United States Department of Agriculture

Soil Conservation Service

In cooperation with Massachusetts Agricultural Experiment Station

Soil Survey of Essex County, Massachusetts, Southern Part

HOW TO USE

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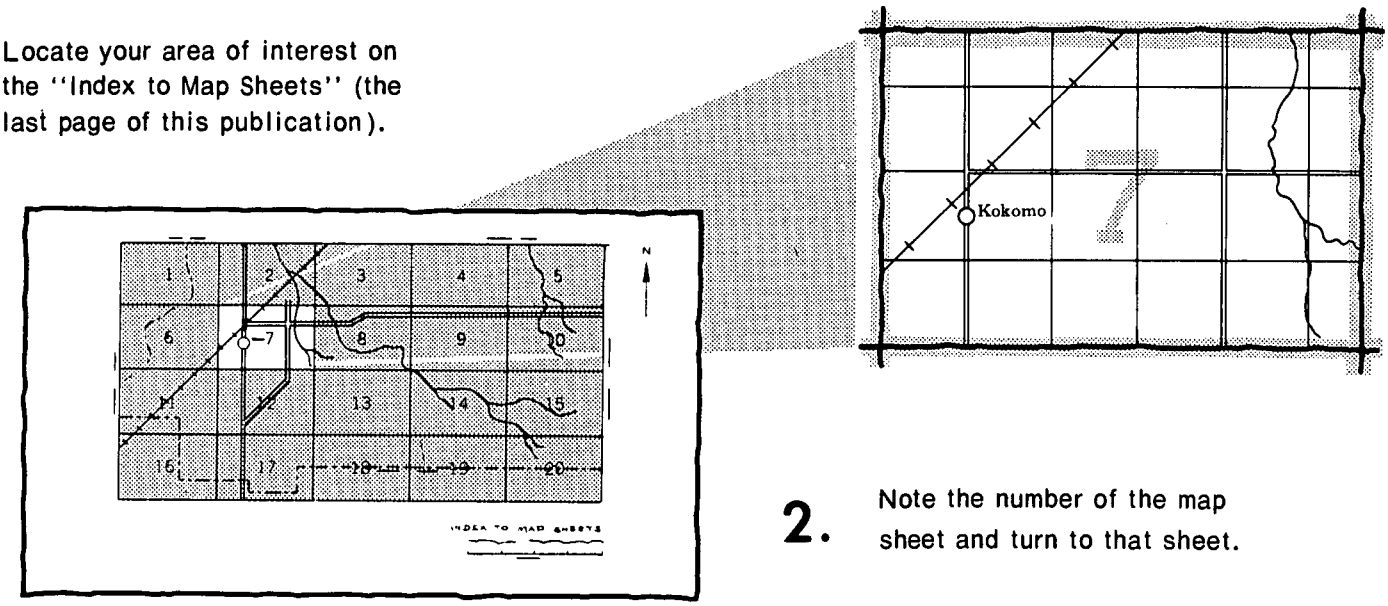

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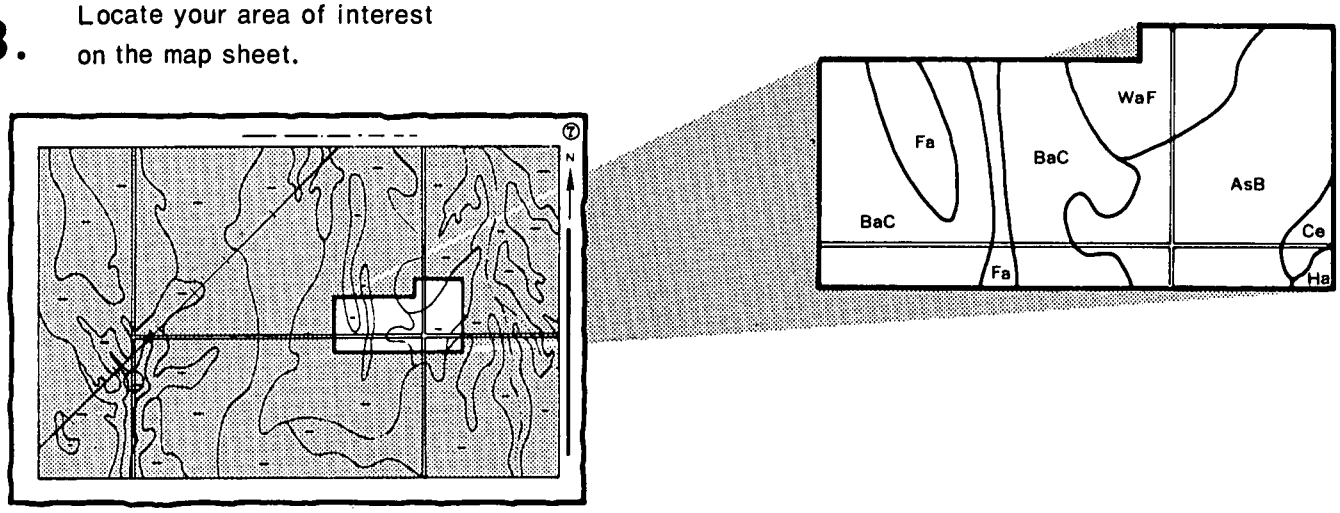

