers of silt loam, loam, and sandy loam but in places is sandy loam glacial till.

Varna series

The Varna series consists of deep, moderately well drained and well drained soils on uplands. These soils formed in a thin layer of silty material and the underlying silty clay loam glacial till. They are moderately slowly permeable in the upper part and slowly permeable in the lower part. Slope ranges from 2 to 5 percent.

Varna soils are commonly adjacent to Ashkum, Elliott, and Markham soils in the landscape and are similar to Markham soils. Ashkum soils do not have an argillic horizon and are in depressions. Elliott soils have mottles that have chroma of 2 or less throughout the B horizon. Markham soils do not have a mollic epipedon.

Typical pedon of Varna silt loam, 2 to 5 percent slopes, in an idle field in a forest preserve about 3.5 miles east of the city of Elgin, in Cook County, 750 feet south and 400 feet west of the center of sec. 10, T. 41 N., R. 9 E:

Ap—0 to 8 inches; black (10YR 2/1) silt loam, very dark brown (10YR 2/2) crushed; weak very fine granular structure; friable; many roots; neutral; abrupt smooth boundary.

A12—8 to 12 inches; very dark grayish brown (10YR 3/2) light silty clay loam; moderate medium granular structure; friable; many roots; many very dark gray (10YR 3/1) organic coats on faces of peds; neutral; clear smooth boundary.

A3—12 to 15 inches; dark brown (10YR 3/3) silty clay loam; moderate fine subangular blocky structure; friable; common roots; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine pebbles; slightly acid; clear smooth boundary.

IIB21t—15 to 19 inches; brown (10YR 4/3) heavy silty clay loam; weak fine prismatic structure parting to moderate very fine subangular blocky; firm; common roots; many thin dark brown (10YR 3/3) and dark grayish brown (10YR 4/2) clay films on faces of peds; few fine pebbles; neutral; clear smooth boundary.

IIB22t—19 to 25 inches; brown (10YR 4/3) light silty clay; common fine faint yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) mottles; moderate fine prismatic structure parting to moderate and strong fine and medium angular blocky; firm; common roots; many thin dark brown (10YR 3/3) and dark grayish brown (10YR 4/2) clay films on faces of peds; a few moderately thick very dark gray (10YR 3/1) clay films on vertical faces of peds; few fine pebbles; mildly alkaline; abrupt wavy boundary.

IIB3—25 to 33 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium and coarse gray (5Y 5/1) and many fine faint dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to weak medium and coarse angular blocky; firm; few roots; few thin dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few fine and medium pebbles; strong effervescence; moderately alkaline; gradual wavy boundary.

IIC—33 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium and coarse gray (5Y 5/1) and many fine faint dark yellowish brown (10YR 4/4) mottles; massive; firm; few fine roots to a depth of about 40 inches; few fine yellowish red (5YR 4/6) and red (2.5Y 5/6) soft rounded iron and manganese concretions; common light gray (10YR 7/1) segregated filaments of lime; common fine and medium pebbles; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 29 to 38 inches. Depth to free carbonates ranges from 21 to 31 inches and commonly is less than the thickness of the solum. Thickness of the overlying silty material ranges from 11 to 18 inches. The mollic epipedon ranges from 11 to 15 inches in thickness.

The Ap or A1 horizon has value of 2 or 3 and chroma of 1 or 2. A B1 horizon is in some pedons. The lower part of the B2t horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 to 4. The B2t is heavy silty clay loam to heavy silty clay and has an average 36 to 45 percent clay. It is medium acid to neutral in the upper part and neutral to mildly alkaline in the lower part. The C horizon is light or medium silty clay loam.

Warsaw series

The Warsaw series consists of well drained soils that are moderately deep over sand and gravel on uplands or on stream benches. Permeability is moderate in the solum and very rapid in the underlying material. These soils formed in 20 to 40 inches of silty and loamy material over gravel and sand. Slope ranges from 1 to 7 percent.

Warsaw soils are similar to Fox soils and are commonly adjacent to Kane, Waupecan, and Will soils in the landscape. Fox soils do not have a mollic epipedon. Kane soils are somewhat poorly drained and are nearly level. Waupecan soils have a thicker solum and contain more silt in the control section. Will soils are poorly drained and are in depressions.

Typical pedon of Warsaw silt loam, 2 to 5 percent slopes, in an idle field about 1 mile east of Elgin, in Cook County, 1,600 feet south and 1,400 feet east of the northwest corner sec. 20, T. 41 N., R. 9 E:

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; neutral; abrupt smooth boundary.

A3—9 to 14 inches; dark brown (10YR 3/3) heavy silt loam; weak very fine subangular blocky structure; friable; neutral; clear wavy boundary.

B21t—14 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine subangular blocky structure; firm; thin continuous dark brown (10YR 4/3) clay films on faces of peds; a slight amount of fine and medium sand; slightly acid; gradual wavy boundary.

B22t—21 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; thin continuous dark brown (10YR 4/3) clay films on faces of peds; a moderate amount of fine and medium sand; medium acid; clear wavy boundary.

IIB23t—26 to 31 inches; dark brown (7.5YR 3/2) gravelly clay loam; weak and moderate coarse subangular blocky structure; firm; neutral; abrupt wavy boundary.

IIC—31 to 60 inches; mixed yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) gravel, 60 percent, and sand, 40 percent; single grain; loose; many cobblestones; weak effervescence; moderately alkaline.

The thickness of the solum ranges from 31 to 37 inches. Depth to gravelly material ranges from 24 to 37 inches. The mollic epipedon ranges from 12 to 15 inches in thickness.

The A1 or Ap horizon has value of 2 or 3 and chroma of 1 or 2. A B1 horizon is in some pedons. It has value of 3 or 4 and chroma of 2 or 3. It is heavy silt loam or light silty clay loam. The B23t horizon has hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 2 to 4. It is slightly acid to mildly alkaline. The C horizon is gravel or gravel and sand.

Watseka series

The Watseka series consists of deep, somewhat poorly drained, rapidly permeable soils. These soils are on outwash plains or low beach ridges on lake plains on uplands. They formed in sandy material derived from glacial drift that has been reworked by water. Slope ranges from 0 to 2 percent.

Watseka soils are commonly adjacent to Gilford, Hoopeston, and Wesley soils in the landscape and are similar to Hoopeston soils. Gilford soils are at a lower elevation and have a gleyed B horizon. Hoopeston soils contain more clay in the B horizon. Wesley soils are firmer and finer textured in the lower part of the B horizon and in the C horizon.

Typical pedon of Watseka loamy fine sand, in the Markham Prairie in the village of Markham, in Cook County, 1,800 feet north and 500 feet east of the southwest corner sec. 13, T. 36 N., R. 13 E:

A1—0 to 11 inches; black (10YR 2/1) loamy fine sand; weak medium granular structure; very friable; many roots; slightly alkaline; clear wavy boundary.

B2—11 to 25 inches; light olive brown (2.5Y 5/4) loamy fine sand; common fine and medium faint grayish brown (2.5Y 5/2) and pale olive (5Y 5/3) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; many roots; strongly acid; gradual wavy boundary.

C1—25 to 36 inches; mottled light olive brown (2.5Y 5/4) and grayish brown (2.5Y 5/2) fine sand; common medium distinct strong brown (7.5YR 5/8) mottles; single grain; loose; few roots; medium acid; gradual wavy boundary.

C2—36 to 60 inches; mottled gray (5Y 6/1) and light olive gray (5Y 6/2) fine sand; common fine and medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) mottles; single grain; loose; medium acid.

The thickness of the solum ranges from 25 to 36 inches. The mollic epipedon ranges from 10 to 16 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The B horizon has hue of 10YR or 2.5Y. It is loamy fine sand or fine sand and is strongly acid to slightly acid. The C horizon is loamy fine sand or sand and is medium acid to neutral.

Wauconda series

The Wauconda series consists of deep, somewhat poorly drained, moderately permeable soils on outwash plains on uplands or on benches along streams. These soils formed in silty material and the underlying stratified silts and sands. Slope ranges from 0 to 3 percent.

Wauconda soils are similar to Grays soils and are commonly adjacent to Grays, Mundelein, and Zurich soils in the landscape. Grays soils do not have chroma of 2 or less in the upper part of the B2t horizon and are at a higher elevation. Mundelein soils have a mollic epipedon. Zurich soils have an Ap horizon with value of more than 3 or an A1 horizon that is less than 5 inches thick. Zurich soils do not have chroma of 2 or less in the upper part of the B2t horizon and are on steeper slopes.

Typical pedon of Wauconda silt loam, in a cultivated field about 2.5 miles west of the city of Warrenville, in Du Page County, 400 feet north and 1,320 feet east of the southwest corner sec. 32, T. 40 N., R. 9 E:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam; grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

A2—7 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak thick platy structure; friable; many clean light gray (10YR 7/1) silt grains on faces of peds; medium acid; clear wavy boundary.

B21t—10 to 17 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine faint dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; firm; common clean light gray (10YR 7/1) silt grains and common thin dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—17 to 25 inches; brown (10YR 4/3) heavy silty clay loam; common fine distinct yellowish brown (10YR 5/6 and 5/8) and common medium faint dark grayish brown (10YR 4/2) mottles; moderate fine prismatic structure parting to moderate fine and medium angular blocky; firm; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; few very fine dark iron and manganese concretions; neutral; gradual smooth boundary.

B23t—25 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common moderately thick grayish brown (2.5Y 5/2) clay films on faces of peds; common fine dark iron and manganese concretions; neutral; gradual smooth boundary.

IIB3—36 to 44 inches; grayish brown (2.5Y 5/2) light silty clay loam; many medium distinct olive (5Y 5/3) and pale olive (5Y 6/3) mottles; weak coarse prismatic structure; friable; thin olive gray (5Y 5/2) clay films on faces of peds; moderate amount of fine and medium sand; few very fine dark iron and manganese concretions; strong effervescence; moderately alkaline; clear wavy boundary.

IIC—44 to 60 inches; mixed light yellowish brown (2.5Y 6/4) and yellowish brown (10YR 5/6) stratified silt and very fine sand; many fine distinct light brownish gray (2.5Y 6/2) mottles; massive; very friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 44 inches. Depth to free carbonates ranges from 22 to 36 inches. Depth to the underlying stratified silt and sand ranges from 18 to 44 inches.

The Ap or A1 horizon has value of 2 or 3 and chroma of 1 or 2 and is 6 to 10 inches thick. An A2 horizon is not present in some pedons. The lower part of the B2 horizon is silty clay loam or clay loam. The B3 horizon has strata of light silty clay loam, clay loam, silt loam, and loam. It is mildly alkaline or moderately alkaline. The C horizon has strata of silt, loam, fine sandy loam, and fine sand.

Waupecan series

The Waupecan series consists of deep, well drained or moderately well drained soils on outwash plains on uplands and on benches along streams. These soils formed in deep silty material and the underlying gravel and sand. They are moderately permeable in the silty material and very rapidly permeable in the gravel and sand. Slope ranges from 1 to 5 percent.

Waupecan soils are similar to Barrington soils and are commonly adjacent to Warsaw and Will soils in the landscape. Barrington soils do not have contact with gravel and sand in the lower part of the B horizon and in the C horizon. Warsaw soils have a thinner solum and contain less silt in the B2t horizon. Will soils do not have an argillic horizon and are in depressions.

Typical pedon of Waupecan silt loam, 1 to 5 percent slopes, near the eastern city limits of Elgin, in Cook County, 400 feet north and 1,600 feet west of the southwest corner sec. 19, T. 41 N., R. 9 E:

A1—0 to 7 inches; very dark brown (10YR 2/2) silt loam; grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many roots; neutral; gradual wavy boundary.

A12—7 to 16 inches; very dark grayish brown (10YR 3/2) silt loam; brown (10YR 5/3) dry; moderate medium and coarse granular structure; friable; many roots; neutral; clear wavy boundary.

B1t—16 to 20 inches; brown (10YR 5/3) light silty clay loam, dark brown (10YR 4/3) crushed; weak fine subangular blocky structure; friable; common roots; slightly acid; clear smooth boundary.

B21t—20 to 28 inches; dark brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common roots; thin discontinuous dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

B22t—28 to 38 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium angular blocky structure; firm; common roots; thin discontinuous dark brown (10YR 3/3 and 7.5YR 3/2) clay films on faces of peds; strongly acid; clear smooth boundary.

B23t—38 to 45 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silty clay loam; moderate coarse prismatic structure parting to moderate medium and coarse angular blocky; firm; common roots; continuous moderately thick dark brown (7.5YR 3/2) clay films on vertical faces of peds; medium acid; abrupt wavy boundary.

IIB3t—45 to 50 inches; dark reddish brown (5YR 3/2) clay loam; weak coarse prismatic structure; very firm; few roots; slightly acid; abrupt wavy boundary.

IIC—50 to 60 inches; yellowish brown (10YR 5/4) gravel and sand; single grained; loose; few limestone cobbles, chiefly dolomite; weak effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 56 inches. Thickness of the overlying silty material ranges from 36 to 55 inches. The mollic epipedon ranges from 10 to 17 inches in thickness.

The A1 or Ap horizon has chroma of 1 or 2. An A3 horizon is in some pedons. It has value of 3 and chroma of 2 or 3. The B2t horizon generally has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. In some pedons the lower part of the B2t horizon has hue of 2.5Y and mottles that have chroma of 2 or less. The B horizon is strongly acid to slightly acid in the upper part and medium acid to mildly alkaline in the lower part. The IIB3 horizon is clay loam, sandy clay loam, gravelly clay loam, or gravelly loam. The C horizon varies considerably in the content of sand and gravel and has as much as 30 percent cobbles in some pedons.

Wesley series

The Wesley series consists of deep, somewhat poorly drained soils that are moderately rapidly permeable in the upper part and moderately slowly permeable in the lower part. These soils are on low beach ridges in former glacial lakes. They formed in coarse textured outwash and the underlying finer textured glacial till or lakebed material. Slope ranges from 0 to 3 percent.

Wesley soils are similar to Hoopeston and Watseka soils and are near Oakville soils. Hoopeston soils formed entirely in outwash sediment and have stratified silt and sand in the underlying material. Watseka soils formed entirely in sand. Oakville soils are moderately well drained and well drained. They formed entirely in sand and are on higher beach ridges.

Typical pedon of Wesley fine sandy loam, in the village of Markham, in Cook County, 2,400 feet south and 50 feet west of center of sec. 24, T. 36 N., R. 13 E:

Ap—0 to 6 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—6 to 10 inches; very dark brown (10YR 2/2) very fine sandy loam; weak medium granular structure; very friable; many fine roots; neutral; clear smooth boundary.

A3—10 to 13 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine and medium subangular blocky structure; very friable; many fine and medium roots; neutral; clear smooth boundary.

B21—13 to 26 inches; yellowish brown (10YR 5/4 and 5/6) loamy very fine sand with a band of fine sand at a depth of 17 to 21 inches; common fine faint grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; very friable; common fine roots; neutral; abrupt smooth boundary.

IIB22g—26 to 31 inches; gray (5Y 5/1) loam; many medium distinct yellowish brown (10YR 5/8 and 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; very firm; few fine roots; few pebbles; mildly alkaline; gradual wavy boundary.

IIB3g—31 to 43 inches; gray (5Y 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8 and 5/6) mottles; weak coarse prismatic structure; very firm; few fine roots; few pebbles; slight effervescence; mildly alkaline; gradual wavy boundary.

IICg—43 to 60 inches; gray (5Y 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8 and 5/6) mottles; massive; very firm; few pebbles; strong effervescence; mildly alkaline.

The thickness of the outwash overlying the glacial till or lakebed material ranges from 20 to 40 inches, and the thickness of the solum ranges from 24 to 53 inches. Free carbonates typically are in the lower part of the solum and in the C horizon.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly fine sandy loam but ranges to loamy fine sand. The IIB horizon has value of 5 and chroma of 1 to 4. It is mildly alkaline or moderately alkaline. The IIC horizon has value of 5 or 6 and chroma of 1 to 4. It is mildly alkaline or moderately alkaline.

Will series

The Will series consists of poorly drained soils on outwash plains and stream benches. These soils are moderately deep over sand and gravel. They formed in loamy outwash and the underlying calcareous sand and gravel. They are moderately permeable in the upper part and are rapidly permeable in the lower part. Slope ranges from 0 to 2 percent.

Will soils are similar to Selma soils and are commonly near Kane and Warsaw soils in the landscape. Selma soils do not contact calcareous gravel at a depth of less than 40 inches. Kane soils are somewhat poorly drained, and Warsaw soils are well drained.

Typical pedon of Will silty clay loam, in Du Page County, 1,749 feet north and 1,155 feet east of the southwest corner sec. 8, T. 40 N., R. 10 E:

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam; moderate fine granular structure; firm; neutral; clear smooth boundary.

A12—8 to 14 inches; black (10YR 2/1) clay loam; moderate fine granular structure; firm; neutral; clear smooth boundary.

B21—14 to 20 inches; gray (5Y 5/1) heavy clay loam; few fine distinct light olive brown (2.5Y 5/6) mottles; weak medium angular blocky and subangular blocky structure; firm; neutral; gradual smooth boundary.

B22—20 to 25 inches; gray (5Y 5/1) clay loam; few fine faint olive gray (5Y 5/2) mottles; weak medium subangular blocky and angular blocky structure; firm; mildly alkaline; gradual smooth boundary.

B23—25 to 31 inches; gray (5Y 5/1) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; very weak medium angular blocky and subangular blocky structure; firm; mildly alkaline; abrupt smooth boundary.

IIB3—31 to 34 inches; gray (2.5Y 6/2) gravelly loam; single grain; loose; few dolomitic pebbles; strong effervescence; moderately alkaline; abrupt smooth boundary.

IIC—34 to 60 inches; gray (N 6/0) gravel and sand; few fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; single grain; loose; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 34 to 37 inches. The mollic epipedon ranges from 10 to 17 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1. It is dominantly silty clay loam but ranges to clay loam. The B2 horizon has value of 4 to 6 and chroma of 1 or 2. It is clay loam but ranges to heavy clay loam and silty clay loam. The C horizon has value of 5 to 8 and chroma of less than 2. It is mildly alkaline or moderately alkaline.

Zurich series

The Zurich series consists of deep, moderately well drained and well drained soils on outwash plains on uplands and on benches along streams. These soils formed in silty material and the underlying stratified silts and sands. They are moderately permeable in the upper part and moderately rapidly permeable in the lower part. Slope ranges from 2 to 10 percent.

Zurich soils are similar to Barrington soils and are commonly adjacent to Barrington, Grays, and Wauconda soils in the landscape. Barrington soils have a mollic epipedon. Grays soils have an Ap horizon with value of 3 or less. Wauconda soils have mottles with chroma of 2 or less throughout the B horizon.

Typical pedon of Zurich silt loam, 2 to 5 percent slopes, in a cultivated field about 1 mile northwest of the village of West Chicago, in Du Page County, 2,425 feet north and 1,900 feet west of the southeast corner sec. 33, T. 40 N., R. 9 E:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; a slight amount of fine sand; neutral; abrupt smooth boundary.

B21t—8 to 15 inches; brown (10YR 4/3) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; firm; common light brownish gray (10YR 6/2) silt grains and few thin dark yellowish brown (10YR 3/4) clay films on faces of peds; a slight amount of fine sand; medium acid; gradual smooth boundary.

B22t—15 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; firm; few light brownish gray (10YR 6/2) silt grains and common thin dark brown (10YR 3/3) clay films on faces of peds; few very fine dark iron and manganese concretions; medium acid; clear smooth boundary.

IIB23t—20 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct pale olive (5Y 6/3) mottles; moderate medium angular and subangular blocky structure; firm; common moderately thick dark brown (7.5YR 3/2) clay films on faces of peds; a moderate amount of fine sand; few small pebbles in upper part of horizon; few very fine dark iron and manganese concretions; some strong brown (7.5YR 5/8) iron and manganese stains on faces of peds between depths of 25 and 29 inches; medium acid; clear wavy boundary.

IIB3—29 to 33 inches; yellowish brown (10YR 5/4) light silty clay loam; weak coarse subangular blocky structure; friable; few thin dark brown (7.5YR 3/2) clay films on faces of peds; a moderate amount of sand; slightly acid; clear wavy boundary.

IIC—33 to 60 inches; yellowish brown (10YR 5/4) stratified silt loam, 70 percent, and very fine sand, 30 percent; few fine faint yellowish brown (10YR 5/6) mottles; massive; friable; common fine light concretions of calcium carbonate in upper 5 inches of horizon; strong and violent effervescence; moderately alkaline.

The thickness of the solum ranges from 33 to 48 inches. Depth to free carbonates ranges from 31 to 39 inches. Thickness of the overlying silty material ranges from 20 to 39 inches.

An A1 horizon is in some pedons. It has value of 3 or 4 and chroma of 1 or 2. The B2t horizon has hue of 10YR or 7.5YR and chroma of 3 or 4. The lower part of this horizon, in some pedons, has mottles with chroma of 2 or less. The upper part of this horizon is silty clay loam that has a small amount of sand, but typically the sand content increases to a moderate or high amount in the lower part of the horizon. The B2t horizon is medium acid or strongly acid in the upper part but ranges to mildly alkaline in the lower part of some pedons. The B3 horizon is light silty clay loam or silt loam that contains sand or light clay loam, or it is stratified silts and sands.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*20*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 17, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is 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 expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Haplaquolls (*Hapl*, meaning simple horizons, plus *aquoll*, the suborder of Mollisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-silty, mixed, mesic, Typic Haplaquolls.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the soils

This section discusses the effects of the five soil forming factors on the development of the soils in the survey area. Also included is a brief discussion of the surficial geology of the region (*4, 5, 28*).

Factors of soil formation

Soil is produced by soil forming processes acting on materials deposited or accumulated by geologic agencies. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated and existed since accumulation, (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 soil material (*10*).

Climate and plant and animal life are active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material also affects the kind of soil profile that is formed and, in extreme cases, determines it almost entirely. Finally, time is needed for changing the parent material into a soil profile. It may be much or little, but some time is always required for differentiation of soil horizons. Generally, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four. Many of the processes of soil development are unknown.

Parent material

The parent material of soils in the survey area resulted directly from glaciers of Wisconsin age. As these glaciers advanced, retreated, and readvanced, they changed the landscape significantly. Glacial till was deposited directly by glacial ice, and outwash sediment was deposited by glacial melt water. In areas where drainage was blocked, shallow lakes formed and received deposition of lacustrine sediment. Larger lakes, such as former Lake Chicago, were characterized by sandy beach ridges on their perimeter. Surficial deposits of glacial outwash and till, lacustrine sediment, and beach ridges are parent material of a majority of the soils in the survey area. Less extensive are soils that formed in alluvium, loess, organic material, and material weathered from bedrock.

Silurian age dolomitic limestone (*27*) underlies the unconsolidated deposits in the survey area. The thickness of the overlying deposits ranges from more than 400 feet in the Des Plaines Valley in the northwestern part of Cook County to less than 3 feet in the southern part of Cook County. Near Thornton, the underlying bedrock is exposed or covered by less than 3 feet of loamy material. Rockton, Romeo, and Faxon soils formed in areas where the material is relatively thin over dolomite bedrock. Throughout most of the survey area, unconsolidated materials range from 50 to 250 feet in thickness.

The survey area is made up of four main physiographic divisions: (1) the lake plain of former glacial Lake Chicago, (2) the terminal and ground moraines associated with the Valparaiso, Tinley, Manhattan-Minooka, and Lake Border morainic systems, (3) the outwash plain of the Valparaiso morainic system, and (4) the alluvial stream and river deposits.

The plain of the former glacial Lake Chicago extends in the same general direction as the shoreline of Lake Michigan. It enters Cook County at the Indiana line and stretches northwestward for 20 miles through southern Cook county (*4*). Here, the lake plain leaves the detailed survey area, continues almost due north, and encompasses all of Chicago and many of the western and northern suburbs. The lake plain re-enters the detailed survey area, near Glenview in the northern part of Cook County, and extends northward to within a few miles of the Lake County line.

The ancient lake plain and the associated shorelines of Lake Chicago furnished two distinctly different parent materials, coarse textured beach and near shore deposits and fine textured slack water and offshore sediment. Along old shorelines, rapid gradational changes may occur between the fine and coarse textured sediments.

Lake Chicago had three distinct levels, the Glenwood, Calumet, and Toleston stages. The highest and oldest of these was the Glenwood stage, approximately 55 feet above the present level of Lake Michigan. A long sand beach ridge in the southern part of Cook County marks the boundary of the former lake at this stage. This ridge extends from east of East Chicago Heights, northwest along the Glenwood-Dyer Road to the north of Deer Creek, and on into Glenwood. On the higher parts of the ridges are the well drained Oakville soils, and in the nearly level areas are the somewhat poorly drained Watseka soils. In depressions are the Gilford soils. In areas where the sand only thinly covered the lakebed sediment or where the lakebed sediment is coarser textured near the sand ridges are the poorly drained Selma soils and the somewhat poorly drained Wesley and Hoopeston soils.

To the northeast and southwest of the Glenwood Beach, soil formed in fine textured lacustrine slack water sediment. These lakebed soils are generally quite flat and are between successive beaches of former Lake Chicago. The somewhat poorly drained Martinton and Del Rey soils formed in the nearly level areas, and the poorly drained Milford and Peotone soils formed in the level or depressional areas. These fine textured lakebed soils of the Glenwood stage are also in the northern part of Cook County between morainal ridges from north of Glenview to Northbrook. Beaches of the Glenwood stage are not in the northern part of Cook County.

The Calumet stage was the second highest level of Lake Chicago, approximately 35 feet above the present level of Lake Michigan. The Calumet Beach can be observed in two areas in the southern part of Cook County. The first area forms a mile wide belt, stretching from Indiana on the east directly through the middle of Lansing and on westward to Thorn Creek. Ridge Road follows the top of this ridge.

The other area of the Calumet stage forms a long, almost continuous low ridge 1/2 mile wide, beginning just south of the Calumet Sag Channel in Palos Heights. It runs diagonally to the southeast and cuts off temporarily in Oak Forest. It then begins in Markham and continues through Hazelcrest and Homewood all the way to the dolomite quarry in Thornton. Also, two barely discernible parallel ridges run northwest to southeast between the Calumet Sag Channel and Stony Creek in Worth and Chicago Ridge. The soils formed in these sandy desposits are the Oakville, Watseka, and Gilford soils.

During the Toleston stage, the former lake was only 20 feet higher than the present level of Lake Michigan. Toleston stage deposits are long, low sand ridges in the southern part of Cook County. These ridges form a belt approximately 2 miles wide parallel to Lake Michigan. They extend from the Indiana line on the east, northwesterly to north of Calumet City, and out of the survey area. Michigan City Road runs along the top of the highest ridge.

The entire morainic system in the survey area forms a belt roughly parallel to the shoreline of Lake Michigan. This belt is about 26 miles wide in the northern part of Cook County. It extends westward from Lake Michigan to the Kane County line and then curves southeastward through Du Page County. It narrows gradually until it is only 6 to 8 miles wide in southern Cook County and only about 2 miles wide when it leaves the survey area at the Indiana line. The eastern boundary of this morainic belt in southern Cook County is the lakeplain of former Lake Chicago, approximately 14 miles southwest of Lake Michigan.

The morainic belt consists of three morainic systems in the survey area. The oldest and widest of these is the

Valparaiso. It lies farthest to the west and has for its western boundary the ground moraine of the Manhattan-Minooka moraine, which extends west and south of Naperville out of Du Page County. The Valparaiso moraine is roughly 10 to 12 miles wide throughout the survey area, although it narrows somewhat in southern Cook County. The Tinley moraine is east of the Valparaiso and is 6 miles wide at its widest point in northern Cook County. The Lake Border moraines, the youngest, are only in northern Cook Couunty, east of the Tinley moraine and adjacent to Lake Michigan.

These moraines are glacial till and are made up of an unsorted mixture of boulders, sand, silt, and clay. They generally represent an equilibrium position at the ice margin. Level areas of ground moraines, between the morainic uplands, also consist of glacial till deposited by ice advance or ice retreat. The slopes range from nearly level to steep and, therefore, a wide variety of soils have formed. The predominant soils are the moderately well drained and well drained Varna, Morley, and Markham soils on the more rolling positions. On the slightly convex positions, the somewhat poorly drained Elliott, Blount, and Beecher soils dominate. In the nearly level and depressional areas, the poorly drained Ashkum and Peotone soils are most extensive. In areas where the till contains more clay, the somewhat poorly drained Frankfort, Nappanee, and Swygert soils are in the gently sloping areas and the poorly drained Bryce soils are in the level areas. In closed depressions throughout the morainic belt, Muskego and Houghton soils formed where reeds and sedges have decomposed.

The outwash plain associated with the Valparaiso moraine lies to the west of the moraine in northern parts of Cook and Du Page Counties. It extends from west of Warrenville in Du Page County northward into northern Cook County for about 4 miles to Poplar Creek. Outwash sediment, unlike glacial till, was sorted by streams, which flowed from the glaciers lying to the east. The coarser textured materials, gravels and sands, were generally deposited closest to the ice front. This stratified sediment became parent material for such soils as the well drained Warsaw and Fox soils and the more sloping Lorenzo and Rodman soils. The nearly level, somewhat poorly drained Kane soils and the level, poorly drained Will soils also formed. In the areas containing the finer outwash sediment, the soils that formed are the gently sloping, moderately well drained and well drained Barrington and Grays soils, the somewhat poorly drained Mundelein and Wauconda soils, and the poorly drained Drummer soils.

The alluvial stream and river deposits are throughout the survey area. Areas range from 2 miles wide along the Des Plaines River to less than 1/4 mile wide along minor streams. These alluvial deposits range from coarse textured soils on terraces to moderately fine textured, poorly drained soils on flood plains.

The terrace deposits were laid down in a manner very similar to the mode of depositing outwash plains. Melt water also deposited sediment, but the flow was more concentrated into channels. The well drained Fox and Warsaw soils, the well drained and moderately well drained Barrington and Grays soils, and the somewhat poorly drained Kane, Mundelein, and Wauconda soils formed in stratified material on the terraces. The poorly drained, moderately fine textured Sawmill soil formed in the alluvial deposits on flood plains. In depressions inhabited by sedges and reeds are organic Muskego and Houghton soils.

Climate

The survey area has temperate, humid, continental climate that is essentially uniform. Climate differences are too small to have caused any obvious differences in the soils.

Climate affects soil formation through its effects on weathering, vegetation, and erosion. Water from rains and melting snow seeps slowly downward through the soils and causes physical and chemical changes. Physically, the percolating water moves clay from the surface layer into the subsoil. Accumulation of clay in the subsoil takes place in most soils in the survey area. Chemically, the percolating water dissolves minerals and moves them downward through the soil. As a result of this leaching, the free calcium carbonate has been removed from the upper layers of many of the soils in the survey area. This causes the reaction to be slightly acid or medium acid in the upper layers of these soils.

The climate also influences the formation of soils by stimulating the growth of living organisms, particularly plant life. The climate of the survey area has favored the growth of hardwood trees and prairie grasses. Heavy, untimely, frequent rains are especially harmful and destructive if the soils are exposed during farming or construction operations. Some processes of soil formation are slower when the ground is frozen. For more information on climate, see the section "General nature of the survey area."

Plant and animal life

Soils are highly affected by the vegetation under which they formed. Native vegetation in the survey area consisted mainly of deciduous hardwood trees and prairie grasses. Grasses have many fine fibrous roots that add large amounts of organic matter to the soil when they die and decay. The soils that formed under grasses, therefore, have a thick, black or dark brown surface layer. Varna and Elliott soils formed under grasses. In contrast, soils that formed under deciduous trees have a thinner, lighter colored surface layer. Organic matter is mainly contributed to the surface layer of these soils by leaf litter. Morley and Blount soils formed under trees.

Although plants have been the major living organisms affecting the soils in the survey area, micro-organisms, earthworms, insects, and other large burrowing animals that live in or on the soil have also affected soil formation. Bacteria and fungi help decompose dead plants and animals into humus. Burrowing animals such as earthworms, cicadas, and ground squirrels help incorporate humus into the soil.

Topography

Variations in slope of the land surface greatly influence the amount of runoff, infiltration, and erosion and the natural drainage of the soil. The effect of drainage on the soil is evident when a comparison is made between soils that formed in similar parent material, but under different drainage conditions.

The poorly drained Ashkum soils formed in nearly level areas in silty clay loam till. These soils have a grayish subsoil. The Morley soils also formed in silty clay loam till but in gently sloping to steep areas. These soils have a brown subsoil.

These differences in color of the subsoil are governed by the degree of oxidation of certain mineral compounds, chiefly iron. In nearly level or depressional soils, such as Ashkum soils, the water table is close to the surface nearly all year, the soil is wet most of the time, and the soil pores contain water which restricts the circulation of air. These conditions cause the iron to be poorly oxidized and to be gray. In the more sloping Morley soils the water table is lower, some rainfall runs off, rather than soaking in, the soil is drier, and the pores have more air. These conditions cause the iron in the subsoil to be better oxidized and to be brown.

Topography also greatly determines the intensity of soil erosion. Even though some erosion occurs on almost all sloping soils, erosion generally becomes more severe as slope increases. On some soils, such as the Chatsworth soils, erosion is so rapid that the surface soil particles are removed as rapidly as the soil forms. This soil is weakly developed and quite shallow to the underlying parent material.

Time

Time determines, to a great extent, the degree of profile development in a soil. The influence of time, however, can be modified by erosion, deposition of material, topography, and kind of parent material.

On steep soils erosion removes the soil surface as quickly as it forms. These soils are immature or young, even though the slopes have been exposed to weathering for thousands of years. The Chatsworth soils are good examples of this condition.

On flood plains, alluvial material is deposited during each flood. This continual deposition slows soil development. The Sawmill soils are an example of this process.

The kind of parent material can also cause differences in development between soils lying close together. The Frankfort and Nappanee soils that formed in fine textured parent materials have less profile development and are more shallow to carbonates than the Lisbon and Saybrook soils that formed in medium textured till. These differences are caused by the slower rate of water percolation through the fine textured soils (*26*). The slower percolation reduces the amount of leaching of carbonates, reduces the amount of clay moved downward, and slows down other chemical and physical processes.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Cutbanks cave. Unstable walls of cuts made by earth-moving equipment. The soil sloughs easily.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime. Excess carbonates. Excessive carbonates, or lime, restrict the growth of some plants.

Fast intake. The rapid movement of water into the soil.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Foot slope. The inclined surface at the base of a hill.

Frost action. Freezing and thawing of soil moisture. Frost action can damage structures and plant roots.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the assorted and unassorted material deposited by streams flowing from glaciers.

Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes by water originating mainly from the melting of glacial ice. Many are interbedded or laminated.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

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. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by water that originated mainly from the melting of glacial ice. Glacial outwash is commonly in valleys on landforms known as valley trains, outwash terraces, eskers, kame terraces, kames, outwash fans, or deltas.

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.

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.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the basis of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

Polypedon. A volume of soil having properties within the limits of a soil series, the lowest and most homogeneous category of soil taxonomy. A "soil individual."

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6:5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

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.

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.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

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 or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

ILLUSTRATIONS

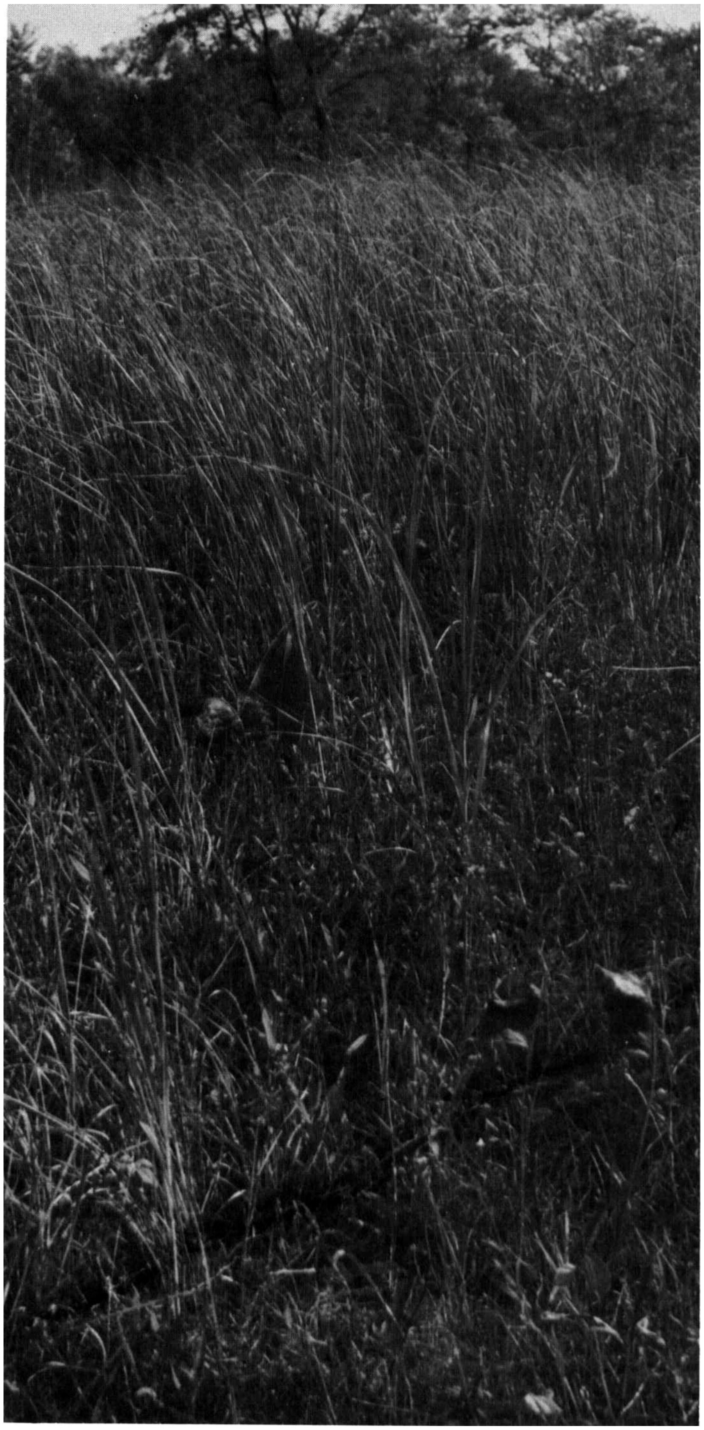

Figure 1.—Area of prairie grasses and wild flowers similar to the former native prairie.

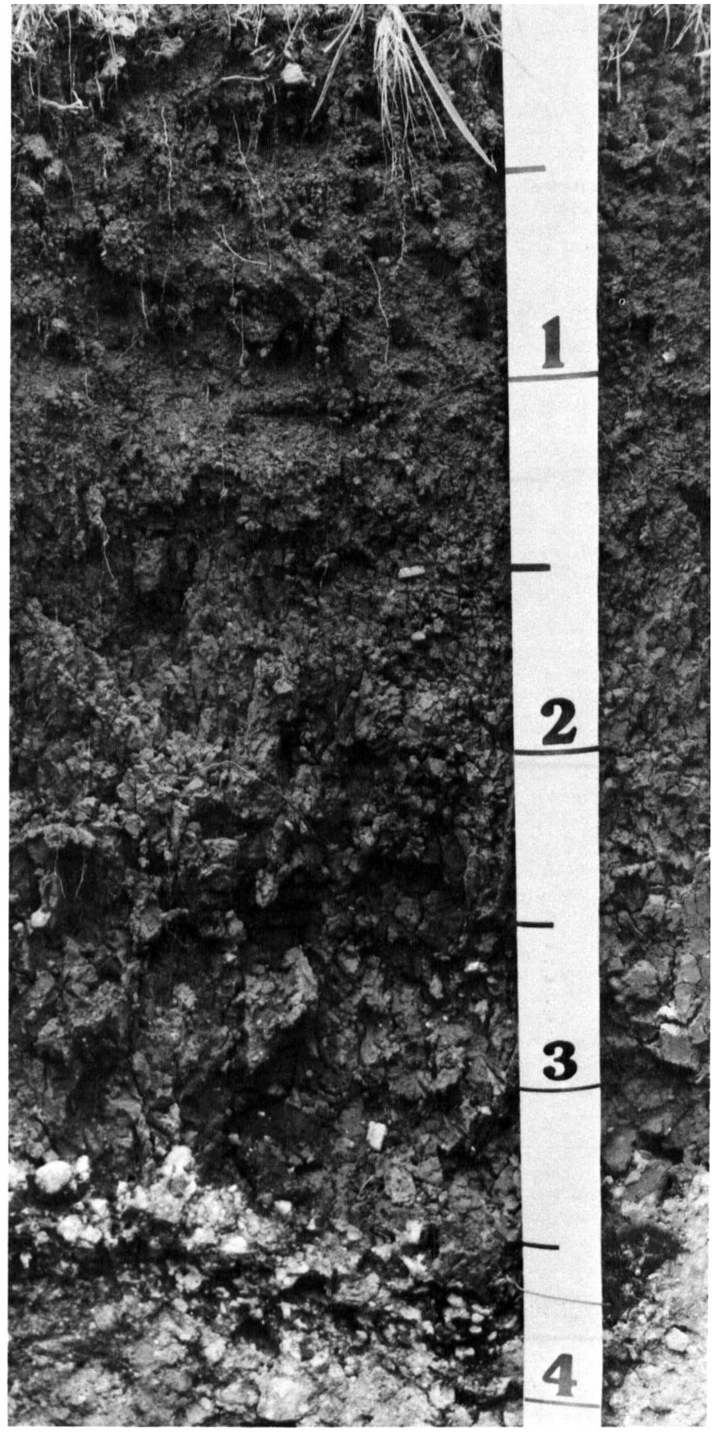

Figure 2.—Profile of Sawmill silty clay loam on a flood plain. This soil has a very thick, dark surface layer.

Figure 3.—Razing of homes in an area of Sawmill silty clay loam because of floodwater damage.

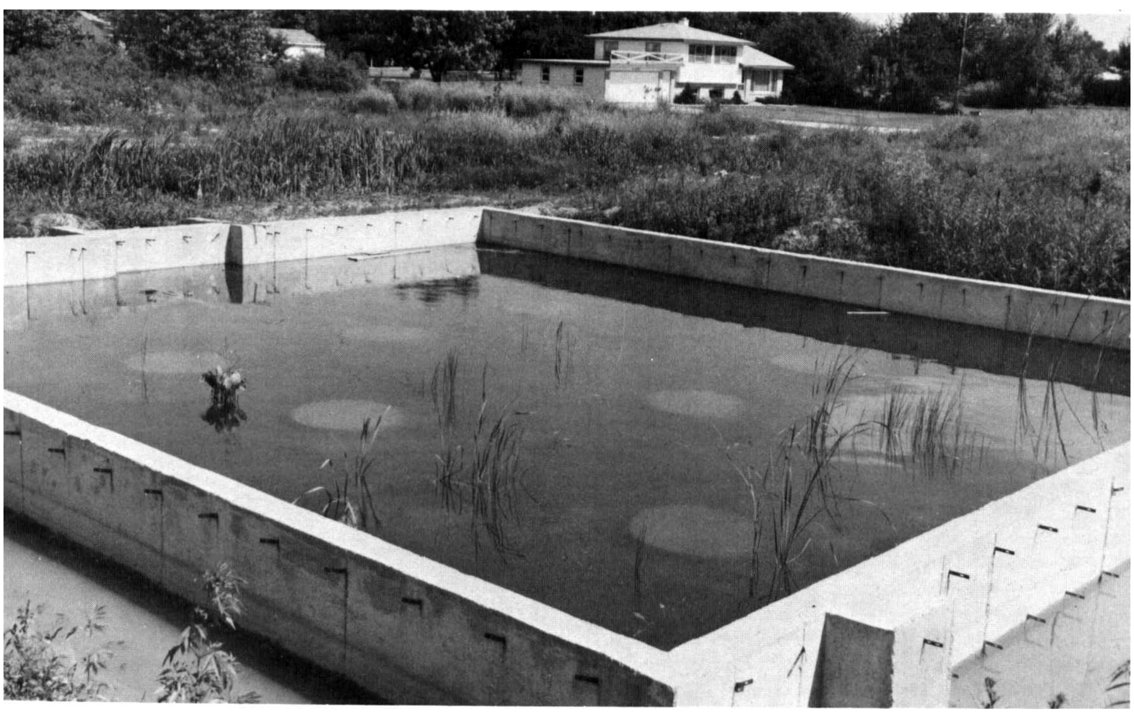

Figure 4.—Abandoned foundation in an area of Drummer silty clay loam because of inadequate drainage before construction

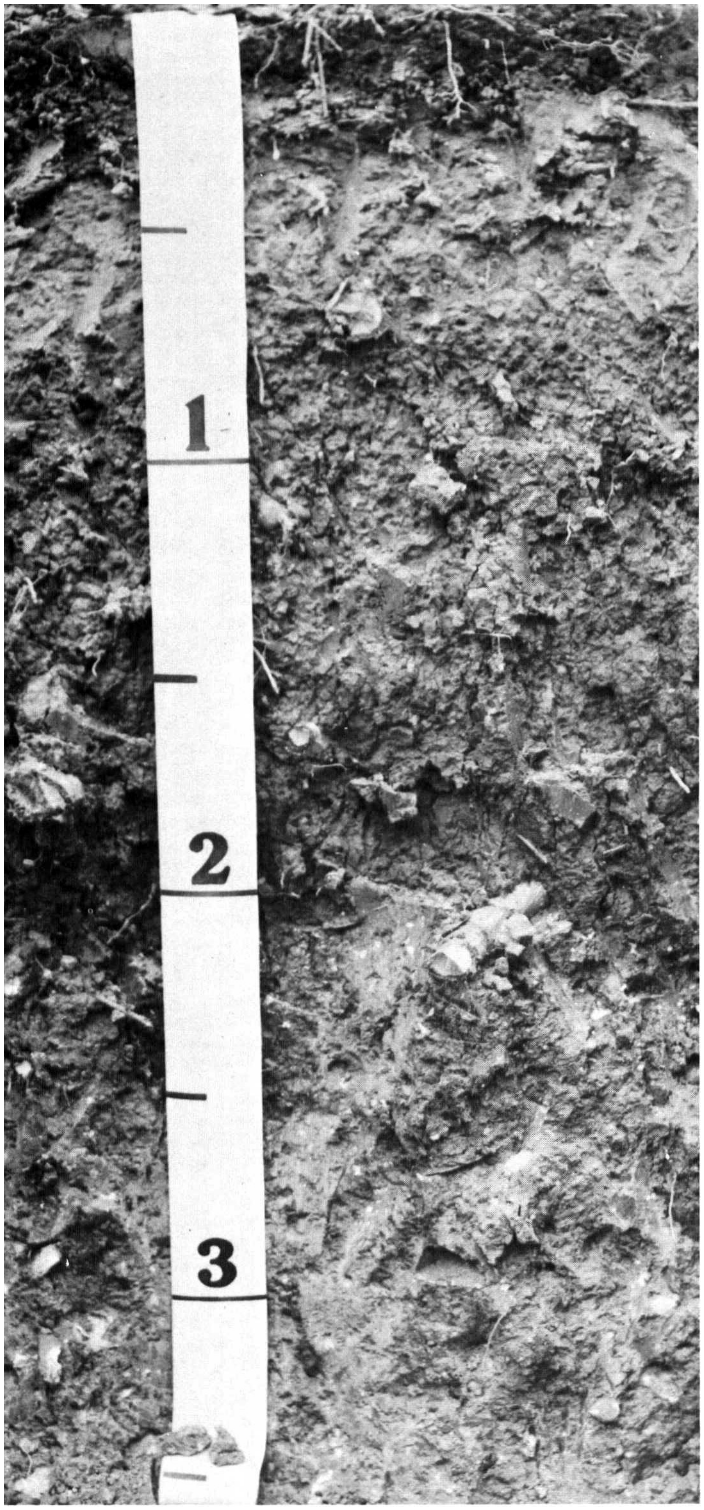

Figure 5.—Profile of Morley silt loam, 2 to 5 percent slopes. This soil has a thin surface layer.

Figure 6.—Well managed trees in an area of Morley silt loam, 2 to 5 percent slopes.