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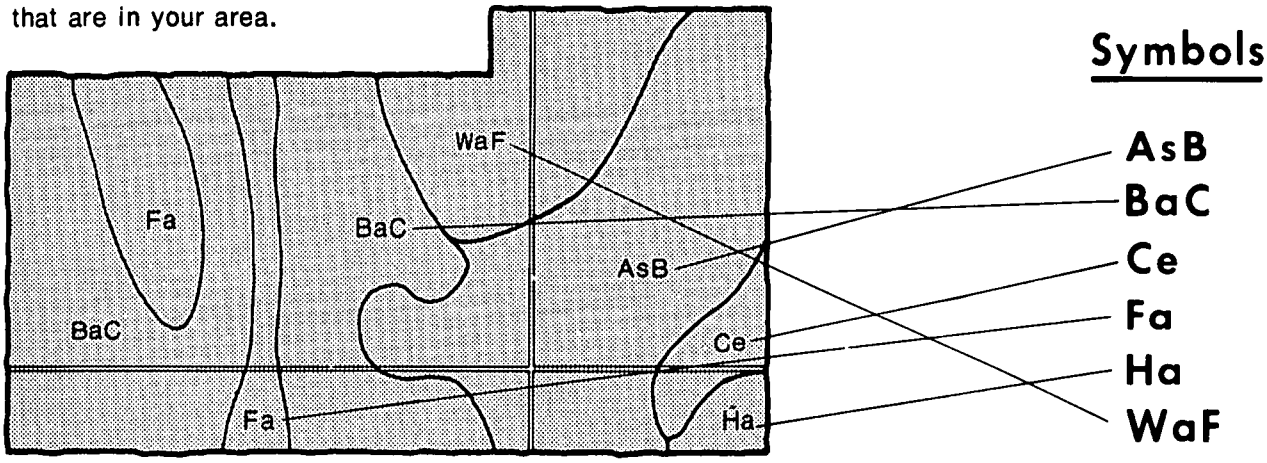