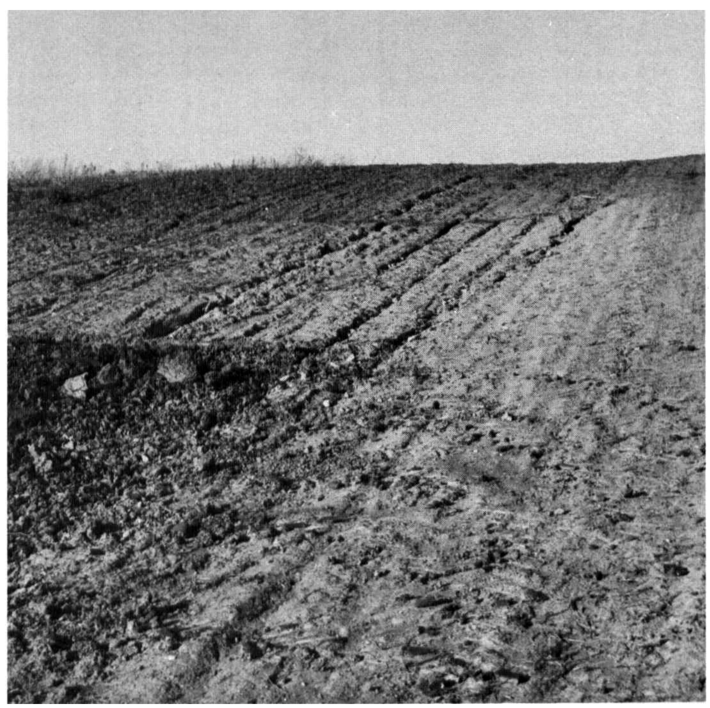

Figure 7.—Area of Chatsworth silty clay, 7 to 15 percent slopes, severely eroded.

Figure 8.—Profile of Warsaw silt loam, 2 to 5 percent slopes. Sand and gravel are at an approximate depth of 30 inches.

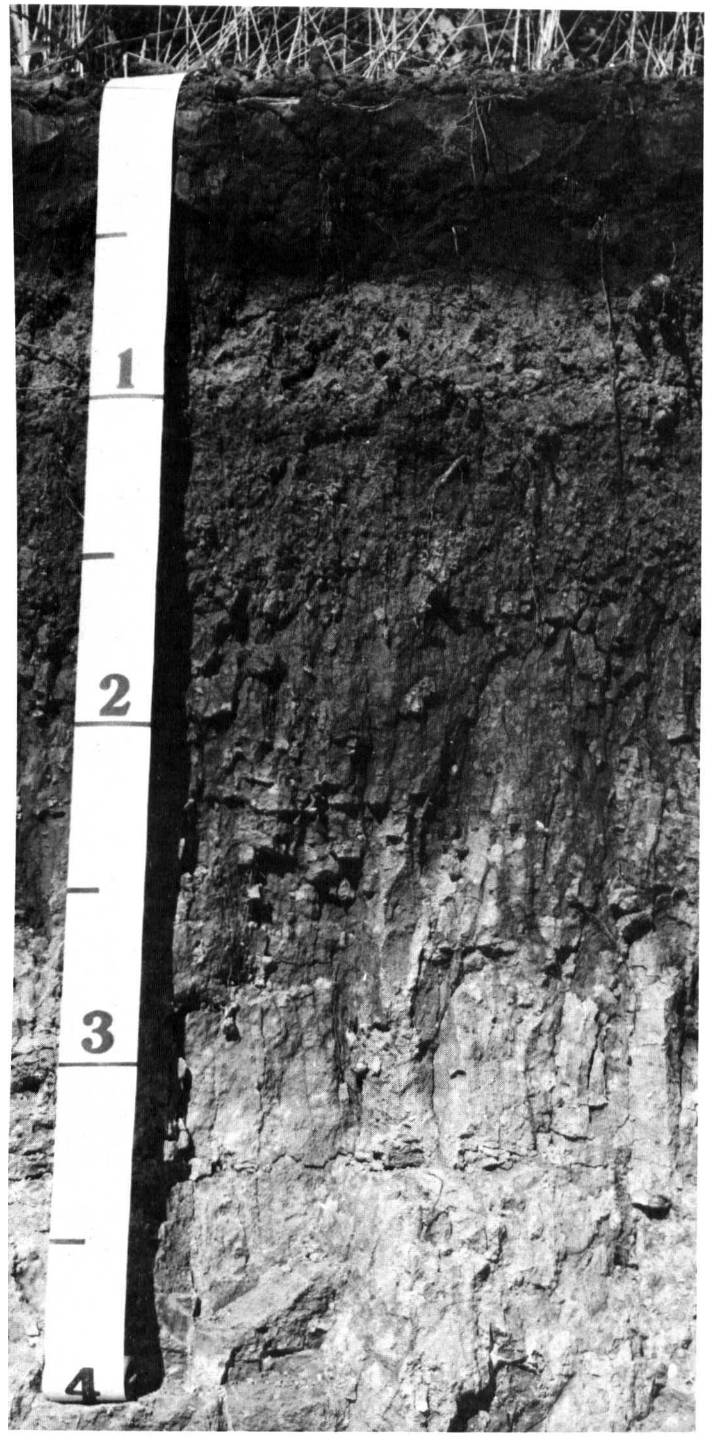

Figure 9.—Profile of an undisturbed Frankfort silty clay loam, 1 to 5 percent slopes.

Figure 10.—Debris basin in an area of Urban land-Orthents loamy complex. The basin controls sedimentation and reduces damage to downslope and downstream areas.

Figure 11.—Limestone bedrock beneath Rockton loam, 2 to 7 percent slopes. The surface layer has been partly removed in this profile.

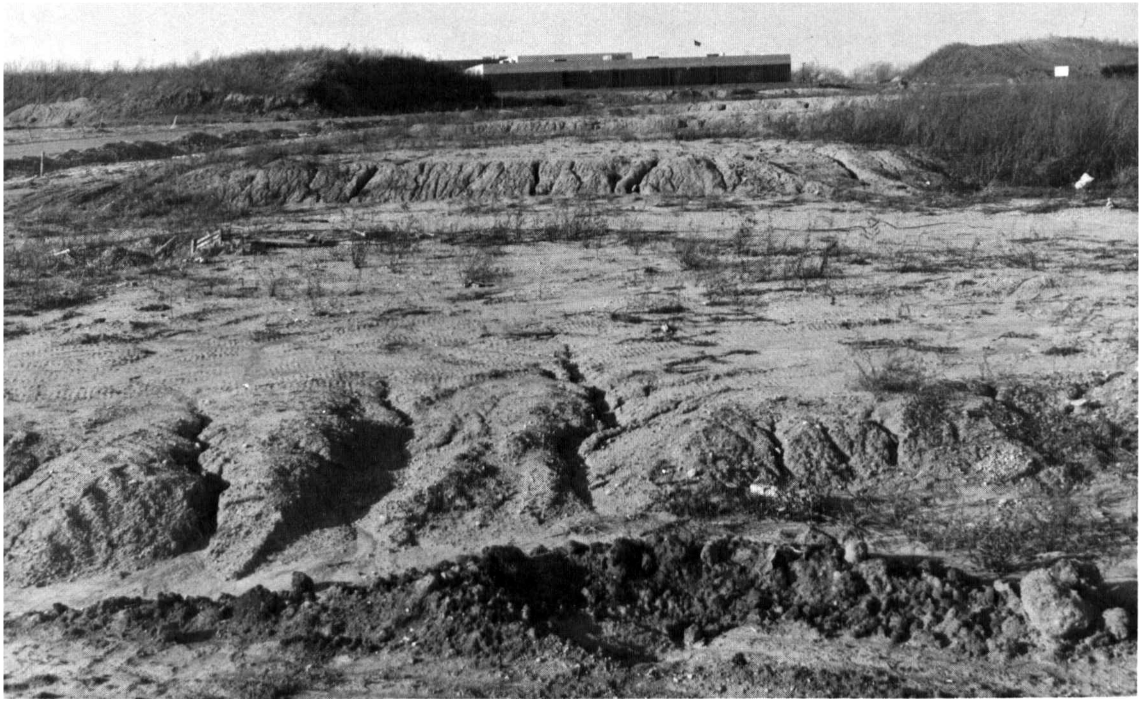

Figure 12.—Area of Urban land-Orthents clayey complex. The soils have been altered by major cuts and fills.

Figure 13.—Mount Hoy in Du Page County. A large multipurpose landfill designed for recreational use.

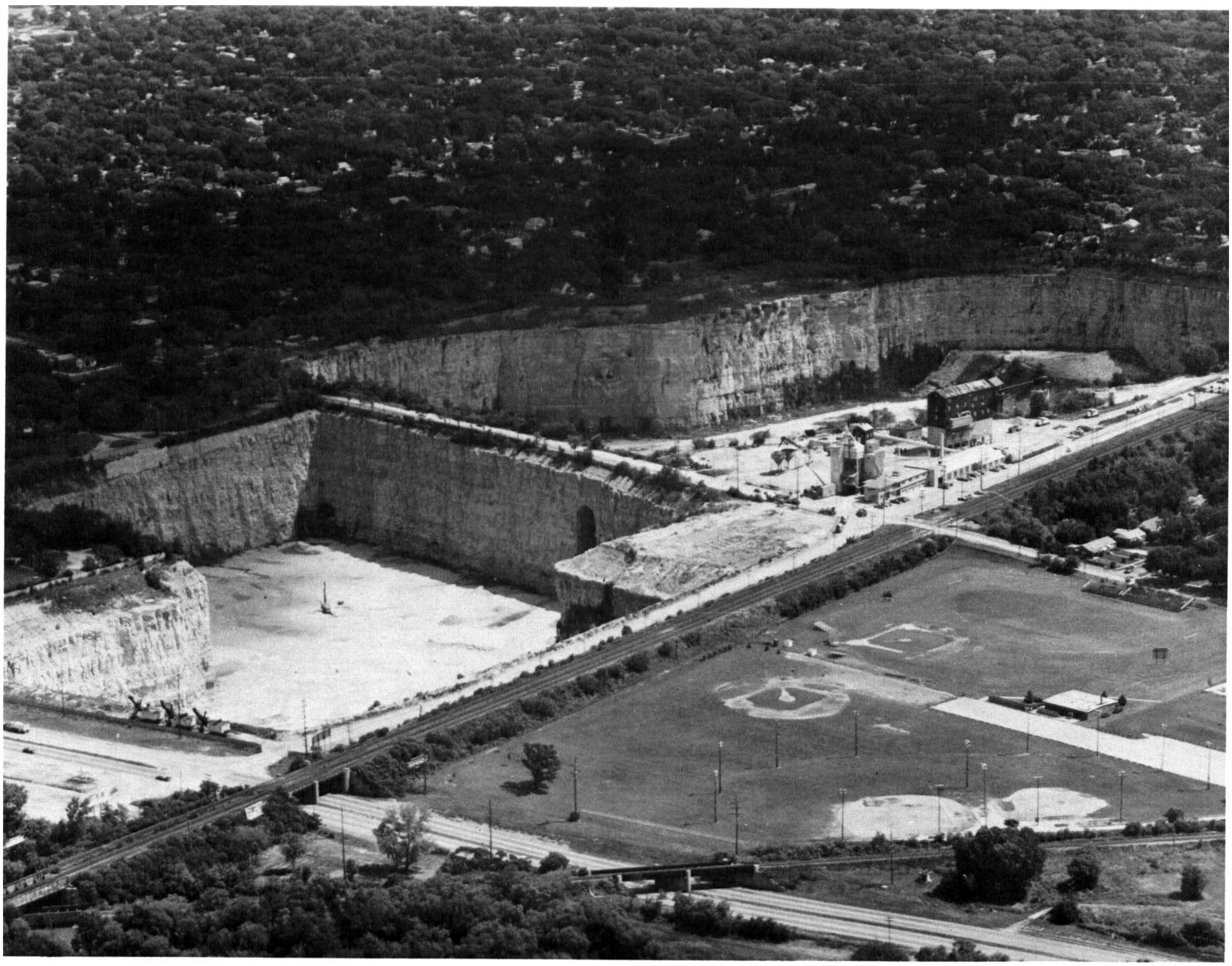

Figure 14.—Large area of Pits, quarry, in a limestone area near Elmhurst.

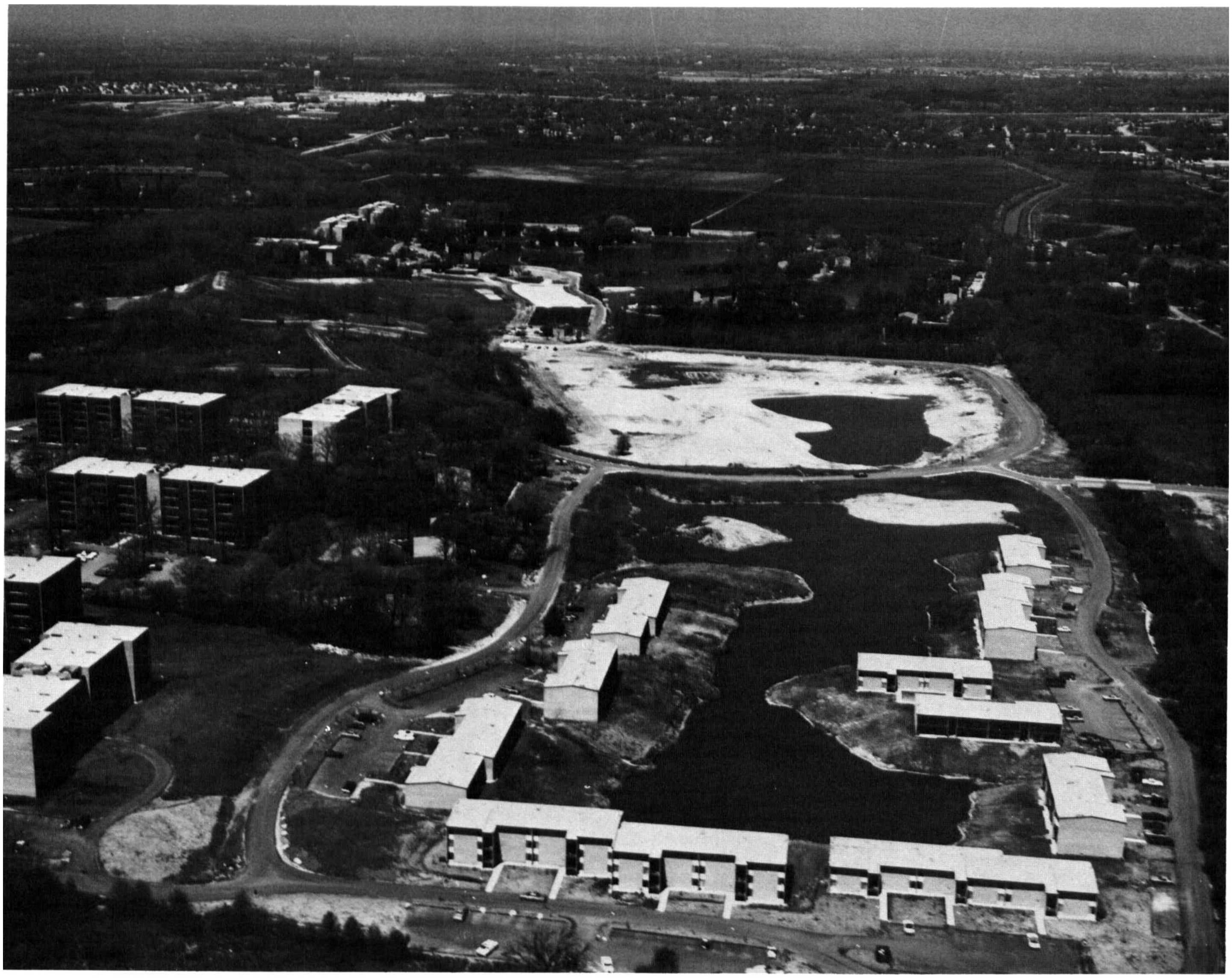

Figure 15.—A multipurpose use of abandoned Pits, gravel, near Lisle in Du Page County.

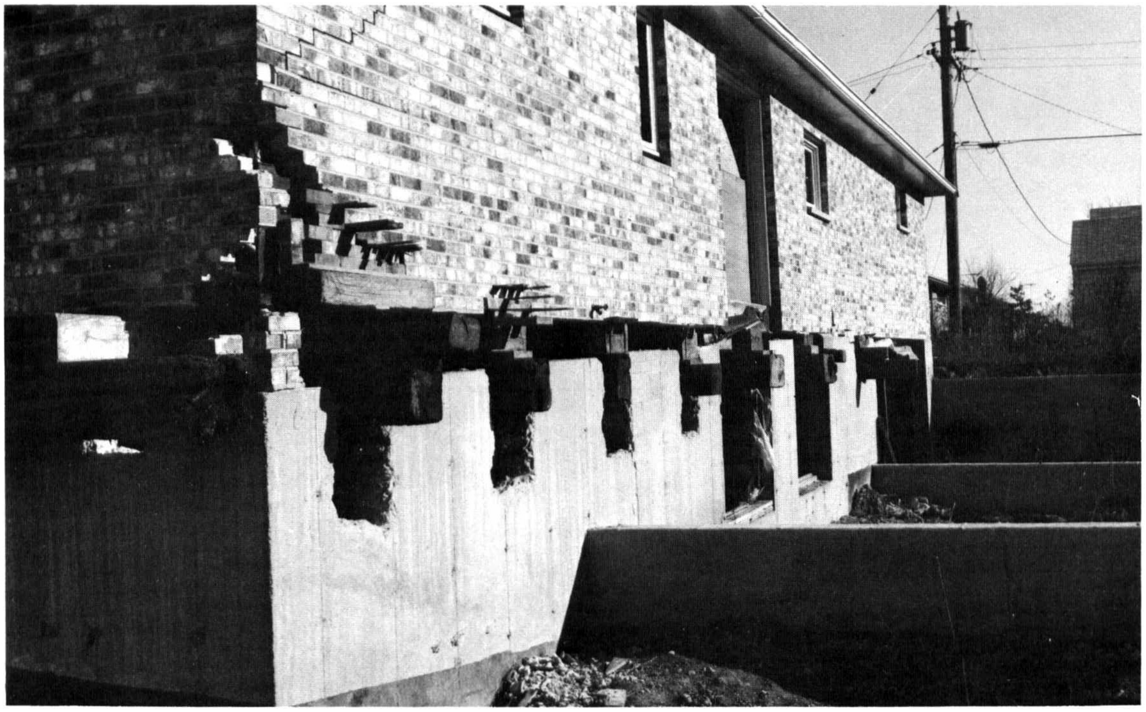

Figure 16.—Failure of house foundation and consequent cracking of wall of house.

Figure 17.—Construction of storm sewer in an area of Muskego and Houghton mucks. Note flotation of crane on planks and support of ditch sidewalls because of unstable soil.

Figure 18.—Lake developed in an area of Muskego and Houghton mucks. Lake provides flood control and recreation benefits.

Figure 19.—Cattails in an area of Muskego and Houghton mucks, wet.

Figure 20.—Flooding of homes in an area of Urban land-Sawmill complex.

Figure 21.—Construction of a local street on the strongly sloping Morley soils.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	28.9	13.3	21.1	57	-17	12	1.71	.81	2.43	4	10.0
February---	33.4	17.3	25.4	57	-11	0	1.24	.56	1.78	3	8.0
March------	44.1	27.3	35.7	78	1	107	2.49	1.62	3.28	6	8.3
April------	58.6	38.9	48.8	84	22	274	3.66	2.22	4.94	8	1.5
May--------	69.4	47.9	58.7	91	30	580	3.22	2.14	4.20	7	.1
June-------	79.2	57.5	68.4	94	41	852	4.02	2.50	5.39	7	.0
July-------	82.4	62.0	72.2	95	46	998	3.80	2.80	4.72	6	.0
August-----	81.8	61.2	71.5	94	46	977	2.79	1.20	4.08	5	.0
September--	75.0	54.1	64.6	93	34	738	4.04	1.63	5.99	7	.0
October----	64.3	43.5	53.9	86	23	440	2.26	.79	3.43	5	.4
November---	48.1	31.7	40.0	74	11	81	2.17	1.29	2.96	5	1.5
December---	34.4	19.8	27.1	64	-13	40	2.02	.87	2.96	5	8.5
Year-----	58.3	39.5	49.0	97	-18	5,099	33.42	28.21	38.60	68	38.3

[1]Recorded in the period 1958-74 at Chicago, Ill.

[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 (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 19	April 25	May 18
2 years in 10 later than--	April 13	April 20	May 12
5 years in 10 later than--	April 2	April 12	April 30
First freezing temperature in fall:			
1 year in 10 earlier than--	October 22	October 6	September 27
2 years in 10 earlier than--	October 27	October 12	October 2
5 years in 10 earlier than--	November 6	October 23	October 12

[1]Recorded in the period 1958-74 at Chicago, Ill.

TABLE 3.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	192	168	137
8 years in 10	201	176	146
5 years in 10	217	193	165
2 years in 10	233	209	183
1 year in 10	241	218	192

[1]Recorded in the period 1958-74 at Chicago, Ill.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Du Page County	Cook County	Total--	
		Acres	Acres	Area Acres	Extent Pct
23	Blount silt loam	1,405	2,543	3,948	0.7
27B	Miami silt loam, 2 to 5 percent slopes	82	102	184	*
27C2	Miami silt loam, 5 to 10 percent slopes, eroded	98	146	244	*
49	Watseka loamy fine sand	27	2,567	2,594	0.5
59	Lisbon silt loam	2,518	82	2,600	0.5
60C2	La Rose silt loam, 5 to 10 percent slopes, eroded	554	292	846	0.2
67	Harpster silty clay loam	239	215	454	0.1
69	Milford silty clay loam	1,386	15,694	17,080	3.2
91	Swygert silty clay loam	66	1,599	1,665	0.3
93F	Rodman soils, 15 to 40 percent slopes	5	617	622	0.1
107	Sawmill silty clay loam	5,887	6,308	12,195	2.3
125	Selma loam	41	2,386	2,427	0.5
141	Wesley fine sandy loam	38	1,527	1,565	0.3
145B	Saybrook silt loam, 2 to 5 percent slopes	2,118	326	2,444	0.5
146	Elliott silt loam	9,956	4,794	14,750	2.8
152	Drummer silty clay loam	14,135	8,399	22,534	4.3
172	Hoopeston fine sandy loam	0	1,649	1,649	0.3
189	Martinton silt loam	1,014	6,079	7,093	1.3
192	Del Rey silt loam	297	2,067	2,364	0.4
194B	Morley silt loam, 2 to 5 percent slopes	7,800	9,628	17,428	3.3
194C2	Morley silt loam, 5 to 10 percent slopes, eroded	7,548	10,975	18,523	3.5
194D	Morley silt loam, 7 to 15 percent slopes	1,906	3,757	5,663	1.1
194D3	Morley silty clay loam, 7 to 15 percent slopes, severely eroded	1,171	2,977	4,148	0.8
194F	Morley silt loam, 15 to 35 percent slopes	711	2,734	3,445	0.7
201	Gilford fine sandy loam	0	832	832	0.2
206	Thorp silt loam	239	493	732	0.1
223B	Varna silt loam, 2 to 5 percent slopes	7,312	3,004	10,316	2.0
228B	Nappanee silt loam, 1 to 5 percent slopes	0	956	956	0.2
232	Ashkum silty clay loam	13,316	35,081	48,397	9.2
235	Bryce silty clay	0	4,605	4,605	0.9
241D3	Chatsworth silty clay, 7 to 15 percent slopes, severely eroded	4	640	644	0.1
290B	Warsaw silt loam, 2 to 5 percent slopes	2,586	1,534	4,120	0.8
293	Andres silt loam	1,833	912	2,745	0.5
294B	Symerton silt loam, 2 to 5 percent slopes	2,054	1,481	3,535	0.7
295	Mokena silt loam	0	558	558	0.1
298	Beecher silt loam	4,336	7,357	11,693	2.2
316	Romeo silt loam	35	529	564	0.1
318C2	Lorenzo loam, 5 to 10 percent slopes, eroded	956	521	1,477	0.3
318D2	Lorenzo loam, 10 to 15 percent slopes, eroded	334	438	772	0.1
320B	Frankfort silty clay loam, 1 to 5 percent slopes	26	10,309	10,335	2.0
320C2	Frankfort silty clay loam, 5 to 10 percent slopes, eroded	0	2,217	2,217	0.4
320C3	Frankfort silty clay, 5 to 10 percent slopes, severely eroded	0	1,232	1,232	0.2
327B	Fox silt loam, 2 to 6 percent slopes	2,663	2,043	4,706	0.9
329	Will silty clay loam	1,011	921	1,932	0.4
330	Peotone silty clay loam	3,970	6,207	10,177	1.9
343	Kane silt loam	1,030	865	1,895	0.4
361B	Kidder silt loam, 2 to 5 percent slopes	0	771	771	0.1
361C2	Kidder silt loam, 4 to 7 percent slopes, eroded	0	581	581	0.1
361D2	Kidder silt loam, 7 to 15 percent slopes, eroded	0	256	256	0.1
363B	Griswold silt loam, 2 to 5 percent slopes	0	264	264	0.1
363C2	Griswold silt loam, 5 to 10 percent slopes, eroded	0	252	252	0.1
369B	Waupecan silt loam, 1 to 5 percent slopes	32	651	683	0.1
392	Urban land-Orthents complex, loamy	781	5,601	6,382	1.2
442	Mundelein silt loam	4,821	3,673	8,494	1.6
443B	Barrington silt loam, 2 to 5 percent slopes	2,735	1,336	4,071	0.8
494B	Kankakee loam, 2 to 7 percent slopes	404	539	943	0.2
503B	Rockton loam, 2 to 7 percent slopes	16	648	664	0.1
531B	Markham silt loam, 2 to 5 percent slopes	13,434	14,064	27,498	5.2
531C2	Markham silt loam, 5 to 10 percent slopes, eroded	9,859	10,334	20,193	3.8
533	Urban land	7,438	10,927	18,365	3.5
534	Urban land-Orthents complex, clayey	19,511	34,434	53,945	10.2
535	Orthents, stony	393	2,141	2,534	0.5
536	Dumps	1,586	2,148	3,734	0.7
696B	Zurich silt loam, 2 to 5 percent slopes	833	965	1,798	0.3
696C2	Zurich silt loam, 5 to 10 percent slopes, eroded	170	200	370	0.1
697	Wauconda silt loam	1,445	1,332	2,777	0.5
698B	Grays silt loam, 2 to 5 percent slopes	1,988	1,099	3,087	0.6

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Dupage county	Cook county	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
741B	Oakville fine sand, 2 to 7 percent slopes	0	1,622	1,622	0.3
862	Pits, sand	0	164	164	*
863	Pits, clay	0	132	132	*
864	Pits, quarry	154	1,044	1,198	0.2
865	Pits, gravel	789	975	1,764	0.3
903	Muskego and Houghton mucks	1,082	3,362	4,444	0.8
904	Muskego and Peotone soils, ponded	250	683	933	0.2
923B	Urban land-Markham-Ashkum complex, 1 to 7 percent slopes	32,854	21,767	54,621	10.4
924	Urban land-Milford-Martinton complex	191	5,251	5,442	1.0
925B	Urban land-Frankfort-Bryce complex, 1 to 7 percent slopes	0	3,168	3,168	0.6
926B	Urban land-Drummer-Barrington complex, 1 to 7 percent slopes	1,148	2,283	3,431	0.7
1107	Sawmill silty clay loam, wet	538	228	766	0.1
1330	Peotone silty clay loam, wet	1,294	1,305	2,599	0.5
1516	Faxon silty clay loam, wet	245	421	666	0.1
1903	Muskego and Houghton mucks, wet	1,973	2,991	4,964	0.9
2049	Urban land-Watseka complex	0	1,395	1,395	0.3
2107	Urban land-Sawmill complex	266	27	293	0.1
2194B	Urban land-Morley complex, 2 to 7 percent slopes	615	1,032	1,647	0.3
2194D	Urban land-Morley complex, 7 to 15 percent slopes	1,254	365	1,619	0.3
2290B	Urban land-Warsaw complex, 1 to 7 percent slopes	560	127	687	0.1
2741B	Urban land-Oakville complex, 2 to 7 percent slopes	0	809	809	0.2
2927	Urban land-Hoopeston-Selma complex	0	1,574	1,574	0.3
	Water	2,474	2,549	5,023	1.0
	Total	211,840	315,688	527,528	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates the crop is generally not grown or the soil is not suited. Only arable soils are listed]

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
23------------------------ Blount	100	34	42	60	4.0	---
27B----------------------- Miami	110	38	50	---	3.6	---
27C2---------------------- Miami	95	33	43	---	3.1	---
49------------------------ Watseka	80	28	37	56	3.4	6.0
59------------------------ Lisbon	135	46	55	84	5.4	9.0
60C2---------------------- La Rose	100	35	42	63	4.2	6.9
67------------------------ Harpster	118	40	45	67	4.5	7.0
69------------------------ Milford	115	40	48	70	4.8	---
91------------------------ Swygert	99	35	44	66	4.1	---
107----------------------- Sawmill	125	41	46	67	4.9	---
125----------------------- Selma	118	40	46	69	4.5	---
141----------------------- Wesley	83	28	39	58	3.5	6.0
145B---------------------- Saybrook	119	41	51	75	5.0	8.4
146----------------------- Elliott	110	38	47	72	4.6	7.2
152----------------------- Drummer	135	45	50	75	5.0	8.2
172----------------------- Hoopeston	91	30	41	64	3.7	6.5
189----------------------- Martinton	117	41	50	76	4.8	7.5
192----------------------- Del Rey	105	35	45	65	4.5	7.5
194B---------------------- Morley	90	33	41	60	3.6	6.2
194C2--------------------- Morley	82	28	36	54	3.4	5.9

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
194D----------------------- Morley	77	---	33	51	3.2	5.4
194D3---------------------- Morley	68	---	26	44	2.6	4.3
194F----------------------- Morley	---	---	---	---	2.0	3.6
201------------------------ Gilford	120	42	54	100	4.0	---
206------------------------ Thorp	110	38	44	63	4.2	7.0
223B----------------------- Varna	101	37	46	66	4.3	6.8
228B----------------------- Nappanee	80	28	33	70	3.5	---
232------------------------ Ashkum	115	40	48	70	4.8	---
235------------------------ Bryce	104	39	42	64	4.0	---
241D3---------------------- Chatsworth	---	---	---	27	1.6	2.6
290B----------------------- Warsaw	100	35	50	---	3.3	---
293------------------------ Andres	126	45	55	80	5.0	8.0
294B----------------------- Symerton	118	40	51	75	4.9	8.0
295------------------------ Mokena	110	37	48	70	4.3	7.0
298------------------------ Beecher	101	35	44	65	4.1	6.6
318C2---------------------- Lorenzo	72	22	31	49	3.0	5.0
318D2---------------------- Lorenzo	69	---	29	45	2.8	5.0
320B----------------------- Frankfort	82	28	37	53	3.4	5.5
320C2, 320C3--------------- Frankfort	74	22	31	45	3.3	5.3
327B----------------------- Fox	85	30	42	70	3.0	---
329------------------------ Will	105	38	45	66	4.5	---
330------------------------ Peotone	113	43	---	70	4.5	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
343 Kane	106	39	48	69	4.4	7.2
361B, 361C2 Kidder	115	---	---	80	4.5	---
361D2 Kidder	100	---	---	75	4.0	---
363B Griswold	95	32	40	60	3.8	6.1
363C2 Griswold	85	25	35	50	3.2	5.5
369B Waupecan	125	40	---	68	4.5	---
442 Mundelein	123	40	50	79	5.0	8.0
443B Barrington	110	36	47	76	4.9	8.0
494B Kankakee	94	35	44	63	4.2	6.8
503B Rockton	90	26	---	65	4.0	5.6
531B Markham	93	35	43	63	4.1	6.6
531C2 Markham	80	29	35	56	3.7	6.0
696B Zurich	102	33	43	63	4.3	7.1
696C2 Zurich	92	27	38	52	4.0	6.3
697 Wauconda	112	37	47	73	4.7	---
698B Grays	106	36	45	70	4.5	7.0
903 Muskego-Houghton	112	35	---	---	---	---

* 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 of 30 days.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; the symbol > means more than. Absence of an entry means that trees of the height class do not generally grow on this soil]

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
23 Blount	American cranberrybush, gray dogwood.	Autumn-olive, cornelian cherry dogwood, blackhaw, arrowwood, rose-of-sharon.	Norway spruce, Amur honeysuckle.	White spruce, northern white cedar.	Eastern white pine, American basswood.
27B, 27C2 Miami	Gray dogwood, Vanhoutte spirea.	Blackhaw, late lilac, Amur honeysuckle, shadblow serviceberry, winged euonymus, American cranberrybush, autumn-olive.	Eastern hemlock, European burningbush.	Norway spruce, eastern redcedar.	Eastern white pine, Douglas fir.
49 Watseka	Gray dogwood, Vanhoutte spirea.	Autumn-olive, blackhaw, arrowwood, cornelian cherry dogwood, American cranberrybush, Amur honeysuckle.	Russian-olive, Amur maple.	Northern white cedar, red pine.	Eastern white pine, Norway spruce.
59 Lisbon	Gray dogwood, Vanhoutte spirea.	Autumn-olive, silky dogwood.	Amur maple, Russian-olive, Amur honeysuckle.	Norway spruce, red pine.	Eastern white pine, Douglas-fir.
60C2 La Rose	Gray dogwood, Vanhoutte spirea.	Autumn-olive, Amur honeysuckle.	Amur maple, flowering dogwood.	Norway spruce, eastern white pine, red pine.	Eastern white pine, Douglas fir.
67 Harpster	---	Silky dogwood, Amur maple, American cranberrybush.	Russian-olive, flowering dogwood.	Tamarack, green ash, black spruce.	---
69 Milford	Gray dogwood, American cranberrybush.	Silky dogwood, forsythia, redosier dogwood, northern white-cedar, Amur honeysuckle.	Black spruce, Amur maple, tall purple willow, medium purple willow.	Pin oak.	Eastern cottonwood, Lombardy poplar.
91 Swygert	Mockorange	Amur maple, silky dogwood, Amur honeysuckle, northern white-cedar, American cranberrybush.	Black spruce, Norway spruce.	White spruce, eastern white pine.	Green ash.
93F Rodman	American hazel, European privet.	Autumn-olive, forsythia, late lilac, tamarisk.	---	Red pine, eastern white pine, jack pine, Austrian pine.	---
107 Sawmill	---	Silky dogwood	Amur maple	Green ash, pin oak	---
125 Selma	---	Amur maple, silky dogwood, American cranberrybush.	Flowering dogwood	Black spruce	Green ash, tamarack.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
141. Wesley	Silky dogwood	Amur maple, Amur honeysuckle.	Russian-olive	Eastern white pine, Norway spruce, Douglas-fir, white spruce.	---
145B. Saybrook	Gray dogwood	Autumn-olive, forsythia.	Amur maple	Norway spruce, Douglas-fir, eastern white pine, red pine.	---
146. Elliott	---	Silky dogwood, autumn-olive, Amur honeysuckle.	Russian-olive	Red pine, Norway spruce, white spruce.	Eastern white pine.
152. Drummer	Gray dogwood, dwarf purple willow.	Silky dogwood, Amur honeysuckle, redosier dogwood.	Northern white-cedar, tall purple willow, medium purple willow.	---	Lombardy poplar.
172. Hoopeston	Silky dogwood	Amur maple, autumn-olive, forsythia, tamarisk.	Russian-olive, northern white-cedar.	Norway spruce, eastern white pine, red pine.	---
189. Martinton	---	Redosier dogwood, northern white-cedar, nannyberry viburnum, Amur maple, silky dogwood, autumn-olive.	Green ash, Russian-olive.	White spruce, red pine.	Eastern white pine.
192. Del Rey	---	Common ninebark, lilac, silky dogwood, autumn-olive.	Norway spruce, northern white-cedar.	White spruce, red pine, Douglas-fir.	Eastern white pine.
194B, 194C2, 194D, 194D3, 194F. Morley	Mockorange	Amur honeysuckle, autumn-olive, late lilac, blackhaw, American cranberrybush.	Eastern redcedar	Eastern white pine, Norway spruce, red pine, Douglas-fir, eastern hemlock.	---
201. Gilford	Gray dogwood, dwarf purple willow.	Redosier dogwood, hawthorn, silky dogwood, shadblow serviceberry.	Northern white-cedar, tall purple willow, laurel willow.	Pin oak, eastern white pine.	Lombardy poplar.
206. Thorp	---	Silky dogwood, flowering dogwood, American cranberrybush.	Green ash, Amur maple.	---	Eastern cottonwood, American sycamore.
223B. Varna	Gray dogwood	Autumn-olive, Amur honeysuckle, late lilac.	Northern white-cedar.	Eastern white pine, Norway spruce, red pine.	---
228B. Nappanee	Silky dogwood, dwarf purple willow.	Redosier dogwood	Eastern white pine, tall purple willow.	---	---
232. Ashkum	Gray dogwood	Silky dogwood, Amur honeysuckle.	Black spruce, northern white-cedar.	Pin oak, Norway spruce.	Green ash.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
235. Bryce	---	Amur maple, silky dogwood, American cranberrybush, forsythia.	Northern white-cedar, flowering dogwood.	---	---
241D3. Chatsworth	Silky dogwood, autumn-olive.	Northern white-cedar, Amur maple, Russian-olive.	Eastern white pine, Norway spruce, Douglas-fir.	---	---
290B. Warsaw	Mockorange	European burningbush, blackhaw, late lilac, Amur honeysuckle, shadblow serviceberry, American cranberrybush, autumn-olive.	Eastern hemlock	Norway spruce	Eastern white pine, honeylocust.
293. Andres	Gray dogwood	Autumn-olive, Amur honeysuckle.	Amur maple	Red pine, Norway spruce, white spruce.	Eastern white pine.
294B. Symerton	Gray dogwood	Autumn-olive, Amur honeysuckle, late lilac.	---	Eastern white pine, red pine, Norway spruce, white spruce.	---
295. Mokena	---	Autumn-olive, forsythia, late lilac, Amur honeysuckle.	---	Red pine, Norway spruce, white spruce.	Eastern white pine.
298. Beecher	---	Silky dogwood, autumn-olive.	Norway spruce, Amur maple.	Douglas-fir, white spruce, Russian-olive.	Eastern white pine.
316. Romeo	Autumn-olive, American cranberrybush.	Russian-olive, Amur honeysuckle.	---	---	---
318C2, 318D2. Lorenzo	Manyflower cotoneaster.	Lilac	Norway spruce, Siberian peashrub.	Jack pine, eastern white pine, red pine.	---
320B, 320C2, 320C3. Frankfort	Gray dogwood	Autumn-olive, Amur maple.	Norway spruce, northern white-cedar, Russian-olive.	Douglas-fir, white spruce.	---
327B. Fox	---	Autumn-olive, Amur honeysuckle, blackhaw, shadblow serviceberry, American cranberrybush, cornelian cherry dogwood.	---	Norway spruce, white spruce, American basswood.	Eastern white pine.
329. Will	---	Silky dogwood, American cranberrybush.	Green ash, Amur maple, flowering dogwood.	Black spruce, tamarack.	---
330. Peotone	Gray dogwood	Forsythia, Amur maple.	Black spruce	Tamarack	Green ash.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
343 Kane	---	Amur maple, autumn-olive, silky dogwood, Amur honeysuckle, late lilac.	---	Eastern white pine, Norway spruce, Douglas-fir.	---
361B, 361C2, 361D2 Kidder	---	Northern white-cedar, lilac, common ninebark, silky dogwood.	White spruce, Norway spruce.	Eastern white pine, red pine.	---
363B, 363C2. Griswold					
369B Waupecan	Silky dogwood, gray dogwood.	Forsythia, autumn-olive, late lilac, American cranberrybush.	Amur maple	Russian-olive	Eastern white pine, red pine, Douglas-fir, Norway spruce.
392*: Urban land.					
Orthents, loamy.					
442 Mundelein	---	Autumn-olive, Amur honeysuckle, lilac.	Russian-olive	Norway spruce, red pine.	Eastern white pine, Douglas-fir.
443B Barrington	Gray dogwood	Autumn-olive, Amur honeysuckle, lilac.	Amur maple, northern white-cedar.	Norway spruce, green ash, eastern white pine, red pine, common hackberry, Douglas-fir.	---
494B Kankakee	Silky dogwood	Forsythia, autumn-olive, lilac.	---	Eastern white pine, red pine, Norway spruce, white spruce.	---
503B Rockton	---	Siberian crabapple, gray dogwood, Tatarian honeysuckle, lilac.	Eastern redcedar, northern white-cedar, blue spruce, eastern white pine, common hackberry.	Green ash, American elm.	---
531B, 531C2 Markham	Gray dogwood	Autumn-olive, Amur honeysuckle, late lilac, American cranberrybush, blackhaw.	Northern white-cedar, eastern hemlock.	Eastern white pine, Norway spruce, red pine.	Honeylocust.
533*: Urban land.					
534*: Urban land.					
Orthents, clayey.					
535*: Orthents, stony.					
536*: Dumps.					

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
696B, 696C2: Zurich	---	Silky dogwood, American cranberrybush, Amur honeysuckle, lilac.	Autumn-olive, Amur maple, Russian-olive.	Eastern white pine, red pine, Norway spruce, white spruce, Douglas-fir.	---
697: Wauconda	---	Common ninebark, lilac, Amur honeysuckle.	Norway spruce, white spruce, northern white-cedar, Amur maple.	Red pine, eastern white pine, common hackberry, green ash.	---
698B: Grays	---	Silky dogwood, Amur maple, Amur honeysuckle, lilac.	Autumn-olive, Russian-olive.	Eastern white pine, red pine, white spruce, Douglas-fir.	Norway spruce.
741B: Oakville	American hazel, European privet.	Tamarisk, late lilac, forsythia, autumn-olive.	Austrian pine, jack pine.	Red pine	Eastern white pine.
862*, 863*: Pits.					
864*: Pits.					
865*: Pits.					
903*: Muskego	---	Late lilac, nannyberry viburnum, common ninebark.	Japanese tree lilac.	Laurel willow	Carolina poplar, almondleaf willow.
Houghton	Gray dogwood, dwarf purple willow.	Amur honeysuckle, redosier dogwood, silky dogwood.	Northern white-cedar, tall purple willow, medium purple willow.	---	Lombardy poplar.
904*: Muskego	---	Late lilac, nannyberry viburnum, common ninebark.	Japanese tree lilac.	Laurel willow	Carolina poplar, almondleaf willow.
Peotone.					
923B*: Urban land.					
Markham	Gray dogwood	Autumn-olive, Amur honeysuckle, late lilac, American cranberrybush, blackhaw.	Northern white-cedar, eastern hemlock.	Eastern white pine, Norway spruce, red pine.	Honeylocust.
Ashkum	Gray dogwood	Silky dogwood, Amur honeysuckle.	Black spruce, northern white-cedar.	Pin oak, Norway spruce.	Green ash.
924*: Urban land.					

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
924*--continued					
Milford	Gray dogwood	Silky dogwood, forsythia, redosier dogwood, northern white-cedar, Amur honeysuckle.	Black spruce, Amur maple, tall purple willow, medium purple willow.	---	Eastern cottonwood, Lombardy poplar.
Martinton	---	Redosier dogwood, northern white-cedar, nannyberry viburnum, Amur maple, silky dogwood, autumn-olive.	Green ash, Russian-olive.	White spruce, red pine.	Eastern white pine.
925B*:					
Urban land.					
Frankfort	Gray dogwood	Autumn-olive, Amur maple.	Norway spruce, northern white-cedar, Russian-olive.	Douglas-fir, white spruce.	---
Bryce	---	Amur maple, silky dogwood, American cranberrybush, forsythia.	Northern white-cedar, flowering dogwood.	---	---
926B*:					
Urban land.					
Drummer	Gray dogwood, dwarf purple willow.	Silky dogwood, Amur honeysuckle, redosier dogwood.	Northern white-cedar, tall purple willow, medium purple willow.	---	Lombardy poplar.
Barrington	Gray dogwood	Autumn-olive, Amur honeysuckle, lilac.	Amur maple, northern white-cedar.	Norway spruce, green ash, eastern white pine, red pine, common hackberry, Douglas-fir.	---
1107:					
Sawmill.					
1330:					
Peotone.					
1516:					
Faxon.					
1903*:					
Muskego	---	Late lilac, nannyberry viburnum, common ninebark.	Japanese tree lilac.	Laurel willow	Carolina poplar, almondleaf willow.
Houghton	Gray dogwood, dwarf purple willow.	Amur honeysuckle, redosier dogwood, silky dogwood.	Northern white-cedar, tall purple willow, medium purple willow.	---	Lombardy poplar.
2049*:					
Urban land.					

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
2049*--continued					
Watseka	Gray dogwood	Autumn-olive, blackhaw, arrowwood, cornelian cherry dogwood, American cranberrybush, Amur honeysuckle.	Russian-olive	Eastern white pine, Norway spruce, Douglas-fir, oriental arborvitae.	---
2107*:					
Urban land.					
Sawmill.					
2194B*, 2194D*:					
Urban land.					
Morley	Mockorange	Amur honeysuckle, autumn-olive, late lilac, blackhaw, American cranberrybush.	Eastern redcedar	Eastern white pine, Norway spruce, red pine, Douglas-fir, eastern hemlock.	---
2290B*:					
Urban land.					
Warsaw	Mockorange	European burningbush, blackhaw, late lilac, Amur honeysuckle, shadblow serviceberry, American cranberrybush, autumn-olive.	Eastern hemlock	Norway spruce	Eastern white pine, honeylocust.
2741B*:					
Urban land.					
Oakville	American hazel, European privet.	Tamarisk, late lilac, forsythia, autumn-olive.	Austrian pine, jack pine.	Red pine	Eastern white pine.
2927*:					
Urban land.					
Hoopeston	Silky dogwood	Amur maple, autumn-olive, forsythia, tamarisk.	Russian-olive, northern white-cedar.	Norway spruce, eastern white pine, red pine.	---
Selma.					

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 7.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
23: Blount	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Moderate: wetness.
27B: Miami	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.	Slight.
27C2: Miami	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.	Slight.
49: Watseka	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, too sandy.
59: Lisbon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
60C2: La Rose	Slight	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.
67: Harpster	Severe: wetness, floods.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: wetness, frost action, low strength.	Severe: wetness.
69: Milford	Severe: wetness, floods.	Severe: wetness, shrink-swell, floods.	Severe: wetness, shrink-swell, floods.	Severe: wetness, shrink-swell, floods.	Severe: low strength, wetness, floods.	Severe: wetness.
91: Swygert	Severe: wetness.	Severe: shrink-swell, wetness, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: shrink-swell, wetness, low strength.	Severe: frost action, shrink-swell, low strength.	Moderate: too clayey, wetness.
93F: Rodman	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
107: Sawmill	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods.
125: Selma	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, frost action, floods.	Severe: wetness.
141: Wesley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
145B: Saybrook	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.	Slight.
146: Elliott	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Moderate: wetness.

TABLE 7.--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
152--------------- Drummer	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness.
172--------------- Hoopeston	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
189--------------- Martinton	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Moderate: wetness.
192--------------- Del Rey	Severe: wetness, too clayey.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength, wetness.	Moderate: wetness.
194B-------------- Morley	Moderate: too clayey.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Severe: low strength.	Slight.
194C2------------- Morley	Moderate: too clayey.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength, slope.	Severe: low strength.	Slight.
194D-------------- Morley	Moderate: too clayey, slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
194D3------------- Morley	Moderate: too clayey, slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope, shrink-swell, wetness.	Severe: slope.	Severe: low strength.	Moderate: too clayey, slope.
194F-------------- Morley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
201--------------- Gilford	Severe: wetness, cutbanks cave, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, frost action, floods.	Severe: wetness, floods.
206--------------- Thorp	Severe: wetness, floods, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods, wetness.	Severe: wetness, floods, low strength.	Severe: wetness.
223B-------------- Varna	Slight---------	Moderate: shrink-swell, low strength.	Severe: wetness.	Moderate: shrink-swell, low strength.	Severe: low strength, frost action.	Slight.
228B-------------- Nappanee	Severe: wetness.	Severe: shrink-swell, wetness, low strength.	Severe: shrink-swell, wetness, low strength.	Severe: shrink-swell, wetness, low strength.	Severe: low strength, shrink-swell.	Moderate: wetness.
232--------------- Ashkum	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness.
235--------------- Bryce	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, low strength, floods.	Severe: too clayey, wetness.

TABLE 7.--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
241D3 Chatsworth	Moderate: too clayey, slope.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.	Severe: too clayey.
290B Warsaw	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: low strength.	Slight.
293 Andres	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
294B Symerton	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Severe: low strength.	Slight.
295 Mokena	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Moderate: wetness.
298 Beecher	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
316 Romeo	Severe: depth to rock, floods, wetness.	Severe: depth to rock, floods, wetness.	Severe: depth to rock, floods, wetness.	Severe: depth to rock, floods, wetness.	Severe: depth to rock, floods, wetness.	Severe: wetness, floods, thin layer.
318C2 Lorenzo	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Slight.
318D2 Lorenzo	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
320B, 320C2 Frankfort	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Moderate: too clayey, wetness.
320C3 Frankfort	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Severe: too clayey.
327B Fox	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.	Slight.
329 Will	Severe: wetness, floods, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, frost action, low strength.	Severe: wetness.
330 Peotone	Severe: wetness, floods.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, low strength.	Severe: wetness.
343 Kane	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
361B Kidder	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.	Slight.
361C2 Kidder	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Slight.

See footnote at end of table.