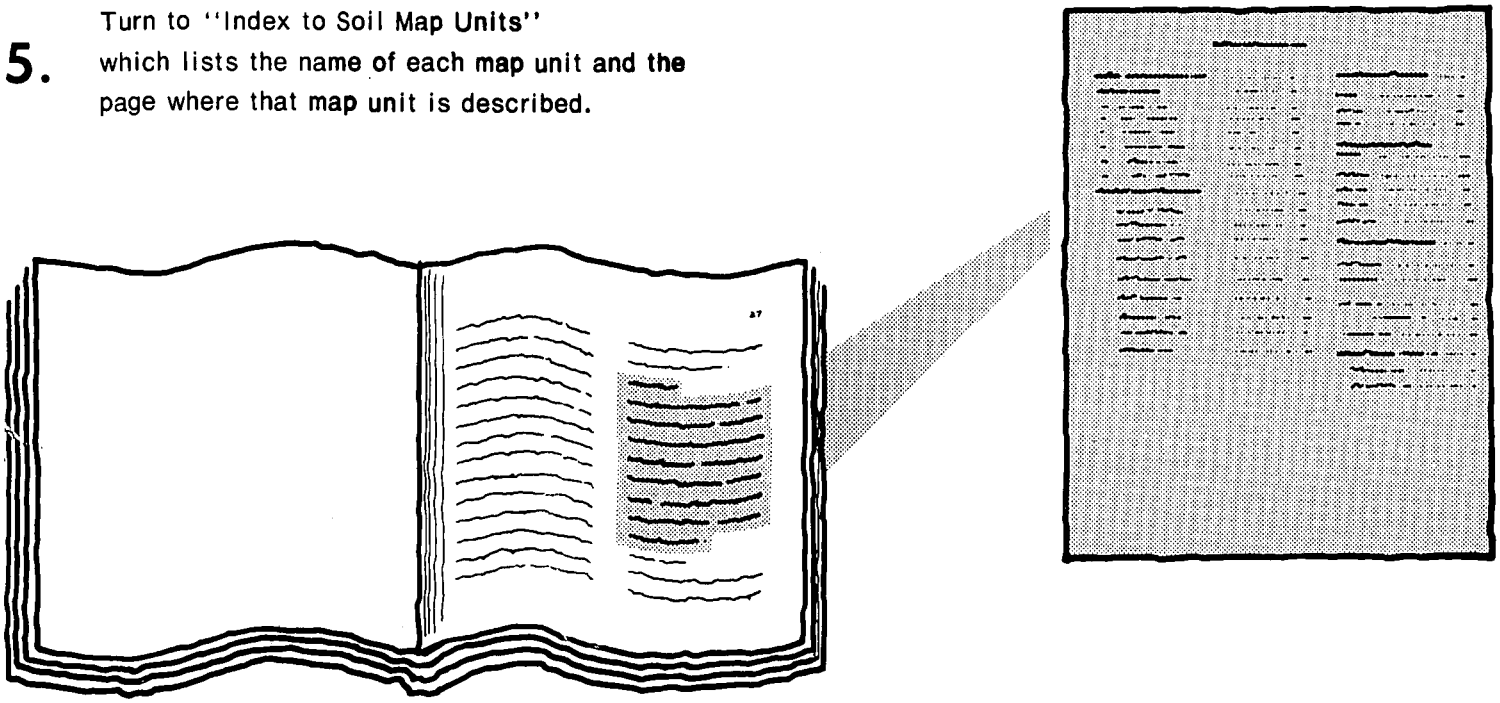
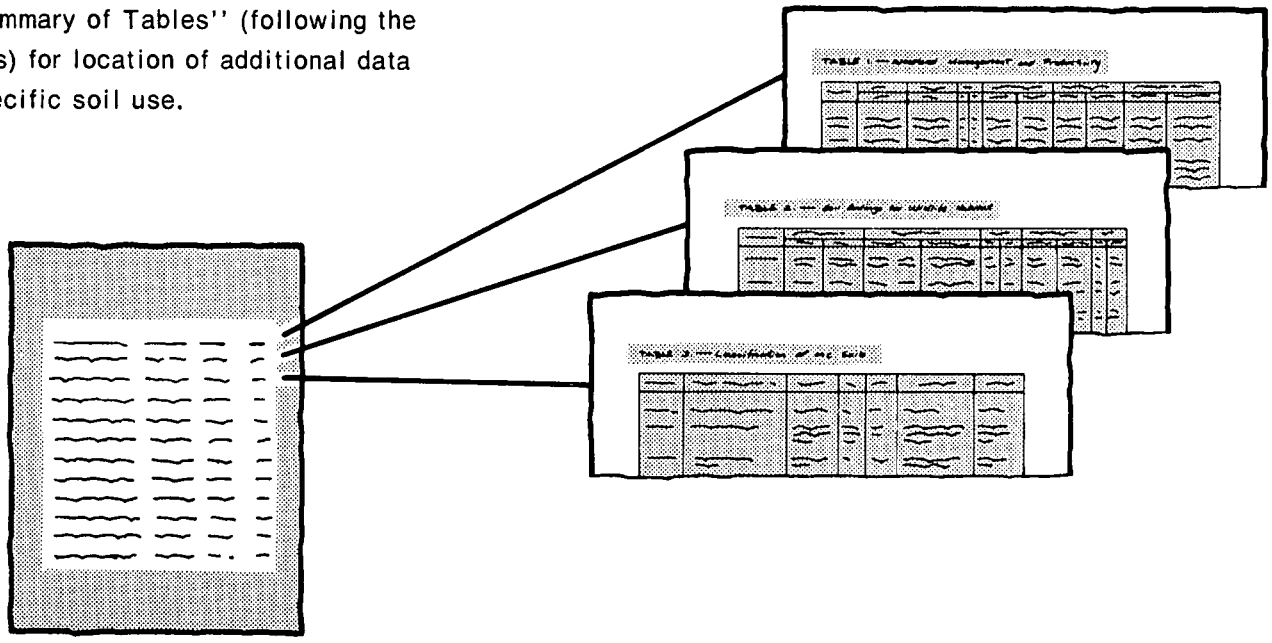