TABLE 7.--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
361D2: Kidder	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
363B: Griswold	Slight	Slight	Slight	Slight	Moderate: frost action.	Slight.
363C2: Griswold	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
369B: Waupecan	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength, frost action.	Slight.
392*:						
Urban land.						
Orthents, loamy.						
442: Mundelein	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
443B: Barrington	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.	Slight.
494B: Kankakee	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight.
503B: Rockton	Moderate: depth to rock.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: low strength.	Moderate: thin layer
531B: Markham	Moderate: too clayey.	Moderate: shrink-swell, low strength.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.	Slight.
531C2: Markham	Moderate: too clayey.	Moderate: shrink-swell, low strength.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, low strength, slope.	Severe: frost action, low strength.	Slight.
533*:						
Urban land.						
534*:						
Urban land.						
Orthents, clayey.						
535*:						
Orthents, stony.						
536*:						
Dumps.						
696B: Zurich	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.	Slight.
696C2: Zurich	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, slope, low strength.	Severe: frost action, low strength.	Slight.

See footnote at end of table.

TABLE 7.--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
697 Wauconda	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Moderate: wetness.
698B Grays	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.	Slight.
741B Oakville	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: too sandy.
862*, 863*: Pits.						
864*: Pits.						
865*: Pits.						
903*: Muskego	Severe: wetness, floods, excess humus.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, floods, excess humus.
Houghton	Severe: wetness, floods, excess humus.	Severe: wetness, floods, low strength.	Severe: wetness, low strength, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: excess humus, wetness, floods.
904*: Muskego	Severe: wetness, floods, excess humus.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, floods, excess humus.
Peotone	Severe: wetness, floods.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, low strength.	Severe: wetness.
923B*: Urban land.						
Markham	Moderate: too clayey.	Moderate: shrink-swell, low strength.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, low strength, slope.	Severe: frost action, low strength.	Slight.
Ashkum	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness.
924*: Urban land.						
Milford	Severe: wetness, floods.	Severe: wetness, shrink-swell, floods.	Severe: wetness, shrink-swell, floods.	Severe: wetness, shrink-swell, floods.	Severe: low strength, wetness, floods.	Severe: wetness.
Martinton	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Moderate: wetness.
925B*: Urban land.						

See footnote at end of table.

TABLE 7.--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
925B*:						
Frankfort	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.	Moderate: too clayey, wetness.
Bryce	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, low strength, floods.	Severe: too clayey, wetness.
926B*:						
Urban land.						
Drummer	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness.
Barrington	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.	Slight.
1107 Sawmill	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods.
1330 Peotone	Severe: wetness, floods.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, low strength.	Severe: wetness.
1516 Faxon	Severe: wetness, floods, depth to rock.	Severe: wetness, floods.	Severe: wetness, floods, depth to rock.	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness.
1903*:						
Muskego	Severe: wetness, floods, excess humus.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, low strength, floods.	Severe: wetness, floods, excess humus.
Houghton	Severe: wetness, floods, excess humus.	Severe: wetness, floods, low strength.	Severe: wetness, low strength, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: excess humus, wetness, floods.
2049*:						
Urban land.						
Watseka	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, too sandy.
2107*:						
Urban land.						
Sawmill	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods.
2194B*:						
Urban land.						

See footnote at end of table.

TABLE 7.--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
2194B*:						
Morley-----------	Moderate: too clayey, wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, low strength, slope.	Severe: low strength.	Slight.
2194D*: Urban land.						
Morley-----------	Moderate: too clayey, slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope, shrink-swell, wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
2290B*: Urban land.						
Warsaw-----------	Severe: cutbanks cave.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.
2741B*: Urban land.						
Oakville---------	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: too sandy.
2927*: Urban land.						
Hoopeston--------	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
Selma------------	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, frost action, floods.	Severe: wetness.

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 8.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," and "fair." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas
23------------------------------------ Blount	Severe: wetness, percs slowly.	Slight.
27B----------------------------------- Miami	Severe: percs slowly.	Moderate: seepage, slope.
27C2---------------------------------- Miami	Severe: percs slowly.	Severe: slope.
49------------------------------------ Watseka	Severe: wetness.	Severe: seepage, wetness.
59------------------------------------ Lisbon	Severe: wetness.	Severe: wetness.
60C2---------------------------------- La Rose	Moderate: percs slowly.	Severe: slope.
67------------------------------------ Harpster	Severe: wetness, floods.	Severe: wetness.
69------------------------------------ Milford	Severe: wetness, percs slowly, floods.	Severe: floods, wetness.
91------------------------------------ Swygert	Severe: wetness, percs slowly.	Slight.
93F----------------------------------- Rodman	Severe: slope.	Severe: seepage, slope.
107----------------------------------- Sawmill	Severe: floods, wetness.	Severe: floods, wetness.
125----------------------------------- Selma	Severe: wetness, floods.	Severe: seepage, wetness.
141----------------------------------- Wesley	Severe: wetness, percs slowly.	Severe: seepage, wetness.
145B---------------------------------- Saybrook	Moderate: percs slowly, wetness.	Moderate: slope, seepage, wetness.
146----------------------------------- Elliott	Severe: wetness, percs slowly.	Severe: wetness.
152----------------------------------- Drummer	Severe: wetness, floods.	Severe: wetness, floods.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas
172: Hoopeston	Severe: wetness.	Severe: seepage, wetness.
189: Martinton	Severe: percs slowly, wetness.	Severe: wetness.
192: Del Rey	Severe: percs slowly, wetness.	Slight.
194B: Morley	Severe: percs slowly.	Moderate: slope.
194C2, 194D, 194D3: Morley	Severe: percs slowly, wetness.	Severe: slope, wetness.
194F: Morley	Severe: percs slowly, slope, wetness.	Severe: slope, wetness.
201: Gilford	Severe: wetness, floods.	Severe: wetness, seepage, floods.
206: Thorp	Severe: wetness, floods, percs slowly.	Severe: wetness, seepage, floods.
223B: Varna	Severe: percs slowly, wetness.	Moderate: slope.
228B: Nappanee	Severe: percs slowly, wetness.	Moderate: slope.
232: Ashkum	Severe: percs slowly, wetness, floods.	Slight.
235: Bryce	Severe: wetness, percs slowly, floods.	Slight.
241D3: Chatsworth	Severe: percs slowly.	Severe: slope.
290B: Warsaw	Slight	Severe: seepage.
293: Andres	Severe: wetness, percs slowly.	Severe: wetness.
294B: Symerton	Severe: percs slowly.	Moderate: slope.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas
295 Mokena	Severe: percs slowly, wetness.	Slight.
298 Beecher	Severe: wetness, percs slowly.	Slight.
316 Romeo	Severe: depth to rock, floods, wetness.	Severe: depth to rock, floods, wetness.
318C2 Lorenzo	Slight	Severe: slope, seepage.
318D2 Lorenzo	Moderate: slope.	Severe: slope, seepage.
320B Frankfort	Severe: percs slowly, wetness.	Moderate: slope.
320C2, 320C3 Frankfort	Severe: percs slowly, wetness.	Severe: slope.
327B Fox	Slight	Severe: seepage.
329 Will	Severe: wetness, floods.	Severe: wetness, seepage.
330 Peotone	Severe: percs slowly, wetness.	Slight.
343 Kane	Severe: wetness.	Severe: wetness, seepage.
361B, 361C2 Kidder	Slight	Severe: seepage.
361D2 Kidder	Moderate: slope.	Severe: seepage, slope.
363B Griswold	Slight	Moderate: seepage, slope.
363C2 Griswold	Slight	Severe: slope.
369B Waupecan	Slight	Severe: seepage.
392*: Urban land.		
Orthents, loamy.		

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas
442 Mundelein	Severe: wetness.	Severe: wetness.
443B Barrington	Slight	Severe: seepage.
494B Kankakee	Slight	Severe: seepage.
503B Rockton	Severe: depth to rock.	Moderate: depth to rock, slope.
531B Markham	Severe: percs slowly, wetness.	Moderate: slope.
531C2 Markham	Severe: percs slowly, wetness.	Severe: slope.
533*: Urban land.		
534*: Urban land.		
Orthents, clayey.		
535*: Orthents, stony.		
536*: Dumps.		
696B Zurich	Moderate: wetness.	Severe: seepage.
696C2 Zurich	Moderate: wetness.	Severe: slope, seepage.
697 Wauconda	Severe: wetness.	Severe: seepage, wetness.
698B Grays	Severe: wetness.	Severe: seepage, wetness.
741B Oakville	Slight	Severe: seepage.
862*, 863*: Pits.		
864*: Pits.		
865*: Pits.		
903*: Muskego	Severe: wetness, floods, percs slowly.	Severe: wetness, floods, seepage.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas
903*:		
Houghton	Severe: wetness, floods.	Severe: wetness, seepage, floods.
904*:		
Muskego	Severe: wetness, floods, percs slowly.	Severe: wetness, floods, seepage.
Peotone	Severe: percs slowly, wetness.	Slight.
923B*:		
Urban land.		
Markham	Severe: percs slowly, wetness.	Moderate: slope.
Ashkum	Severe: percs slowly, wetness, floods.	Slight.
924*:		
Urban land.		
Milford	Severe: wetness, percs slowly, floods.	Severe: floods, wetness.
Martinton	Severe: percs slowly, wetness.	Severe: wetness.
925B*:		
Urban land.		
Frankfort	Severe: percs slowly, wetness.	Moderate: slope.
Bryce	Severe: wetness, percs slowly, floods.	Slight.
926B*:		
Urban land.		
Drummer	Severe: wetness, floods.	Severe: wetness, floods.
Barrington	Slight	Severe: seepage.
1107 Sawmill	Severe: floods, wetness.	Severe: floods, wetness.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas
1330 Peotone	Severe: percs slowly, wetness.	Slight.
1516 Faxon	Severe: wetness, depth to rock, floods.	Severe: wetness, depth to rock, floods.
1903*:		
Muskego	Severe: wetness, floods, percs slowly.	Severe: wetness, floods, seepage.
Houghton	Severe: wetness, floods.	Severe: wetness, seepage, floods.
2049*: Urban land.		
Watseka	Severe: wetness.	Severe: seepage, wetness.
2107*: Urban land.		
Sawmill	Severe: floods, wetness.	Severe: floods, wetness.
2194B*: Urban land.		
Morley	Severe: percs slowly, wetness.	Severe: wetness.
2194D*: Urban land.		
Morley	Severe: percs slowly, wetness.	Severe: slope, wetness.
2290B*: Urban land.		
Warsaw	Slight	Severe: seepage.
2741B*: Urban land.		
Oakville.		
2927*: Urban land.		
Hoopeston	Severe: wetness.	Severe: seepage, wetness.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas
2927*:		
Selma	Severe: wetness, floods.	Severe: seepage, wetness.

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 9.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
23------------------- Blount	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
27B, 27C2------------ Miami	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
49------------------- Watseka	Poor: wetness.	Good-----------------	Unsuited: excess fines.	Fair: too sandy.
59------------------- Lisbon	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
60C2----------------- La Rose	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
67------------------- Harpster	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
69------------------- Milford	Poor: wetness, shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
91------------------- Swygert	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
93F------------------ Rodman	Poor: slope.	Good-----------------	Good-----------------	Poor: small stones, slope.
107------------------ Sawmill	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
125------------------ Selma	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
141------------------ Wesley	Poor: frost action, low strength.	Poor: thin layer.	Unsuited: excess fines.	Fair: thin layer.
145B----------------- Saybrook	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
146------------------ Elliott	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
152------------------ Drummer	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
172------------------ Hoopeston	Poor: wetness.	Fair: excess fines.	Unsuited: excess fines.	Good.
189------------------ Martinton	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
192------------------ Del Rey	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
194B, 194C2 Morley	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
194D Morley	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
194D3 Morley	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, slope.
194F Morley	Poor: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
201 Gilford	Poor: wetness, frost action.	Good	Unsuited: excess fines.	Poor: wetness.
206 Thorp	Poor: wetness, low strength.	Poor: excess fines.	Unsuited: excess fines.	Poor: wetness.
223B Varna	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
228B Nappanee	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
232 Ashkum	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
235 Bryce	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness.
241D3 Chatsworth	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.
290B Warsaw	Fair: low strength.	Good	Good	Good.
293 Andres	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
294B Symerton	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
295 Mokena	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
298 Beecher	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
316 Romeo	Poor: thin layer, area reclaim, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, area reclaim, wetness.
318C2 Lorenzo	Good	Fair: excess fines.	Fair: excess fines.	Fair: too clayey.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
318D2: Lorenzo	Good	Fair: excess fines.	Fair: excess fines.	Fair: too clayey, slope.
320B, 320C2: Frankfort	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
320C3: Frankfort	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
327B: Fox	Good	Good	Good	Fair: thin layer.
329: Will	Poor: wetness, low strength.	Good	Good	Poor: wetness.
330: Peotone	Poor: shrink-swell, wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
343: Kane	Poor: wetness.	Good	Good	Fair: thin layer.
361B, 361C2: Kidder	Good	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
361D2: Kidder	Good	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
363B, 363C2: Griswold	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
369B: Waupecan	Good	Good	Good	Fair: thin layer.
392*:				
Urban land.				
Orthents, loamy.				
442: Mundelein	Poor: low strength, wetness.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
443B: Barrington	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
494B: Kankakee	Fair: large stones, low strength.	Poor: excess fines, large stones.	Unsuited: excess fines.	Good.
503B: Rockton	Poor: low strength, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: area reclaim.
531B, 531C2: Markham	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
533*:				
Urban land.				

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
534*:				
Urban land.				
Orthents, clayey.				
535*:				
Orthents, stony.				
536*:				
Dumps.				
696B, 696C2 Zurich	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
697 Wauconda	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
698B Grays	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
741B Oakville	Good	Good	Unsuited: excess fines.	Poor: too sandy.
862*, 863*. Pits				
864*:				
Pits.				
865*:				
Pits.				
903*:				
Muskego	Poor: wetness, low strength.	Unsuited: excess humus, excess fines.	Unsuited: excess humus, excess fines.	Poor: wetness, excess humus.
Houghton	Poor: wetness, low strength.	Unsuited: excess humus.	Unsuited: excess humus.	Poor: wetness, excess humus.
904*:				
Muskego	Poor: wetness, low strength.	Unsuited: excess humus, excess fines.	Unsuited: excess humus, excess fines.	Poor: wetness, excess humus.
Peotone	Poor: shrink-swell, wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
923B*:				
Urban land.				
Markham	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Ashkum	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
924*:				
Urban land.				
Milford	Poor: wetness, shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
924*:				
Martinton	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
925B*: Urban land.				
Frankfort	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Bryce	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness.
926B*: Urban land.				
Drummer	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Barrington	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
1107 Sawmill	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
1330 Peotone	Poor: shrink-swell, wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
1516 Faxon	Poor: wetness, low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
1903*:				
Muskego	Poor: wetness, low strength.	Unsuited: excess humus, excess fines.	Unsuited: excess humus, excess fines.	Poor: wetness, excess humus.
Houghton	Poor: wetness, low strength.	Unsuited: excess humus.	Unsuited: excess humus.	Poor: wetness, excess humus.
2049*: Urban land.				
Watseka	Poor: wetness.	Good	Unsuited: excess fines.	Fair: too sandy.
2107*: Urban land.				
Sawmill	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
2194B*: Urban land.				
Morley	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2194D*:				
Urban land.				
Morley	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
2290B*:				
Urban land.				
Warsaw	Fair: low strength.	Good	Good	Good.
2741B*:				
Urban land.				
Oakville	Good	Good	Unsuited: excess fines.	Poor: too sandy.
2927*:				
Urban land.				
Hoopeston	Poor: wetness.	Fair: excess fines.	Unsuited: excess fines.	Good.
Selma	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 10.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
23 Blount	Favorable	Wetness	Percs slowly, frost action.	Wetness, erodes easily, percs slowly.	Not needed	Erodes easily, wetness, percs slowly.
27B Miami	Seepage	Piping	Not needed	Erodes easily	Favorable	Erodes easily.
27C2 Miami	Slope, seepage.	Piping	Not needed	Slope, erodes easily.	Favorable	Erodes easily.
49 Watseka	Seepage	Piping, seepage.	Favorable	Wetness, droughty, fast intake.	Not needed	Wetness, droughty.
59 Lisbon	Seepage	Wetness	Frost action	Wetness	Not needed	Wetness.
60C2 La Rose	Slope, seepage.	Favorable	Not needed	Slope	Favorable	Favorable.
67 Harpster	Seepage	Hard to pack, wetness.	Frost action, floods.	Wetness, floods.	Not needed	Wetness.
69 Milford	Favorable	Wetness	Floods, frost action.	Wetness, slow intake, floods.	Not needed	Wetness.
91 Swygert	Favorable	Hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Not needed	Percs slowly, wetness, erodes easily.
93F Rodman	Slope, seepage.	Seepage	Not needed	Slope, droughty.	Slope, too sandy.	Slope, droughty.
107 Sawmill	Favorable	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
125 Selma	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
141 Wesley	Seepage	Wetness	Frost action	Wetness, wind erosion.	Not needed	Wetness, erodes easily.
145B Saybrook	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
146 Elliott	Favorable	Wetness, hard to pack.	Frost action	Wetness	Not needed	Wetness.
152 Drummer	Seepage	Wetness	Frost action, floods.	Wetness, floods.	Not needed	Wetness.
172 Hoopeston	Seepage	Seepage	Frost action	Wetness, wind erosion.	Not needed	Wetness.
189 Martinton	Favorable	Wetness	Percs slowly, frost action.	Wetness, percs slowly.	Not needed	Wetness, erodes easily, percs slowly.
192 Del Rey	Favorable	Hard to pack, wetness.	Percs slowly, frost action.	Slow intake, wetness, percs slowly.	Not needed	Wetness, erodes easily, percs slowly.
194B Morley	Favorable	Favorable	Not needed	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
194C2 Morley	Favorable	Favorable	Not needed	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
194D, 194D3 Morley	Favorable	Favorable	Not needed	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
194F Morley	Favorable	Favorable	Not needed	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
201 Gilford	Seepage	Seepage	Floods, frost action.	Wetness, wind erosion.	Not needed	Wetness.
206 Thorp	Seepage	Wetness	Floods, percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Not needed	Wetness, erodes easily, percs slowly.
223B Varna	Favorable	Favorable	Not needed	Favorable	Percs slowly	Percs slowly.
228B Nappanee	Favorable	Hard to pack, wetness.	Percs slowly	Percs slowly, wetness, erodes easily.	Wetness, percs slowly, erodes easily.	Percs slowly, wetness, erodes easily.
232 Ashkum	Favorable	Hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Not needed	Wetness, percs slowly.
235 Bryce	Favorable	Hard to pack, wetness.	Percs slowly, floods, frost action.	Wetness, slow intake, percs slowly.	Not needed	Wetness, percs slowly.
241D3 Chatsworth	Slope	Hard to pack	Not needed	Slow intake, percs slowly, slope.	Percs slowly	Slope, percs slowly.
290B Warsaw	Seepage	Seepage	Not needed	Favorable	Too sandy	Favorable.
293 Andres	Favorable	Wetness, hard to pack.	Frost action	Wetness	Not needed	Wetness, erodes easily.
294B Symerton	Favorable	Hard to pack	Not needed	Favorable	Erodes easily	Erodes easily.
295 Mokena	Favorable	Hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Not needed	Wetness, percs slowly.
298 Beecher	Favorable	Wetness	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Not needed	Erodes easily, percs slowly, wetness.
316 Romeo	Depth to rock, seepage.	Thin layer, wetness.	Depth to rock, floods.	Droughty, rooting depth, wetness.	Not needed	Droughty, wetness, erodes easily.
318C2 Lorenzo	Seepage	Seepage	Not needed	Droughty, slope.	Too sandy	Droughty.
318D2 Lorenzo	Seepage	Seepage	Not needed	Droughty, slope.	Too sandy	Droughty, slope.
320B Frankfort	Favorable	Hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Erodes easily, wetness.
320C2 Frankfort	Slope	Hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Erodes easily, wetness.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
320C3------------- Frankfort	Slope-----------	Hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, slow intake, slope.	Wetness, percs slowly.	Erodes easily, wetness.
327B-------------- Fox	Seepage---------	Seepage---------	Not needed------	Erodes easily	Too sandy------	Erodes easily.
329--------------- Will	Seepage---------	Seepage---------	Floods, frost action.	Wetness, floods.	Not needed------	Wetness.
330--------------- Peotone	Favorable-------	Wetness, hard to pack.	Percs slowly, floods, frost action.	Wetness, percs slowly, floods.	Not needed------	Wetness.
343--------------- Kane	Seepage---------	Seepage---------	Frost action---	Wetness---------	Not needed------	Wetness.
361B, 361C2------- Kidder	Seepage---------	Seepage---------	Not needed------	Favorable-------	Favorable-------	Favorable.
361D2------------- Kidder	Seepage, slope.	Seepage---------	Not needed------	Slope-----------	Favorable-------	Slope.
363B-------------- Griswold	Seepage---------	Favorable-------	Not needed------	Favorable-------	Favorable-------	Favorable.
363C2------------- Griswold	Slope, seepage.	Favorable-------	Not needed------	Slope-----------	Favorable-------	Favorable.
369B-------------- Waupecan	Seepage---------	Seepage---------	Not needed------	Favorable-------	Too sandy, erodes easily.	Erodes easily.
392*: Urban land.						
Orthents, loamy.						
442--------------- Mundelein	Seepage---------	Piping----------	Frost action---	Wetness---------	Not needed------	Wetness, erodes easily.
443B-------------- Barrington	Seepage---------	Favorable-------	Not needed------	Favorable-------	Erodes easily	Erodes easily.
494B-------------- Kankakee	Seepage---------	Seepage, large stones.	Not needed------	Large stones---	Large stones, soil blowing.	Large stones.
503B-------------- Rockton	Depth to rock, seepage.	Thin layer------	Not needed------	Rooting depth	Depth to rock	Depth to rock.
531B-------------- Markham	Favorable-------	Hard to pack---	Not needed------	Erodes easily, percs slowly.	Percs slowly---	Erodes easily, percs slowly.
531C2------------- Markham	Slope-----------	Hard to pack---	Not needed------	Erodes easily, slope, percs slowly.	Percs slowly---	Erodes easily, percs slowly.
533*: Urban land.						
534*: Urban land.						
Orthents, clayey.						
535*: Orthents, stony.						
536*: Dumps.						