THIS SOIL SURVEY

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 soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. 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 1980. Soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service and the Massachusetts Agricultural Experiment Station. It is part of the technical assistance furnished to the Essex Conservation District.

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

Cover: The view from Hog Island across the Essex River. The hikers are standing in an area of Woodbridge soils. (Photo courtesy of Trustees of Reservations.)

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preface

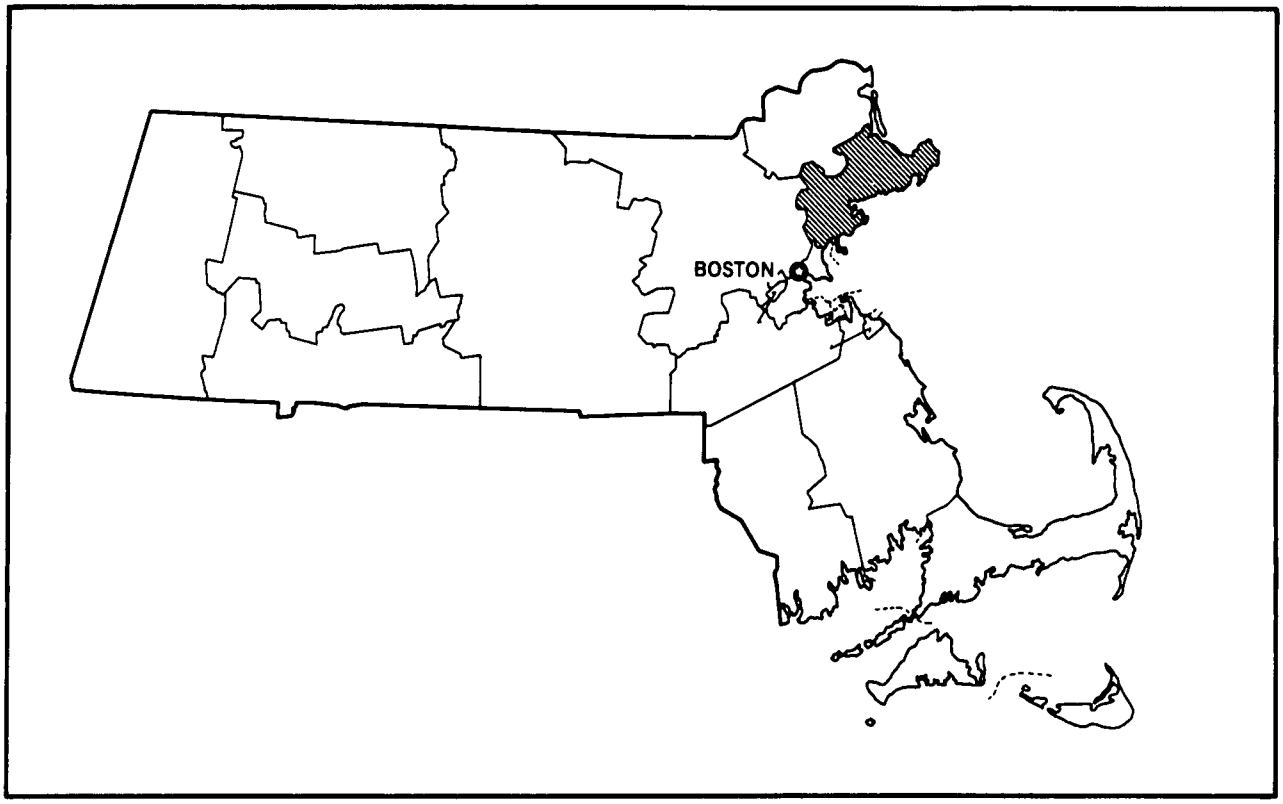
This soil survey contains information that can be used in land-planning programs in Essex County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of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

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

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

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

This soil survey is dedicated to the memory of the late Donald C. Fuller by his many friends and associates.



Location of Essex County, Southern Part, in Massachusetts.