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
696B: Zurich	Seepage	Piping	Not needed	Erodes easily	Favorable	Erodes easily.
696C2: Zurich	Slope, seepage.	Piping	Not needed	Slope, erodes easily.	Favorable	Erodes easily.
697: Wauconda	Seepage	Piping, wetness.	Frost action	Wetness	Not needed	Wetness, erodes easily.
698B: Grays	Seepage	Piping	Not needed	Favorable	Erodes easily	Erodes easily.
741B: Oakville	Seepage	Piping, seepage.	Not needed	Fast intake, droughty, wind erosion.	Too sandy, wind erosion.	Droughty.
862*, 863*: Pits.						
864*: Pits.						
865*: Pits.						
903*:						
Muskego	Seepage	Wetness, hard to pack.	Floods, percs slowly, frost action.	Wetness, soil blowing, percs slowly.	Not needed	Wetness, percs slowly.
Houghton	Seepage	Excess humus, low strength.	Frost action, excess humus.	Wind erosion, wetness, floods.	Not needed	Wetness.
904*:						
Muskego	Seepage	Wetness, hard to pack.	Floods, percs slowly, frost action.	Wetness, wind erosion, percs slowly.	Not needed	Wetness, percs slowly.
Peotone	Favorable	Wetness, hard to pack.	Percs slowly, floods, frost action.	Wetness, percs slowly, floods.	Not needed	Wetness.
923B*: Urban land.						
Markham	Favorable	Hard to pack	Not needed	Erodes easily, percs slowly.	Percs slowly	Erodes easily, percs slowly.
Ashkum	Favorable	Hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
924*: Urban land.						
Milford	Favorable	Wetness	Floods, frost action.	Wetness, slow intake, floods.	Not needed	Wetness.
Martinton	Favorable	Wetness	Percs slowly, frost action.	Wetness, percs slowly.	Not needed	Wetness, erodes easily, percs slowly.
925B*: Urban land.						
Frankfort	Favorable	Hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Erodes easily, wetness.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
925B*:						
Bryce	Favorable	Hard to pack, wetness.	Percs slowly, floods, frost action.	Wetness, slow intake, percs slowly.	Not needed	Wetness, percs slowly.
926B*: Urban land.						
Drummer	Seepage	Wetness	Frost action, floods.	Wetness, floods.	Not needed	Wetness.
Barrington	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
1107 Sawmill	Favorable	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
1330 Peotone	Favorable	Wetness, hard to pack.	Percs slowly, floods, frost action.	Wetness, percs slowly, floods.	Not needed	Wetness.
1516 Faxon	Depth to rock	Thin layer, wetness.	Depth to rock, frost action.	Wetness, rooting depth.	Not needed	Wetness, depth to rock.
1903*:						
Muskego	Seepage	Wetness, hard to pack.	Floods, percs slowly, frost action.	Wetness, soil blowing, percs slowly.	Not needed	Wetness, percs slowly.
Houghton	Seepage	Excess humus, low strength.	Frost action, excess humus.	Soil blowing, wetness, floods.	Not needed	Wetness.
2049*: Urban land.						
Watseka	Seepage	Piping, seepage.	Favorable	Wetness, droughty, fast intake.	Not needed	Wetness, droughty.
2107*: Urban land.						
Sawmill	Favorable	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
2194B*: Urban land.						
Morley	Favorable	Favorable	Not needed	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
2194D*: Urban land.						
Morley	Favorable	Favorable	Not needed	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
2290B*: Urban land.						
Warsaw	Seepage	Seepage	Not needed	Favorable	Too sandy	Favorable.
2741B*: Urban land.						
Oakville	Seepage	Piping, seepage.	Not needed	Fast intake, droughty, wind erosion.	Too sandy, wind erosion.	Droughty.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2927*:						
Urban land.						
Hoopeston	Seepage	Seepage	Frost action	Wetness, wind erosion.	Not needed	Wetness.
Selma	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 11.--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
23 Blount	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
27B Miami	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
27C2 Miami	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
49 Watseka	Severe: wetness.	Moderate: wetness, too sandy.	Severe: wetness.	Moderate: wetness, too sandy.
59 Lisbon	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
60C2 La Rose	Slight	Slight	Severe: slope.	Slight.
67 Harpster	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
69 Milford	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
91 Swygert	Severe: wetness.	Moderate: too clayey, wetness.	Severe: wetness.	Moderate: wetness, too clayey.
93F Rodman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
107 Sawmill	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
125 Selma	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
141 Wesley	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
145B Saybrook	Slight	Slight	Moderate: slope.	Slight.
146 Elliott	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
152 Drummer	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
172 Hoopeston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
189 Martinton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
192 Del Rey	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
194B: Morley	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
194C2: Morley	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
194D: Morley	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.
194D3: Morley	Moderate: percs slowly, slope.	Moderate: too clayey, slope.	Severe: slope.	Moderate: too clayey.
194F: Morley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
201: Gilford	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
206: Thorp	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
223B: Varna	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
228B: Nappanee	Severe: percs slowly, wetness.	Moderate: wetness.	Severe: percs slowly, wetness.	Moderate: wetness.
232: Ashkum	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
235: Bryce	Severe: wetness, floods.	Severe: wetness, too clayey.	Severe: too clayey, wetness.	Severe: wetness, too clayey.
241D3: Chatsworth	Severe: percs slowly, too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
290B: Warsaw	Slight	Slight	Moderate: slope.	Slight.
293: Andres	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
294B: Symerton	Slight	Slight	Moderate: slope.	Slight.
295: Mokena	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
298: Beecher	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
316: Romeo	Severe: floods, wetness, depth to rock.	Severe: wetness.	Severe: depth to rock, floods, wetness.	Severe: wetness.
318C2: Lorenzo	Slight	Slight	Severe: slope.	Slight.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
318D2: Lorenzo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
320B: Frankfort	Severe: wetness, percs slowly.	Moderate: wetness, too clayey.	Severe: wetness.	Moderate: wetness.
320C2: Frankfort	Severe: wetness, percs slowly.	Moderate: wetness, too clayey.	Severe: slope, wetness.	Moderate: wetness.
320C3: Frankfort	Severe: wetness, percs slowly, too clayey.	Severe: too clayey.	Severe: slope, too clayey, wetness.	Severe: too clayey.
327B: Fox	Slight	Slight	Moderate: slope.	Slight.
329: Will	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
330: Peotone	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.
343: Kane	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
361B, 361C2: Kidder	Slight	Slight	Moderate: slope.	Slight.
361D2: Kidder	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
363B: Griswold	Slight	Slight	Moderate: slope.	Slight.
363C2: Griswold	Slight	Slight	Severe: slope.	Slight.
369B: Waupecan	Slight	Slight	Moderate: slope.	Slight.
392*: Urban land.				
Orthents, loamy.				
442: Mundelein	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
443B: Barrington	Slight	Slight	Moderate: slope.	Slight.
494B: Kankakee	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
503B: Rockton	Slight	Slight	Moderate: depth to rock, slope.	Slight.
531B: Markham	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
531C2: Markham	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
533*: Urban land.				
534*: Urban land.				
Orthents, clayey.				
535*: Orthents, stony.				
536*: Dumps.				
696B: Zurich	Slight	Slight	Moderate: slope.	Slight.
696C2: Zurich	Slight	Slight	Severe: slope.	Slight.
697: Wauconda	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
698B: Grays	Slight	Slight	Moderate: slope.	Slight.
741B: Oakville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
862*, 863*: Pits.				
864*: Pits.				
865*: Pits.				
903*:				
Muskego	Severe: wetness, excess humus, floods.	Severe: wetness, excess humus.	Severe: wetness, excess humus, floods.	Severe: wetness, excess humus.
Houghton	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.
904*:				
Muskego	Severe: wetness, excess humus, floods.	Severe: wetness, excess humus.	Severe: wetness, excess humus, floods.	Severe: wetness, excess humus.
Peotone	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.
923B*: Urban land.				
Markham	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
923B*:				
Ashkum	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
924*:				
Urban land.				
Milford	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Martinton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
925B*:				
Urban land.				
Frankfort	Severe: wetness, percs slowly.	Moderate: wetness, too clayey.	Severe: wetness.	Moderate: wetness.
Bryce	Severe: wetness, floods.	Severe: wetness, too clayey.	Severe: too clayey, wetness.	Severe: wetness, too clayey.
926B*:				
Urban land.				
Drummer	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Barrington	Slight	Slight	Moderate: slope.	Slight.
1107 Sawmill	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
1330 Peotone	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.
1516 Faxon	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1903*:				
Muskego	Severe: wetness, excess humus, floods.	Severe: wetness, excess humus.	Severe: wetness, excess humus, floods.	Severe: wetness, excess humus.
Houghton	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.
2049*:				
Urban land.				
Watseka	Severe: wetness.	Moderate: wetness, too sandy.	Severe: wetness.	Moderate: wetness, too sandy.
2107*:				
Urban land.				

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
2107*:				
Sawmill	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
2194B*:				
Urban land.				
Morley	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
2194D*:				
Urban land.				
Morley	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.
2290B*:				
Urban land.				
Warsaw	Slight	Slight	Moderate: slope.	Slight.
2741B*:				
Urban land.				
Oakville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
2927*:				
Urban land.				
Hoopeston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
Selma	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 12.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
23----------------- Blount	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
27B---------------- Miami	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
27C2--------------- Miami	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
49----------------- Watseka	Fair	Fair	Good	Good	Good	Fair	Poor	Fair	Good	Poor
59----------------- Lisbon	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
60C2--------------- La Rose	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
67----------------- Harpster	Good	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor
69----------------- Milford	Good	Fair	Fair	Fair	Fair	Poor	---	Fair	Fair	Poor
91----------------- Swygert	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
93F---------------- Rodman	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
107---------------- Sawmill	Good	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor
125---------------- Selma	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
141---------------- Wesley	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
145B--------------- Saybrook	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
146---------------- Elliott	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
152---------------- Drummer	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor
172---------------- Hoopeston	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor
189---------------- Martinton	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
192---------------- Del Rey	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
194B--------------- Morley	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
194C2, 194D, 194D3: Morley	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
194F: Morley	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
201: Gilford	Fair	Poor	Poor	Poor	Poor	Good	Good	Fair	Poor	Good
206: Thorp	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Good
223B: Varna	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
228B: Nappanee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
232: Ashkum	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
235: Bryce	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
241D3: Chatsworth	Fair	Fair	Fair	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor
290B: Warsaw	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
293: Andres	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
294B: Symerton	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
295: Mokena	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
298: Beecher	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
316: Romeo	Very poor	Very poor	Poor	Poor	Poor	Poor	Very poor	Very poor	Poor	Very poor
318C2, 318D2: Lorenzo	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
320B, 320C2, 320C3: Frankfort	Fair	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor
327B: Fox	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
329: Will	Fair	Good	Good	Good	Fair	Poor	Poor	Good	Good	Poor
330: Peotone	Fair	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Poor
343: Kane	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
361B, 361C2: Kidder	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
361D2: Kidder	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
363B: Griswold	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
363C2: Griswold	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
369B: Waupecan	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
392*: Urban land.										
Orthents, loamy.										
442: Mundelein	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
443B: Barrington	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
494B: Kankakee	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
503B: Rockton	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
531B: Markham	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
531C2: Markham	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
533*: Urban land.										
534*: Urban land.										
Orthents, clayey.										
535*: Orthents, stony.										
536*: Dumps.										
696B, 696C2: Zurich	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
697: Wauconda	Good	Good	Good	Good	Fair	Fair	Poor	Good	Good	Poor
698B: Grays	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
741B: Oakville	Poor	Poor	Fair	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor
862*, 863*: Pits.										
864*: Pits.										

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
865*: Pits.										
903*: Muskego	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Houghton	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor
904*: Muskego	Very poor	Very poor	Very poor	Very poor	Very poor	Good	Good	Very poor	Very poor	Good
Peotone	Poor	Poor	Fair	Fair	Fair	Good	Good	Poor	Fair	Good
923B*: Urban land.										
Markham	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Ashkum	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
924*: Urban land.										
Milford	Poor	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good
Martinton	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
925B*: Urban land.										
Frankfort	Fair	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor
Bryce	Poor	Poor	Fair	Fair	Poor	Good	Good	Poor	Fair	Good
926B*: Urban land.										
Drummer	Poor	Poor	Good	Fair	Poor	Good	Good	Poor	Fair	Good
Barrington	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
1107 Sawmill	Poor	Poor	Good	Fair	Fair	Good	Fair	Poor	Fair	Fair
1330 Peotone	Poor	Poor	Fair	Fair	Fair	Good	Good	Poor	Fair	Good
1516 Faxon	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair
1903*: Muskego	Very poor	Very poor	Very poor	Very poor	Very poor	Good	Good	Very poor	Very poor	Good
Houghton	Very poor	Very poor	Very poor	Very poor	Very poor	Good	Good	Very poor	Very poor	Good
2049*: Urban land.										
Watseka	Fair	Fair	Good	Good	Good	Fair	Poor	Fair	Good	Poor
2107*: Urban land.										

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2107*:										
Sawmill	Poor	Poor	Good	Fair	Fair	Good	Fair	Poor	Fair	Fair
2194B*:										
Urban land.										
Morley	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
2194D*:										
Urban land.										
Morley	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
2290B*:										
Urban land.										
Warsaw	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
2741B*:										
Urban land.										
Oakville	Poor	Poor	Fair	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor
2927*:										
Urban land.										
Hoopeston	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor
Selma	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that the data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
23-----------------Blount	0-11	Silt loam-------	ML, CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	80-95	25-40	3-15
	11-37	Silty clay loam, silty clay, clay loam.	CH, CL	A-7, A-6	0-5	95-100	90-100	90-100	80-95	35-60	15-35
	37-60	Silty clay loam, clay loam.	CL	A-6	0-10	90-100	90-100	80-100	70-90	25-40	10-25
27B, 27C2----------Miami	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	95-100	80-100	50-90	22-34	6-15
	8-30	Clay loam, silty clay loam, sandy clay loam.	CL	A-6, A-7	0	92-99	89-97	78-95	64-95	35-50	17-31
	30-60	Loam, clay loam, sandy loam.	CL, CL-ML, ML	A-4, A-6	0-3	88-94	83-89	74-87	50-64	17-30	2-14
49-----------------Watseka	0-11	Loamy fine sand	SM	A-2	0	100	95-100	80-100	17-35	<25	NP-5
	11-60	Fine sand, sand, loamy fine sand.	SP, SM	A-3, A-2	0	90-100	90-100	60-80	3-25	---	NP
59-----------------Lisbon	0-11	Silt loam-------	ML, CL	A-6, A-7	0	100	100	95-100	80-95	35-50	10-20
	11-31	Silty clay loam	CL, CH	A-7, A-6	0	100	95-100	95-100	80-98	35-55	15-35
	31-60	Loam, clay loam, silt loam.	CL, ML	A-4, A-6, A-7	0-5	90-100	90-100	85-100	70-95	20-45	8-25
60C2---------------La Rose	0-8	Silt loam-------	ML, CL, OL	A-6, A-7	0	100	95-100	90-100	60-95	30-50	11-20
	8-14	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	90-100	85-100	60-95	30-50	11-25
	14-60	Loam, clay loam	CL	A-4, A-6	0-5	95-100	90-100	75-100	50-90	25-40	8-20
67-----------------Harpster	0-15	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	15-33	Silty clay loam, silt loam, loam.	CL, CH	A-7	0	100	95-100	95-100	80-100	40-60	20-35
	33-60	Stratified sandy loam to clay loam.	CL, CL-ML, SC, SM-SC	A-6, A-4, A-7	0	100	95-100	95-100	45-95	20-50	5-25
69-----------------Milford	0-13	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	80-95	40-60	20-35
	13-36	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	100	95-100	90-100	75-100	40-60	20-40
	36-60	Stratified clay to sandy loam.	CL	A-6, A-7	0	97-100	95-100	90-100	70-100	30-50	15-30
91-----------------Swygert	0-10	Silty clay loam	CL	A-7	0	100	100	95-100	85-95	40-50	15-25
	10-34	Silty clay, clay, silty clay loam.	CH, CL	A-7, A-6	0	95-100	95-100	95-100	85-95	35-55	20-30
	34-60	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	95-100	95-100	90-100	80-95	35-55	20-30
93F----------------Rodman	0-12	Gravelly loam	ML, CL, SM, GM	A-4	0-2	70-85	65-85	60-80	36-65	<30	3-9
	12-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
107 Sawmill	0-41	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	80-100	30-50	15-30
	41-60	Stratified silty clay loam to loam.	CL	A-4, A-6, A-7	0	100	100	95-100	70-100	25-45	10-30
125 Selma	0-14	Loam	SC, CL	A-4, A-6	0	100	98-100	90-100	35-70	25-35	7-17
	14-50	Loam, clay loam, sandy clay loam.	CL, SC	A-6	0	100	95-100	90-100	38-75	24-36	11-19
	50-60	Stratified sand to silt loam.	CL, SC, SM, ML	A-4, A-6, A-2	0	90-100	85-100	65-100	18-67	<35	NP-21
141 Wesley	0-13	Fine sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	70-90	30-50	<25	NP-5
	13-26	Fine sand, loamy very fine sand, fine sandy loam.	SM, SP-SM, SP	A-2, A-3	0-5	100	95-100	60-90	3-25	<30	NP-5
	26-60	Silty clay loam, loam, clay loam.	CL	A-6, A-7	0-5	100	95-100	85-100	80-95	30-45	13-26
145B Saybrook	0-13	Silt loam	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	11-30
	13-26	Silty clay loam	CL	A-7	0	100	95-100	90-100	85-100	40-55	15-25
	26-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	95-100	85-100	80-95	60-85	20-40	8-25
146 Elliott	0-11	Silt loam	CL, ML	A-6, A-7	0	95-100	95-100	95-100	80-99	30-50	10-20
	11-37	Silty clay, silty clay loam.	CH, CL	A-6, A-7	0-5	95-100	95-100	90-100	75-99	30-52	11-26
	37-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-5	95-100	95-100	90-100	70-95	28-45	11-24
152 Drummer	0-15	Silty clay loam	CL	A-6, A-7	0	100	95-100	85-100	72-95	30-50	15-30
	15-46	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7	0	100	95-100	85-100	50-80	30-50	15-30
	46-56	Loam, silt loam, clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	50-80	30-50	15-30
	56-60	Stratified sandy loam to silty clay loam.	SC, CL	A-4, A-6	0-5	95-100	85-95	75-95	45-80	20-35	7-20
172 Hoopeston	0-30	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	90-100	90-100	70-90	25-45	20-35	NP-10
	30-60	Stratified silt loam to fine sand.	SP-SM, ML, SM, SC, SM-SC	A-2, A-3, A-4	0	90-100	90-100	50-80	5-55	<25	NP-10
189 Martinton	0-12	Silt loam	ML	A-6, A-7	0	95-100	95-100	90-100	75-95	34-49	10-19
	12-45	Silty clay loam, silty clay.	CH, CL	A-7	0	95-100	95-100	90-100	70-95	40-60	16-32
	45-60	Stratified sandy loam to silty clay loam.	CL, ML, SM, SC	A-4, A-6, A-7	0	95-100	95-100	90-100	35-90	25-50	NP-25
192 Del Rey	0-8	Silt loam	CL, ML, CL-ML	A-6, A-4, A-7	0	95-100	95-100	90-98	75-95	25-50	5-20
	8-46	Silty clay loam, silty clay.	CH, CL	A-7, A-6	0	95-100	95-100	90-100	70-95	35-55	15-30
	46-60	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	0	95-100	95-100	90-100	70-95	30-50	5-25

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
194B, 194C2, 194D-- Morley	0-7	Silt loam-------	CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	85-95	25-40	5-15
	7-11	Silty clay loam, clay loam.	CL	A-6	0-10	95-100	90-100	85-95	80-90	25-40	10-20
	11-23	Silty clay, clay loam, clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-55	15-30
	23-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-45	10-25
194D3-------------- Morley	0-6	Silty clay loam	CL	A-6	0-5	95-100	90-100	85-95	80-90	25-40	10-20
	6-14	Silty clay, clay loam, clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-55	15-30
	14-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-45	10-25
194F--------------- Morley	0-7	Silt loam-------	CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	85-95	25-40	5-15
	7-11	Silty clay loam, clay loam.	CL	A-6	0-10	95-100	90-100	85-95	80-90	25-40	10-20
	11-23	Silty clay, clay loam, clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-55	15-30
	23-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-45	10-25
201---------------- Gilford	0-16	Fine sandy loam	SM, SC, SM-SC	A-4	0	95-100	90-100	65-80	35-45	<25	2-10
	16-27	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2-4	0	90-100	90-100	55-70	20-35	15-30	NP-8
	27-60	Loamy sand, sand	SM, SP, SP-SM	A-3, A-1-b, A-2-4	0	90-100	85-100	18-60	3-20	---	NP
206---------------- Thorp	0-17	Silt loam-------	CL, CL-ML	A-6, A-4	0	95-100	95-100	90-100	75-95	20-40	7-19
	17-30	Silty clay loam	CL	A-7, A-6	0	95-100	95-100	90-100	75-95	35-50	13-27
	30-60	Silt loam, clay loam, loam.	CL	A-6, A-4, A-7	0	90-100	90-100	90-100	70-90	20-50	8-26
223B--------------- Varna	0-8	Silt loam-------	CL	A-6, A-4	0-5	95-100	95-100	95-100	85-95	25-40	8-20
	8-25	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	95-100	90-98	80-98	33-56	15-29
	25-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-10	95-100	95-100	90-98	80-95	30-45	13-26
228B--------------- Nappanee	0-9	Silt loam-------	ML, CL	A-4, A-6	0-5	95-100	95-100	85-100	55-90	25-40	3-15
	9-24	Silty clay, silty clay loam, clay.	CL, CH	A-6, A-7	0-5	95-100	95-100	85-100	70-95	25-70	10-42
	24-60	Silty clay, clay, clay loam.	CL, CH	A-6, A-7	0-5	95-100	95-100	85-100	70-95	25-60	10-34
232---------------- Ashkum	0-37	Silty clay loam, silty clay.	CL, CH	A-7	0	100	98-100	95-100	75-100	45-65	20-35
	37-60	Silty clay loam	CL	A-7, A-6	0-5	98-100	95-100	90-100	75-95	35-50	15-30
235---------------- Bryce	0-17	Silty clay------	CH, CL	A-7	0	100	100	95-100	80-100	45-60	20-31
	17-32	Silty clay, clay	CH, CL	A-7	0-5	100	100	95-100	85-100	47-62	25-40
	32-60	Silty clay, silty clay loam, clay.	CH, CL	A-7, A-6	0-5	100	95-100	95-100	70-95	35-60	21-38
241D3-------------- Chatsworth	0-6	Silty clay------	CH, CL	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-45
	6-60	Silty clay, clay, silty clay loam.	CH, CL	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-45

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
290B----------------- Warsaw	0-14	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	25-35	4-12
	14-26	Silty clay loam, loam.	SC, CL	A-6, A-2-6	0-3	90-95	70-95	60-90	30-70	25-35	10-20
	26-31	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC	A-6, A-2-6	0-5	70-90	60-85	55-70	30-60	25-35	10-15
	31-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP
293----------------- Andres	0-15	Silt loam, silty clay loam.	CL, OL	A-7, A-6	0	95-100	95-100	90-99	80-94	35-50	13-21
	15-38	Silty clay loam, clay loam, sandy clay loam.	CL, CH	A-7	0-5	95-100	95-100	95-100	80-99	40-56	16-32
	38-60	Silty clay loam	CL	A-6, A-7	0-5	95-100	95-100	85-100	70-95	28-48	11-26
294B---------------- Symerton	0-12	Silt loam--------	CL, ML	A-7, A-6	0	95-100	95-100	90-100	60-95	35-50	11-20
	12-28	Sandy clay loam, clay loam, silty clay loam.	CL, CH	A-7, A-6	0-5	98-100	95-100	95-100	70-85	30-57	15-32
	28-60	Silty clay loam	CL	A-7, A-6	0-10	95-100	95-100	85-100	75-85	30-45	13-26
295----------------- Mokena	0-14	Silt loam--------	CL	A-6, A-7	0	95-100	95-100	85-100	75-90	31-45	11-24
	14-30	Clay loam, silty clay loam.	CL	A-7, A-6	0	95-100	95-100	85-100	80-95	36-50	13-26
	30-60	Silty clay, clay	CH, CL	A-7, A-6	0-5	95-100	90-100	85-100	75-95	35-55	14-31
298----------------- Beecher	0-11	Silt loam--------	ML	A-6, A-4, A-7	0	95-100	95-100	90-100	85-95	30-45	7-15
	11-30	Silty clay, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	85-95	35-50	15-26
	30-60	Silty clay loam, clay loam.	CL	A-6	0-5	90-100	90-100	85-95	80-90	28-40	10-20
316----------------- Romeo	0-5	Silt loam--------	CL, OL	A-4, A-6	0-15	90-100	90-100	80-100	50-90	30-40	8-15
	5	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
318C2, 318D2-------- Lorenzo	0-7	Loam-------------	CL, ML	A-6, A-7	0-5	95-100	95-100	85-100	60-95	30-50	10-20
	7-16	Loam, clay loam, gravelly clay loam.	CL, SC	A-6, A-7	5-10	95-100	85-100	80-100	40-90	30-50	10-25
	16-60	Sand and gravel	GM, GC, SM, SC	A-1, A-2, A-3	5-20	25-80	25-80	10-70	5-35	<30	NP-10
320B, 320C2--------- Frankfort	0-8	Silty clay loam	CL	A-6, A-7	0	100	98-100	90-98	75-95	34-45	11-19
	8-60	Silty clay-------	CH, CL, ML, MH	A-7	0-5	95-100	95-100	90-100	60-95	40-54	14-28
320C3--------------- Frankfort	0-6	Silty clay-------	CH, CL, ML, MH	A-7	0-5	95-100	95-100	90-100	60-95	40-54	14-28
	6-60	Silty clay-------	CH, CL, ML, MH	A-7	0-5	95-100	95-100	90-100	60-95	40-54	14-28
327B---------------- Fox	0-11	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	85-100	75-95	55-90	20-30	3-10
	11-20	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7	0	85-100	75-100	70-95	55-90	25-45	10-25
	20-36	Clay loam, loam, sandy clay loam.	CL, SC	A-2, A-6, A-7	0	85-100	75-95	50-95	20-65	25-45	10-25
	36-60	Sand and gravel	SP, SM, GP, GM	A-1, A-2, A-3	0-5	40-100	35-100	15-95	2-15	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
329: Will	0-8	Silty clay loam	CL, OH, CH, OL	A-7	0	95-100	95-100	90-100	80-95	45-60	20-35
	8-31	Loam, clay loam, silty clay loam.	CL, CH	A-7	0-5	90-100	90-100	80-100	60-90	40-60	20-35
	31-60	Stratified sand to gravelly loamy sand.	GP, GP-GM, SP, SP-SM	A-1	1-10	40-80	40-70	40-50	0-10	---	NP
330: Peotone	0-13	Silty clay loam	OH, CH, CL, OL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	13-43	Silty clay loam	CH, CL	A-7	0-5	100	95-100	90-100	85-100	41-70	17-39
	43-60	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	14-29
343: Kane	0-13	Silt loam	CL, CL-ML	A-6, A-4	0	95-100	95-100	90-100	75-95	25-35	5-15
	13-25	Silty clay loam, clay loam.	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-45	10-20
	25-29	Sandy clay loam, sandy loam.	SC, CL	A-6, A-4	0-5	90-95	85-95	70-90	40-70	20-35	8-15
	29-60	Gravelly loamy sand, sand, gravel.	SP, GP, SP-SM, GP-GM	A-1	0-10	30-70	30-55	10-30	2-12	<5	NP
361B, 361C2, 361D2: Kidder	0-8	Silt loam	ML, CL-ML, CL	A-4	0	95-100	95-100	85-100	60-90	20-30	3-10
	8-18	Clay loam, sandy clay loam, loam.	CL, SC	A-6, A-7	0-5	75-100	75-100	65-95	45-70	25-40	8-15
	18-60	Gravelly loam, gravelly sandy loam.	SM	A-2	3-10	50-90	50-90	50-80	15-35	---	NP
363B, 363C2: Griswold	0-7	Silt loam	CL-ML, CL	A-4, A-6	0	95-100	95-100	90-100	70-90	20-30	5-15
	7-25	Loam, sandy clay loam, clay loam.	CL-ML, CL, SM-SC, SC	A-6, A-4	0-5	95-100	90-100	80-90	45-80	20-35	5-15
	25-60	Sandy loam	SM, SC, SM-SC	A-2, A-4	0-10	85-95	65-85	50-75	20-45	<25	3-10
369B: Waupecan	0-16	Silt loam	CL	A-4, A-6	0	100	100	90-100	85-95	20-35	8-15
	16-50	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	85-95	35-45	15-25
	50-60	Sand and gravel	GP, SP, SP-SM, GP-GM	A-1	10-35	40-95	30-85	30-50	0-12	---	NP
392*:											
Urban land.											
Orthents, loamy.											
442: Mundelein	0-12	Silt loam	ML, OL	A-4, A-6, A-7	0	95-100	95-100	95-100	85-95	30-50	5-20
	12-36	Silty clay loam, clay loam, loam	CL	A-7, A-6	0	95-100	95-100	95-100	75-95	35-50	15-25
	36-60	Stratified silt loam to fine sand.	SC, SM, ML, CL	A-2, A-4, A-6	0	90-100	90-100	60-90	10-75	<35	NP-20
443B: Barrington	0-14	Silt loam	CL	A-4, A-6	0	100	95-100	90-100	80-95	30-40	8-18
	14-33	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	80-95	35-50	11-25
	33-60	Stratified silt loam to fine sand.	CL, SM-SC, SC, CL-ML	A-4, A-6	0	100	95-100	75-100	36-90	25-40	5-15

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
494B---------------- Kankakee	0-21	Loam------------	CL, CL-ML	A-4, A-6	0-10	70-95	55-75	50-70	50-55	25-40	5-15
	21-60	Very cobbly loam, very cobbly sandy loam.	SM-SC, SC, SM, SP-SM	A-2, A-1	30-80	70-90	45-70	25-60	10-35	15-25	5-10
503B---------------- Rockton	0-13	Loam------------	ML, CL-ML, CL	A-4	0	90-100	90-100	85-95	50-75	25-35	5-10
	13-23	Loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	90-100	90-100	75-90	45-70	30-45	10-20
	23-29	Clay, clay loam, silty clay.	CH, CL	A-7	0-2	90-100	90-100	90-95	70-90	40-60	20-35
	29	Weathered bedrock.	---	---	---	---	---	---	---	---	---
531B, 531C2--------- Markham	0-12	Silt loam-------	CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	85-95	23-40	6-17
	12-28	Silty clay, silty clay loam.	CL, CH	A-7	0-10	95-100	90-100	85-100	80-90	40-54	15-28
	28-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-10	95-100	90-100	85-95	80-90	30-45	13-26
533*: Urban land.											
534*: Urban land.											
Orthents, clayey.											
535*: Orthents, stony.											
536*: Dumps.											
696B, 696C2--------- Zurich	0-8	Silt loam-------	CL-ML, CL	A-4, A-6	0	100	95-100	90-100	80-95	25-40	5-20
	8-33	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	90-100	60-90	30-45	10-25
	33-60	Stratified silt loam to fine sandy loam.	ML, CL, SM, SC	A-2, A-4, A-6	0	90-100	80-100	70-100	30-70	20-40	NP-20
697----------------- Wauconda	0-10	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	95-100	80-100	20-35	6-15
	10-36	Silty clay loam	CL	A-7, A-6	0	100	95-100	90-100	85-100	30-45	15-30
	36-60	Loam, silt loam, sand.	ML, CL, SM, SC	A-2, A-4, A-6	0	100	95-100	70-100	30-90	<30	NP-15
698B---------------- Grays	0-13	Silt loam-------	CL	A-4, A-6	0	100	95-100	90-100	80-95	25-40	8-20
	13-35	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	90-100	60-90	30-45	15-25
	35-60	Stratified silt loam to very fine sand.	ML, CL, SM, SC	A-4, A-2, A-6	0	90-100	80-100	70-100	30-70	15-40	NP-20
741B---------------- Oakville	0-6	Fine sand-------	SM, SP, SP-SM	A-2, A-3	0	100	100	50-85	0-35	---	NP
	6-60	Fine sand-------	SM, SP, SP-SM	A-2, A-3	0	100	95-100	65-95	0-25	---	NP
862*, 863*: Pits.											
864*: Pits.											

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
865*: Pits.											
903*:											
Muskego----------	0-27	Sapric material	Pt	A-8	0	---	---	---	---	---	---
	27-60	Coprogenous earth.	OH, OL	A-8	0	---	---	---	---	---	---
Houghton----------	0-59	Sapric material	Pt	---	0	---	---	---	---	---	---
904*:											
Muskego----------	0-27	Sapric material	Pt	A-8	0	---	---	---	---	---	---
	27-60	Coprogenous earth.	OH, OL	A-8	0	---	---	---	---	---	---
Peotone----------	0-13	Silty clay loam	OH, CH, CL, OL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	13-43	Silty clay loam, silty clay.	CH, CL	A-7	0-5	100	95-100	90-100	85-100	41-70	17-39
	43-60	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	14-29
923B*: Urban land.											
Markham----------	0-12	Silt loam-------	CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	85-95	23-40	6-17
	12-40	Silty clay, silty clay loam.	CL, CH	A-7	0-10	95-100	90-100	85-100	80-90	40-54	15-28
	40-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-10	95-100	90-100	85-95	80-90	30-45	13-26
Ashkum-----------	0-37	Silty clay loam	CL, CH	A-7	0	100	98-100	95-100	75-100	45-65	20-35
	37-60	Silty clay loam	CL	A-7, A-6	0-5	98-100	95-100	90-100	75-95	35-50	15-30
924*: Urban land.											
Milford----------	0-13	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	80-95	40-60	20-35
	13-36	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	100	95-100	90-100	75-100	40-60	20-40
	36-60	Stratified clay to sandy loam.	CL	A-6, A-7	0	97-100	95-100	90-100	70-100	30-50	15-30
Martinton---------	0-12	Silt loam-------	ML	A-6, A-7	0	95-100	95-100	90-100	75-95	34-49	10-19
	12-45	Silty clay loam, silty clay.	CH, CL	A-7	0	95-100	95-100	90-100	70-95	40-60	16-32
	45-60	Stratified sandy loam to silty clay loam.	CL, ML, SM, SC	A-4, A-6, A-7	0	95-100	95-100	90-100	35-90	25-50	NP-25
925B*: Urban land.											
Frankfort---------	0-8	Silty clay loam	CL	A-6, A-7	0	100	98-100	90-98	75-95	34-45	11-19
	8-60	Silty clay------	CH, CL, ML, MH	A-7	0-5	95-100	95-100	90-100	60-95	40-54	14-28
Bryce------------	0-17	Silty clay------	CH, CL	A-7	0	100	100	95-100	80-100	45-60	20-31
	17-32	Silty clay, clay	CH, CL	A-7	0-5	100	100	95-100	85-100	47-62	25-40
	32-60	Silty clay, silty clay loam, clay.	CH, CL	A-7, A-6	0-5	100	95-100	95-100	70-95	35-60	21-38
926B*: Urban land.											

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
926B*:											
Drummer	0-15	Silty clay loam	CL	A-6, A-7	0	100	95-100	85-100	72-95	30-50	15-30
	15-46	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7	0	100	95-100	85-100	50-80	30-50	15-30
	46-56	Loam, silt loam, clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	50-80	30-50	15-30
	56-60	Stratified sandy loam to silty clay loam.	SC, CL	A-4, A-6	0-5	95-100	85-95	75-95	45-80	20-35	7-20
Barrington	0-14	Silt loam	CL	A-4, A-6	0	100	95-100	90-100	80-95	30-40	8-18
	14-33	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	80-95	35-50	11-25
	33-60	Stratified silt loam to fine sand.	CL, SM-SC, SC, CL-ML	A-4, A-6	0	100	95-100	75-100	36-90	25-40	5-15
1107 Sawmill	0-41	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	80-100	30-50	15-30
	41-60	Stratified silty clay loam to loam.	CL	A-4, A-6, A-7	0	100	100	95-100	70-100	25-45	10-30
1330 Peotone	0-13	Silty clay loam	OH, CH, CL, OL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	13-43	Silty clay loam, silty clay.	CH, CL	A-7	0-5	100	95-100	90-100	85-100	41-70	17-39
	43-60	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	14-29
1516 Faxon	0-30	Silty clay loam	CL	A-7	0-10	95-100	85-100	85-100	80-95	40-50	15-25
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1903*:											
Muskego	0-27	Sapric material	Pt	A-8	0	---	---	---	---	---	---
	27-60	Coprogenous earth.	OH, OL	A-8	0	---	---	---	---	---	---
Houghton	0-59	Sapric material	Pt	---	0	---	---	---	---	---	---
2049*:											
Urban land.											
Watseka	0-11	Loamy fine sand	SM	A-2	0	100	95-100	80-100	17-35	<25	NP-5
	11-60	Fine sand, sand, loamy fine sand.	SP, SM	A-3, A-2	0	90-100	90-100	60-80	3-25	---	NP
2107*:											
Urban land.											
Sawmill	0-41	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	80-100	30-50	15-30
	41-60	Stratified silty clay loam to loam.	CL	A-4, A-6, A-7	0	100	100	95-100	70-100	25-45	10-30
2194B*, 2194D*:											
Urban land.											
Morley	0-7	Silt loam	CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	85-95	25-40	5-15
	7-11	Silty clay loam, clay loam.	CL	A-6	0-10	95-100	90-100	85-95	80-90	25-40	10-20
	11-23	Silty clay, clay loam, clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-55	15-30
	23-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-45	10-25
2290B*:											
Urban land.											

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
2290B*:											
Warsaw	0-14	Silt loam	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	25-35	4-12
	14-26	Sandy clay loam, loam, gravelly clay loam.	SC, CL	A-6, A-2-6	0-3	90-95	70-95	60-90	30-70	25-35	10-20
	26-31	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC	A-6, A-2-6	0-5	70-90	60-85	55-70	30-60	25-35	10-15
	31-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP
2741B*: Urban land.											
Oakville	0-6	Fine sand	SM, SP, SP-SM	A-2, A-3	0	100	100	50-85	0-35	---	NP
	6-60	Fine sand	SM, SP, SP-SM	A-2, A-3	0	100	95-100	65-95	0-25	---	NP
2927*: Urban land.											
Hoopeston	0-30	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	90-100	90-100	70-90	25-45	20-35	NP-10
	30-60	Loamy sand, sand	SP-SM, SM, SC, SM-SC	A-2, A-3	0	90-100	90-100	50-80	5-20	<25	NP-10
Selma	0-14	Loam	SC, CL	A-4, A-6	0	100	98-100	90-100	35-70	25-35	7-17
	14-50	Loam, clay loam, sandy clay loam.	CL, SC	A-6	0	100	95-100	90-100	38-75	24-36	11-19
	50-60	Stratified sand to silt loam.	CL, SC, SM, ML	A-4, A-6, A-2	0	90-100	85-100	65-100	18-67	<35	NP-21

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
23--------------- Blount	0-11 11-37 37-60	0.6-2.0 0.06-0.6 0.06-0.6	0.20-0.24 0.06-0.10 0.07-0.10	5.1-6.5 4.5-6.5 7.4-8.4	Low------------ Moderate------- Moderate-------	0.43 0.43 0.43	3
27B, 27C2-------- Miami	0-8 8-30 30-60	0.6-2.0 0.6-2.0 0.2-0.6	0.20-0.24 0.15-0.20 0.05-0.19	5.6-7.3 5.6-6.0 6.6-8.4	Low------------ Moderate------- Low------------	0.37 0.37 0.37	5
49--------------- Watseka	0-11 11-60	6.0-20 6.0-20	0.10-0.12 0.05-0.10	6.1-7.3 5.1-7.3	Low------------ Low------------	0.17 0.17	2
59--------------- Lisbon	0-11 11-31 31-60	0.6-2.0 0.6-2.0 0.6-2.0	0.22-0.24 0.18-0.22 0.17-0.21	5.6-7.3 6.1-7.8 6.6-8.4	Low------------ Moderate------- Low------------	0.28 0.43 0.43	4
60C2------------- La Rose	0-8 8-14 14-60	0.6-2.0 0.6-2.0 0.6-2.0	0.20-0.24 0.15-0.20 0.17-0.19	6.1-7.3 5.6-7.8 7.4-8.4	Low------------ Low------------ Low------------	0.32 0.32 0.32	5-4
67--------------- Harpster	0-15 15-33 33-60	0.6-2.0 0.6-2.0 0.6-2.0	0.21-0.24 0.17-0.22 0.11-0.22	7.4-8.4 7.4-8.4 7.4-8.4	Moderate------- Moderate------- Low------------	0.28 0.28 0.28	5
69--------------- Milford	0-13 13-36 36-60	0.6-2.0 0.2-0.6 0.2-0.6	0.12-0.23 0.11-0.20 0.14-0.20	6.1-7.3 6.6-7.8 7.4-8.4	High----------- High----------- Moderate-------	0.28 0.28 0.28	5
91--------------- Swygert	0-10 10-34 34-60	0.2-0.6 0.06-0.2 0.06-0.2	0.21-0.23 0.10-0.19 0.10-0.18	5.6-6.5 6.1-7.8 7.9-8.4	Moderate------- High----------- Moderate-------	0.43 0.32 0.32	3
93F-------------- Rodman	0-12 12-60	2.0-6.0 >20	0.10-0.12 0.02-0.04	6.6-7.8 7.4-8.4	Low------------ Low------------	0.20 0.10	3-2
107-------------- Sawmill	0-41 41-60	0.2-2.0 0.2-2.0	0.18-0.23 0.11-0.20	6.1-7.8 7.4-8.4	Moderate------- Moderate-------	0.28 0.28	5
125-------------- Selma	0-14 14-50 50-60	0.6-2.0 0.6-2.0 0.6-6.0	0.17-0.22 0.15-0.19 0.05-0.22	6.1-7.8 6.1-7.8 6.1-7.8	Moderate------- Moderate------- Low------------	0.28 0.28 0.28	5
141-------------- Wesley	0-13 13-26 26-60	2.0-6.0 2.0-20 0.2-0.6	0.15-0.18 0.06-0.14 0.09-0.12	5.6-7.3 5.6-7.3 6.6-8.4	Low------------ Low------------ Moderate-------	0.24 0.20 0.37	3-2
145B------------- Saybrook	0-13 13-26 26-60	0.6-2.0 0.6-2.0 0.6-2.0	0.22-0.24 0.18-0.20 0.15-0.21	5.6-7.3 5.6-6.5 6.1-8.4	Low------------ Moderate------- Low------------	0.28 0.43 0.43	5
146-------------- Elliott	0-11 11-37 37-60	0.6-2.0 0.2-0.6 0.2-0.6	0.21-0.24 0.11-0.20 0.14-0.20	5.6-7.3 5.6-7.8 7.4-8.4	Moderate------- Moderate------- Moderate-------	0.28 0.28 0.28	4
152-------------- Drummer	0-15 15-46 46-56 56-60	0.6-2.0 0.6-2.0 0.6-2.0 0.6-2.0	0.21-0.23 0.21-0.24 0.17-0.20 0.11-0.19	5.6-7.3 5.6-7.3 6.1-8.4 6.6-8.4	Moderate------- Moderate------- Moderate------- Low------------	0.28 0.28 0.28 0.28	5
172-------------- Hoopeston	0-30 30-60	2.0-6.0 6.0-20	0.12-0.15 0.05-0.10	5.1-6.5 5.6-7.8	Low------------ Low------------	0.28 0.28	4
189-------------- Martinton	0-12 12-45 45-60	0.6-2.0 0.2-0.6 0.06-0.2	0.22-0.24 0.11-0.20 0.11-0.22	5.1-6.5 5.6-7.8 7.5-8.4	Low------------ Moderate------- Moderate-------	0.32 0.43 0.43	4

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
192-------------- Del Rey	0-8	0.6-2.0	0.22-0.24	5.1-6.5	Low------------	0.43	3
	8-46	0.06-0.2	0.12-0.20	6.1-8.4	Moderate-------	0.43	
	46-60	0.06-0.2	0.09-0.11	7.9-8.4	Moderate-------	0.43	
194B, 194C2, 194D------------ Morley	0-7	0.6-2.0	0.20-0.24	5.1-6.5	Low------------	0.43	3
	7-11	0.2-0.6	0.18-0.20	5.1-6.5	Moderate-------	0.43	
	11-23	0.06-0.2	0.11-0.13	5.6-6.5	Moderate-------	0.43	
	23-60	0.2-0.6	0.09-0.20	6.6-8.4	Moderate-------	0.43	
194D3------------ Morley	0-6	0.2-0.6	0.18-0.22	5.1-6.5	Moderate-------	0.43	2
	6-14	0.06-0.2	0.11-0.13	5.6-6.5	Moderate-------	0.43	
	14-60	0.2-0.6	0.09-0.20	6.6-8.4	Moderate-------	0.43	
194F------------- Morley	0-7	0.6-2.0	0.20-0.24	5.1-6.5	Low------------	0.43	3
	7-11	0.2-0.6	0.18-0.20	5.1-6.5	Moderate-------	0.43	
	11-23	0.06-0.2	0.11-0.13	5.6-6.5	Moderate-------	0.43	
	23-60	0.2-0.6	0.09-0.20	6.6-8.4	Moderate-------	0.43	
201-------------- Gilford	0-16	2.0-6.0	0.16-0.18	6.1-7.3	Low------------	0.20	5
	16-27	2.0-6.0	0.12-0.14	6.1-7.3	Low------------	0.20	
	27-60	6.0-20	0.05-0.08	6.6-8.4	Low------------	0.15	
206-------------- Thorp	0-17	0.2-0.6	0.22-0.24	5.1-7.3	Low------------	0.37	4
	17-30	0.06-0.2	0.18-0.20	5.6-6.5	Moderate-------	0.37	
	30-60	0.06-0.2	0.15-0.22	6.6-7.3	Moderate-------	0.37	
223B------------- Varna	0-8	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.32	4-3
	8-25	0.2-0.6	0.09-0.19	5.6-7.3	Moderate-------	0.32	
	25-60	0.06-0.6	0.14-0.20	6.6-8.4	Low------------	0.32	
228B------------- Nappanee	0-9	0.6-2.0	0.20-0.24	5.1-7.3	Low------------	0.43	3
	9-24	<0.06	0.10-0.14	5.1-7.8	High-----------	0.32	
	24-60	<0.06	0.08-0.12	7.4-8.4	High-----------	0.32	
232-------------- Ashkum	0-47	0.2-0.6	0.12-0.23	5.6-7.8	Moderate-------	0.28	5
	47-60	0.2-0.6	0.18-0.20	6.1-8.4	Moderate-------	0.28	
235-------------- Bryce	0-17	0.2-0.6	0.12-0.23	5.6-7.8	Moderate-------	0.28	3
	17-32	0.06-0.2	0.09-0.13	6.6-8.4	Moderate-------	0.28	
	32-60	0.06-0.2	0.08-0.19	7.4-8.4	Moderate-------	0.28	
241D3------------ Chatsworth	0-6	<0.06	0.09-0.11	5.6-7.8	Moderate-------	0.43	2
	6-60	<0.06	0.08-0.10	6.6-8.4	Moderate-------	0.43	
290B------------- Warsaw	0-14	0.6-2.0	0.20-0.24	5.6-7.3	Low------------	0.32	4-3
	14-26	0.6-2.0	0.16-0.19	5.1-7.8	Low------------	0.32	
	26-31	0.6-2.0	0.15-0.17	6.6-8.4	Low------------	0.32	
	31-60	>20	0.02-0.04	7.9-8.4	Low------------	0.10	
293-------------- Andres	0-15	0.6-2.0	0.21-0.24	6.1-7.3	Low------------	0.28	5
	15-38	0.6-2.0	0.16-0.20	6.1-7.8	Moderate-------	0.28	
	38-60	0.2-0.6	0.18-0.20	7.9-8.4	Moderate-------	0.37	
294B------------- Symerton	0-12	0.6-2.0	0.20-0.24	5.6-6.5	Low------------	0.32	5-4
	12-28	0.6-2.0	0.16-0.20	5.6-7.8	Moderate-------	0.32	
	28-60	0.2-0.6	0.18-0.20	7.4-8.4	Moderate-------	0.43	
295-------------- Mokena	0-14	0.6-2.0	0.20-0.24	5.6-7.3	Low------------	0.28	4
	14-30	0.2-0.6	0.15-0.20	5.6-7.3	Moderate-------	0.28	
	30-60	0.06-0.2	0.08-0.12	6.6-8.4	Moderate-------	0.28	
298-------------- Beecher	0-11	0.2-0.6	0.22-0.24	4.5-6.0	Low------------	0.37	3-2
	11-30	0.06-0.2	0.11-0.19	4.5-6.5	Moderate-------	0.37	
	30-60	0.06-0.2	0.14-0.20	7.4-8.4	Moderate-------	0.37	
316-------------- Romeo	0-5	0.6-2.0	0.22-0.24	6.1-8.4	Low------------	0.37	1
	5	---	---	---	---------------	---	

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
318C2, 318D2: Lorenzo	0-7	2.0-6.0	0.20-0.22	5.6-7.3	Low	0.28	3-2
	7-16	2.0-6.0	0.15-0.19	5.6-7.3	Low	0.28	
	16-60	>6.0	0.02-0.07	7.4-8.4	Low	0.10	
320B, 320C2: Frankfort	0-8	0.2-0.6	0.20-0.24	5.6-7.8	Low	0.37	3
	8-60	0.06-0.2	0.10-0.13	6.1-8.4	Moderate	0.37	
320C3: Frankfort	0-6	0.06-0.2	0.10-0.13	6.1-8.4	Moderate	0.37	2
	6-60	0.06-0.2	0.10-0.13	6.1-8.4	Moderate	0.37	
327B: Fox	0-11	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.32	4
	11-20	0.6-2.0	0.15-0.22	5.1-7.3	Moderate	0.32	
	20-36	0.6-2.0	0.15-0.19	5.6-7.8	Moderate	0.32	
	36-60	>20	0.02-0.04	7.9-8.4	Low	0.10	
329: Will	0-8	0.6-2.0	0.17-0.23	5.6-7.3	Moderate	0.32	4
	8-31	0.6-2.0	0.15-0.20	6.1-7.3	Moderate	0.32	
	31-60	6.0-20	0.02-0.04	7.9-8.4	Low	0.10	
330: Peotone	0-13	0.2-0.6	0.12-0.23	5.6-6.5	High	0.28	5
	13-43	0.2-0.6	0.11-0.20	6.1-7.8	High	0.28	
	43-60	0.06-0.2	0.18-0.20	6.6-8.4	High	0.28	
343: Kane	0-13	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.28	4
	13-25	0.6-2.0	0.15-0.20	5.6-7.3	Moderate	0.28	
	25-29	0.6-6.0	0.12-0.18	6.1-7.8	Low	0.28	
	29-60	6.0-20	0.02-0.04	7.9-8.4	Very low	0.10	
361B, 361C2, 361D2: Kidder	0-8	0.6-2.0	0.20-0.24	6.1-7.8	Low	0.32	5
	8-18	0.6-2.0	0.15-0.19	5.6-7.8	Moderate	0.32	
	18-60	2.0-6.0	0.09-0.11	7.4-8.4	Low	0.32	
363B, 363C2: Griswold	0-7	0.6-2.0	0.16-0.22	6.1-7.3	Low	0.32	5
	7-25	0.6-2.0	0.14-0.19	6.1-7.3	Low	0.32	
	25-60	0.6-2.0	0.11-0.13	7.4-8.4	Low	0.32	
369B: Waupecan	0-16	0.6-2.0	0.22-0.24	5.1-6.5	Low	0.32	4
	16-50	0.6-2.0	0.18-0.22	5.6-6.5	Moderate	0.43	
	50-60	>20	0.02-0.04	7.9-8.4	Low	0.10	
392*: Urban land.							
Orthents, loamy.							
442: Mundelein	0-12	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.28	5
	12-36	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43	
	36-60	0.6-2.0	0.05-0.22	6.1-8.4	Low	0.43	
443B: Barrington	0-14	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	5
	14-33	0.6-2.0	0.18-0.20	5.6-6.5	Moderate	0.43	
	33-60	0.6-2.0	0.07-0.11	6.6-8.4	Low	0.43	
494B: Kankakee	0-21	0.6-2.0	0.15-0.22	5.6-7.8	Low	0.20	4
	21-60	2.0-6.0	0.15-0.08	6.1-8.4	Low	0.15	
503B: Rockton	0-13	0.6-2.0	0.20-0.22	5.1-6.5	Low	0.28	4
	13-23	0.6-2.0	0.17-0.19	5.1-6.5	Moderate	0.28	
	23-29	0.6-2.0	0.10-0.14	5.6-7.3	High	0.28	
	29	---	---	---	---	---	
531B, 531C2: Markham	0-12	0.6-2.0	0.22-0.24	5.6-6.5	Low	0.37	3
	12-28	0.06-0.6	0.11-0.20	5.1-7.8	Moderate	0.37	
	28-60	0.06-0.6	0.14-0.20	7.4-8.4	Moderate	0.37	
533*: Urban land.							

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
534*:							
Urban land.							
Orthents, clayey.							
535*:							
Orthents, stony.							
536*:							
Dumps.							
696B, 696C2------	0-8	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.37	5-4
Zurich	8-33	0.6-2.0	0.18-0.22	4.5-7.8	Moderate-------	0.37	
	33-60	0.6-6.0	0.14-0.22	7.4-8.4	Low------------	0.37	
697--------------	0-10	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.32	4-3
Wauconda	10-36	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-------	0.43	
	36-60	0.6-6.0	0.05-0.22	7.4-8.4	Low------------	0.32	
698B-------------	0-13	0.6-2.0	0.22-0.24	5.6-6.5	Low------------	0.32	3-2
Grays	13-35	0.6-2.0	0.18-0.20	5.6-6.5	Moderate-------	0.43	
	35-60	0.6-6.0	0.14-0.22	7.4-8.4	Low------------	0.43	
741B-------------	0-6	>20	0.07-0.09	5.6-7.3	Low------------	0.15	5
Oakville	6-60	>20	0.06-0.08	5.6-7.3	Low------------	0.15	
862*, 863*:							
Pits.							
864*:							
Pits.							
865*:							
Pits.							
903*:							
Muskego---------	0-27	0.2-6.0	0.35-0.45	5.6-7.3	---------------	---	---
	27-60	0.06-0.2	0.18-0.24	6.6-8.4	---------------	---	
Houghton--------	0-59	0.2-6.0	0.35-0.45	5.6-7.8	---------------	---	---
904*:							
Muskego---------	0-27	0.2-6.0	0.35-0.45	5.6-7.3	---------------	---	---
	27-60	0.06-0.2	0.18-0.24	6.6-8.4	---------------	---	
Peotone---------	0-13	0.2-0.6	0.12-0.23	5.6-6.5	High-----------	0.28	5
	13-43	0.2-0.6	0.11-0.20	6.1-7.8	High-----------	0.28	
	43-60	0.06-0.2	0.18-0.20	6.6-8.4	High-----------	0.28	
923B*:							
Urban land.							
Markham---------	0-12	0.6-2.0	0.22-0.24	5.6-6.5	Low------------	0.37	3
	12-40	0.06-0.6	0.11-0.20	5.1-7.8	Moderate-------	0.37	
	40-60	0.06-0.6	0.14-0.20	7.4-8.4	Moderate-------	0.37	
Ashkum----------	0-37	0.2-0.6	0.12-0.23	5.6-7.8	Moderate-------	0.28	5
	37-60	0.2-0.6	0.18-0.20	6.1-8.4	Moderate-------	0.28	
924*:							
Urban land.							
Milford---------	0-13	0.6-2.0	0.12-0.23	6.1-7.3	High-----------	0.28	5
	13-36	0.2-0.6	0.11-0.20	6.6-7.8	High-----------	0.28	
	36-60	0.2-0.6	0.14-0.20	7.4-8.4	Moderate-------	0.28	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
924*:							
Martinton	0-12	0.6-2.0	0.22-0.24	5.1-6.5	Low	0.32	4
	12-45	0.2-0.6	0.11-0.20	5.6-7.8	Moderate	0.43	
	45-60	0.06-0.2	0.11-0.22	7.5-8.4	Moderate	0.43	
925B*:							
Urban land.							
Frankfort	0-8	0.2-0.6	0.20-0.24	5.6-7.8	Low	0.37	3
	8-60	0.06-0.2	0.10-0.13	6.1-8.4	Moderate	0.37	
Bryce	0-17	0.2-0.6	0.12-0.23	5.6-7.8	Moderate	0.28	3
	17-32	0.06-0.2	0.09-0.13	6.6-8.4	Moderate	0.28	
	32-60	0.06-0.2	0.08-0.19	7.4-8.4	Moderate	0.28	
926B*:							
Urban land.							
Drummer	0-15	0.6-2.0	0.21-0.23	5.6-7.3	Moderate	0.28	5
	15-46	0.6-2.0	0.21-0.24	5.6-7.3	Moderate	0.28	
	46-56	0.6-2.0	0.17-0.20	6.1-8.4	Moderate	0.28	
	56-60	0.6-2.0	0.11-0.19	6.6-8.4	Low	0.28	
Barrington	0-14	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	5
	14-33	0.6-2.0	0.18-0.20	5.6-6.5	Moderate	0.43	
	33-60	0.6-2.0	0.07-0.11	6.6-8.4	Low	0.43	
1107 Sawmill	0-41	0.2-2.0	0.18-0.23	6.1-7.8	Moderate	0.28	5
	41-60	0.2-2.0	0.11-0.20	7.4-8.4	Moderate	0.28	
1330 Peotone	0-13	0.2-0.6	0.12-0.23	5.6-6.5	High	0.28	5
	13-43	0.2-0.6	0.11-0.20	6.1-7.8	High	0.28	
	43-60	0.06-0.2	0.18-0.20	6.6-8.4	High	0.28	
1516 Faxon	0-30	0.6-2.0	0.17-0.22	6.6-7.8	Moderate	0.28	4
	30	---	---	---	---	---	
1903*:							
Muskego	0-27	0.2-6.0	0.35-0.45	5.6-7.3	---	---	---
	27-60	0.06-0.2	0.18-0.24	6.6-8.4	---	---	
Houghton	0-59	0.2-6.0	0.35-0.45	5.6-7.8	---	---	---
2049*:							
Urban land.							
Watseka	0-11	6.0-20	0.10-0.12	6.1-7.3	Low	0.17	2
	11-60	6.0-20	0.05-0.10	5.1-7.3	Low	0.17	
2107*:							
Urban land.							
Sawmill	0-41	0.2-2.0	0.18-0.23	6.1-7.8	Moderate	0.28	5
	41-60	0.2-2.0	0.11-0.20	7.4-8.4	Moderate	0.28	
2194B*, 2194D*:							
Urban land.							
Morley	0-7	0.6-2.0	0.20-0.24	5.1-6.5	Low	0.43	3
	7-11	0.2-0.6	0.18-0.20	5.1-6.5	Moderate	0.43	
	11-23	0.06-0.2	0.11-0.13	5.6-6.5	Moderate	0.43	
	23-60	0.2-0.6	0.09-0.20	6.6-8.4	Moderate	0.43	
2290B*:							
Urban land.							

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
2290B*:							
Warsaw----------	0-14	0.6-2.0	0.20-0.24	5.6-7.3	Low------------	0.32	4-3
	14-26	0.6-2.0	0.16-0.19	5.1-7.8	Low------------	0.32	
	26-31	0.6-2.0	0.15-0.17	6.6-8.4	Low------------	0.32	
	31-60	>20	0.02-0.04	7.9-8.4	Low------------	0.10	
2741B*:							
Urban land.							
Oakville--------	0-6	>20	0.07-0.09	5.6-7.3	Low------------	0.15	5
	6-60	>20	0.06-0.08	5.6-7.3	Low------------	0.15	
2927*:							
Urban land.							
Hoopeston-------	0-30	2.0-6.0	0.12-0.15	5.1-6.5	Low------------	0.28	4
	30-60	6.0-20	0.05-0.10	5.6-7.8	Low------------	0.28	
Selma-----------	0-14	0.6-2.0	0.17-0.22	6.1-7.8	Moderate-------	0.28	5
	14-50	0.6-2.0	0.15-0.19	6.1-7.8	Moderate-------	0.28	
	50-60	0.6-6.0	0.05-0.22	6.1-7.8	Low------------	0.28	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

The definitions of "flooding" and "water table" in the Glossary explain such terms as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
23---------------- Blount	C	None---------	---	---	1.0-3.0	Perched	Jan-May	>60	---	High-----	High-----	High.
27B, 27C2---------- Miami	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
49---------------- Watseka	B	None---------	---	---	1.0-3.0	Apparent	Feb-May	>60	---	Moderate	Low------	High.
59---------------- Lisbon	B	None---------	---	---	1.0-3.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
60C2-------------- La Rose	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
67---------------- Harpster	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Low.
69---------------- Milford	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
91---------------- Swygert	C	None---------	---	---	1.0-3.0	Apparent	Feb-May	>60	---	High-----	High-----	Low.
93F--------------- Rodman	A	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	Low.
107--------------- Sawmill	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
125--------------- Selma	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
141--------------- Wesley	B	None---------	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High-----	High-----	Low.
145B-------------- Saybrook	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
146--------------- Elliott	C	None---------	---	---	1.0-3.0	Perched	Mar-May	>60	---	High-----	High-----	Moderate.
152--------------- Drummer	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
172--------------- Hoopeston	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	Low------	Moderate.
189--------------- Martinton	C	None---------	---	---	1.0-3.0	Apparent	Feb-May	>60	---	High-----	High-----	Moderate.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
192--------------- Del Rey	C	None---------	---	---	1.0-3.0	Apparent	Jan-May	>60	---	High-----	High-----	Low.
194B, 194C2, 194D, 194D3, 194F Morley	C	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
201--------------- Gilford	B/D	Frequent----	Brief-----	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High-----	High-----	Moderate.
206--------------- Thorp	C/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
223B-------------- Varna	C	None---------	---	---	3.0-6.0	Perched	Mar-May	>60	---	High-----	Moderate	Moderate.
228B-------------- Nappanee	D	None---------	---	---	1.0-2.0	Apparent	Nov-May	>60	---	Moderate	High-----	Low.
232--------------- Ashkum	B/D	Occasional	Brief-----	Apr-May	0-2.0	Apparent	Apr-Jun	>60	---	High-----	High-----	Moderate.
235--------------- Bryce	D	Occasional	Long------	Mar-Jun	0-1.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Low.
241D3------------- Chatsworth	D	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
290B-------------- Warsaw	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
293--------------- Andres	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
294B-------------- Symerton	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
295--------------- Mokena	C	None---------	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High-----	High-----	Moderate.
298--------------- Beecher	C	None---------	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High-----	High-----	High.
316--------------- Romeo	D	Frequent----	Brief-----	Mar-Jun	0-1.0	Perched	Mar-Jun	2-10	Hard	Moderate	Moderate	Low.
318C2, 318D2------ Lorenzo	B	None---------	---	---	>6.0	---	---	>60	---	Low------	Moderate	Moderate.
320B, 320C2, 320C3------------ Frankfort	D	None---------	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High-----	High-----	Low.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
327B--------------- Fox	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
329---------------- Will	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
330---------------- Peotone	B/D	Occasional	Long------	Feb-Jul	0-1.0	Perched	Feb-Jul	>60	---	High-----	High-----	Moderate.
343---------------- Kane	B	None---------	---	---	1.0-3.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
361B, 361C2, 361D2------------- Kidder	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
363B, 363C2-------- Griswold	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
369B--------------- Waupecan	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
392*: Urban land.												
Orthents, loamy.												
442---------------- Mundelein	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
443B--------------- Barrington	B	None---------	---	---	>6.0	---	---	>60	---	High-----	High-----	Moderate.
494B--------------- Kankakee	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
503B--------------- Rockton	B	None---------	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low------	Low.
531B, 531C2-------- Markham	C	None---------	---	---	3.0-6.0	Perched	Mar-May	>60	---	High-----	Moderate	Moderate.
533*: Urban land.												
534*: Urban land.												
Orthents, clayey.												
535*: Orthents, stony.												

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
536*:												
Dumps.												
696B, 696C2-------- Zurich	B	None---------	---	---	4.0-6.0	Apparent	Feb-Apr	>60	---	High-----	Moderate	Moderate.
697---------------- Wauconda	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
698B--------------- Grays	B	None---------	---	---	4.0-6.0	Apparent	Feb-Apr	>60	---	High-----	Moderate	Moderate.
741B--------------- Oakville	A	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	Moderate.
862*, 863*:												
Pits.												
864*:												
Pits.												
865*:												
Pits.												
903*:												
Muskego-----------	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Nov-Aug	>60	---	High-----	Moderate	Moderate.
Houghton----------	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
904*:												
Muskego-----------	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Nov-Aug	>60	---	High-----	Moderate	Moderate.
Peotone-----------	B/D	Occasional	Long------	Feb-Jul	0-1.0	Perched	Feb-Jul	>60	---	High-----	High-----	Moderate.
923B*:												
Urban land.												
Markham-----------	C	None---------	---	---	3.0-6.0	Perched	Mar-May	>60	---	High-----	Moderate	Moderate.
Ashkum------------	B/D	Occasional	Brief-----	Apr-May	0-2.0	Apparent	Apr-Jun	>60	---	High-----	High-----	Moderate.
924*:												
Urban land.												
Milford-----------	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
Martinton---------	C	None---------	---	---	1.0-3.0	Apparent	Feb-May	>60	---	High-----	High-----	Moderate.
925B*:												
Urban land.												
Frankfort---------	D	None---------	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High-----	High-----	Low.
Bryce-------------	D	Occasional	Long------	Mar-Jun	0-1.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
926B*: Urban land.												
Drummer----------	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
Barrington-------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High-----	Moderate.
1107-------------- Sawmill	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
1330-------------- Peotone	B/D	Frequent----	Long------	Feb-Jul	0-1.0	Perched	Feb-Jul	>60	---	High-----	High-----	Moderate.
1516-------------- Faxon	B/D	Common------	Long------	Apr-May	0-1.0	Apparent	Nov-May	20-40	Hard	High-----	High-----	Low.
1903*:												
Muskego----------	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Nov-Aug	>60	---	High-----	Moderate	Moderate.
Houghton---------	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
2049*: Urban land.												
Watseka----------	B	None--------	---	---	1.0-3.0	Apparent	Feb-May	>60	---	Moderate	Low------	High.
2107*: Urban land.												
Sawmill----------	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
2194B*, 2194D*: Urban land.												
Morley-----------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
2290B*: Urban land.												
Warsaw-----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
2741B*: Urban land.												
Oakville---------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	Moderate.
2927*: Urban land.												
Hoopeston--------	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	Low------	Moderate.
Selma------------	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.

* See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 16.--ENGINEERING TEST DATA

Soil name and location	Parent material	Report number	Depth	Moisture density: Maximum dry density	Moisture density: Optimum moisture	Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO	Unified
			In	lb/cu ft	Pct									Pct			
Barrington silt loam: Cook County; 1,418 feet south and 45 feet west of northeast corner sec. 33, T. 42 N., R. 9 E. (Modal)	Medium textured glacial outwash.	16-39-1	0-9	103	19	99	99	99	82	74	56	32	20	39	15	A-6(13)	CL
		16-39-3	14-20	117	17	---	100	99	81	71	52	35	26	37	17	A-6(14)	CL
		16-39-7	41-60	115	15	99	99	99	92	75	47	26	20	28	10	A-6(8)	CL
Beecher silt loam: Cook County; 300 feet north and 120 feet east of southwest corner sec. 15, T. 41 N., R. 9 E. (Modal)	Silty clay loam till.	16-31-1	0-7	103	19	99	99	97	90	85	71	36	27	37	15	A-6(14)	CL
		16-31-4&5	14-21	112	17	93	91	88	79	77	69	44	29	56	31	A-7-6 (26)	CH
		16-31-7	45-60	119	15	93	90	83	75	71	59	37	24	34	16	A-6(11)	CL
Del Rey silt loam: Cook County; 2,050 feet north and 220 feet west of southeast corner sec. 6, T. 36 N., R. 13 E. (Modal)	Moderately fine textured and medium textured lacustrine material.	16-13-1	0-8	104	20	100	99	98	93	91	77	43	27	41	17	A-7-6 (18)	ML
		16-13-3	12-20	107	19	100	99	92	82	79	68	46	34	49	28	A-7-6 (24)	CL
		16-13-6	46-60	114	16	100	99	98	84	78	63	39	31	38	20	A-6(17)	CL
Frankfort silty clay loam: Town of Northbrook, Cook County; 2,500 feet west and 1,450 south of northwest corner sec. 6, T. 42 N., R. 12 E. (Modal)	Silty clay till.	16-2-5	0-8	105	19	98	97	94	80	73	67	41	29	38	15	A-6(12)	CL
		16-2-2 & 3	8-19	99	23	99	97	96	87	86	79	57	42	52	28	A-7-6 (27)	CH
			30-60	110	18	98	96	94	89	86	77	56	40	41	22	A-7-6 (20)	CL
Grays silt loam: Du Page County; 1 mile southwest of West Chicago, 1,800 feet east of center sec. 8, T. 39 N., R. 9 E. (Modal)	Loess over medium textured outwash.	22-1-1 & 2	0-13	105	18	---	100	99	92	83	57	27	20	30	7	A-4(7)	CL
		22-1-4	16-24	100	22	100	99	99	92	90	65	36	29	48	26	A-7-6 (27)	CL
		22-1-7	35-60	118	13	99	99	98	91	59	27	9	6	18	1	A-4(0)	CL

TABLE 16.--ENGINEERING TEST DATA--Continued

Soil name and location	Parent material	Report number	Depth	Moisture density: Maximum dry density	Moisture density: Optimum moisture	Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO	Classification: Unified
			In	lb/cu ft	Pct									Pct			
Kankakee loam: Cook County; 1,430 feet south and 1,300 feet east of northwest corner sec. 19, T. 37 N., R. 11 E. (Modal)	Thin, medium textured outwash and coarse cobbly, flaggy outwash.	16-17-1	0-8	110	17	97	95	89	51	47	37	22	13	33	11	A-6(3)	CL
		16-17-4	16-22	120	12	47	46	45	23	21	16	9	7	24	9	A-1-6 (0)	SC
		16-7-6	28-60	128	9	43	42	39	15	13	8	4	3	---	NP	A-1-6 (0)	SP
Markham silt loam: Cook County; 510 feet north and 2,450 feet east of southwest corner sec. 3. T. 41 N., R. 9 E. (Modal)	Silty clay loam glacial till.	16-51-1	0-8	86	28	100	99	99	95	91	72	35	24	56	20	A-7-5 (26)	MH
		16-51-2	8-12	103	20	99	99	99	95	90	71	34	24	39	14	A-6(15)	CL
		16-51-4	15-22	99	24	99	97	93	83	82	74	54	43	64	39	A-7-6 (36)	CH
		16-51-7	40-60	119	14	94	91	86	76	72	64	39	27	32	16	A-6(11)	CL
Martinton silt loam: Cook County; 1,825 feet north and 62 feet east of center sec. 34, T. 42 N., R. 9 E.	Moderately fine textured lakebed sediment.	16-40-1	0-10	93	24	100	99	98	90	80	61	33	21	48	18	A-7-6 (20)	ML
		16-40-5	25-33	100	22	---	100	99	97	93	81	53	40	40	20	A-7-6 (21)	CL
		16-40-7	45-60	109	19	100	99	99	98	93	83	51	34	40	20	A-7-6 (22)	CL
Wauconda silt loam: Du Page County; about 2.5 miles west of Warrenville, 1,320 feet east and 400 feet north of southwest corner sec. 32, T. 40 N., R. 9 E. (Modal)	Silty material and outwash.	22-2-1	0-7	105	18	---	100	98	85	82	63	22	15	30	6	A-4(5)	ML
		22-2-4	17-25	102	21	100	99	98	88	83	64	40	32	43	21	A-7-6 (19)	CL
		22-2-7	44-60	119	13	---	100	98	73	52	29	14	11	21	3	A-4(0)	CL
Zurich silt loam: Du Page County; 2,425 feet north and 1,900 feet west of southeast corner sec. 33, T. 40 N., R. 9 E. (Modal)	Medium textured outwash.	22-3-1	0-8	105	18	99	98	97	87	83	68	36	25	33	12	A-6(10)	CL
		22-3-3 & 4	15-20	101	20	99	99	98	90	82	57	28	20	35	12	A-6(12)	CL
		22-3-6	33-60	118	13	99	99	98	83	68	36	14	10	21	3	A-4(1)	CL

TABLE 17.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics of this taxadjunct 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
Barrington	Fine-silty, mixed, mesic Typic Argiudolls
Beecher	Fine, illitic, mesic Udollic Ochraqualfs
Blount	Fine, illitic, mesic Aeric Ochraqualfs
Bryce	Fine, mixed, mesic Typic Haplaquolls
Chatsworth	Fine, illitic, mesic Typic Eutrochrepts
Del Rey	Fine, illitic, mesic Aeric Ochraqualfs
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Elliott	Fine, illitic, mesic Aquic Argiudolls
*Faxon	Fine-loamy, mixed, mesic Typic Haplaquolls
Fox	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
Frankfort	Fine, illitic, mesic Udollic Ochraqualfs
Gilford	Coarse-loamy, mixed, mesic Typic Haplaquolls
Grays	Fine-silty, mixed, mesic Mollic Hapludalfs
*Griswold	Fine-loamy, mixed, mesic Typic Argiudolls
Harpster	Fine-silty, mesic Typic Calciaquolls
Hoopeston	Coarse-loamy, mixed, mesic Aquic Hapludolls
Houghton	Euic, mesic Typic Medisaprists
Kane	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Argiudolls
Kankakee	Loamy-skeletal, mixed, mesic Typic Hapludolls
*Kidder	Fine-loamy, mixed, mesic Typic Hapludalfs
La Rose	Fine-loamy, mixed, mesic Typic Argiudolls
Lisbon	Fine-silty, mixed, mesic Aquic Argiudolls
Lorenzo	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Markham	Fine, illitic, mesic Mollic Hapludalfs
Martinton	Fine, illitic, mesic Aquic Argiudolls
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Milford	Fine, mixed, mesic Typic Haplaquolls
Mokena	Fine-loamy, mixed, mesic Aquic Argiudolls
Morley	Fine, illitic, mesic Typic Hapludalfs
Mundelein	Fine-silty, mixed, mesic Aquic Argiudolls
Muskego	Coprogenous, euic, mesic Limnic Medisaprists
Nappanee	Fine, illitic, mesic Aeric Ochraqualfs
Oakville	Mixed, mesic Typic Udipsamments
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Rockton	Fine-loamy, mixed, mesic Typic Argiudolls
Rodman	Sandy-skeletal, mixed, mesic Typic Hapludolls
Romeo	Loamy, mixed, mesic Lithic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Saybrook	Fine-silty, mixed, mesic Typic Argiudolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
Swygert	Fine, illitic, mesic Aquic Argiudolls
Symerton	Fine-loamy, mixed, mesic Typic Argiudolls
Thorp	Fine-silty, mixed, mesic Argiaquic Argialbolls
Varna	Fine, illitic, mesic Typic Argiudolls
Warsaw	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Watseka	Sandy, mixed, mesic Aquic Hapludolls
Wauconda	Fine-silty, mixed, mesic Udollic Ochraqualfs
Waupecan	Fine-silty, mixed, mesic Typic Argiudolls
Wesley	Coarse-loamy, mixed, mesic Aquic Hapludolls
Will	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Haplaquolls
Zurich	Fine-silty, mixed, mesic Typic Hapludalfs

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