Soil Survey of
Essex County, Massachusetts, Southern Part

Communities of Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich, Lynn, Lynnfield, Manchester, Marblehead, Middleton, Nahant, Peabody, Rockport, Salem, Saugus, Swampscott, and Wenham

By Donald C. Fuller and Everette L. Francis, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with Massachusetts Agricultural Experiment Station

Essex County, Massachusetts, Southern Part, is in the northeastern part of Massachusetts. The survey area is about 138,000 acres, or 216 square miles. The Miles and Ipswich Rivers provide most of the drainage of the survey area. The Castle Neck, Essex, Danvers, Annisquam, and Saugus Rivers are primarily coastal streams. The elevation of the survey area ranges from sea level at the eastern edge of the survey area to 284 feet above sea level at the top of Burrill Hill in Lynn.

The main industries in the survey area are the manufacture of shoes, aircraft and ship turbines, plastics, chemicals, and electronic equipment. The number of farms in the survey area and the acreage used for farming have steadily declined. Fewer than 100 farms are in the area, and their average size is less than 100 acres. From 1951 to 1971, the acreage used for farming decreased by 53 percent and the acreage in woodland decreased by 9 percent, while the area of urban land increased by 50 percent.

general nature of the survey area

This section describes the climate of the area and provides information on the physiography, relief, and drainage.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Peabody, Massachusetts in the period 1967 to 1978. 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 28 degrees F, and the average daily minimum temperature is 19 degrees. The lowest temperature on record, which occurred at Peabody on January 9, 1968, is -11 degrees. In summer the average temperature is 70 degrees, and the average daily maximum temperature is 79 degrees. The highest recorded temperature, which occurred at Peabody on August 2, 1975, is 105 degrees.

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

The total annual precipitation is 46 inches. Of this, 23 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 4.91 inches at Peabody on July 30, 1976. Thunderstorms occur on about 11 days each year, and most occur in summer.

The average seasonal snowfall is 58 inches. The greatest snow depth at any one time during the period of record was 31 inches. On an average of 63 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 70 percent. The sun shines 70 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 14 miles per hour, in winter.

physiography, relief, and drainage

The eastern part of the survey area, with the exception of Cape Ann, consists of a smooth plain dotted with round or oval hills that rise sharply to a height of about 100 feet above the plain. This area begins at sea level in the salt marshes west of southern Plum Island and Crane's Beach and gradually rises inland. Cape Ann has a ruggedly subdued, bedrock-controlled topography with short slopes and many rock outcrops.

The western part of the survey area consists of an undulating, bedrock-controlled topography grading south to rolling plains. It has some isolated, round to oval hills that range from about 100 to 280 feet in elevation.

The northern part of the survey area is drained by the Ipswich and Miles Rivers. The larger Ipswich River flows in a general northeasterly direction from Middleton to Ipswich. Drainage of the rest of the survey area is by small brooks which feed into the broad but short, tidal-influenced Castle Neck, Essex, Annisquam, Danvers, and Saugus Rivers.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. 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; and the kinds of rock. They dug many holes to study 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 plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management 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 can be used by farmers and woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, 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 can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

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

soil descriptions

1. Ipswich-Westbrook-Udipsamments association

Deep, nearly level, very poorly drained, mucky soils formed in organic deposits; rolling, excessively drained to moderately well drained, sandy soils formed in windblown sand

This association mostly is adjacent to the ocean in tidal marshes and on sand dunes. It makes up about 9 percent of the survey area and is about 37 percent Ipswich soils, 19 percent Westbrook soils, 12 percent Udipsamments, and 32 percent soils of minor extent.

The Ipswich and Westbrook soils are very poorly drained and nearly level and are subject to tidal flooding. The Ipswich soils consist of organic deposits more than 51 inches thick. Westbrook soils consist of organic material underlain by loamy mineral soil material at a depth of 16 to 51 inches. The Udipsamments are excessively drained to moderately well drained and are rolling. They consist of wind-deposited sand. They are only partly stabilized by vegetation and are extremely susceptible to wind erosion.

The dominant minor soils in this association are Udorthents, moderately well drained Boxford soils, well drained Paxton soils, somewhat excessively drained Merrimac soils, and excessively drained Hinckley soils and long, narrow Beaches.

The soils in this association are used mainly for recreation. Some areas are used for wildlife habitat, and some areas of Udipsamments are used for urban development. The Ipswich and Westbrook soils are covered with salt-tolerant grasses and sedges. Some bare areas are mud flats that provide habitat for shellfish.

The soils of this association are suited to limited recreational purposes and for development of wildlife habitat. Wetness, tidal flooding, and high organic matter content of the Ipswich and Westbrook soils and the droughtiness, susceptibility to erosion, and low fertility of Udipsamments make the association poorly suited to most other uses.

2. Merrimac-Hinckley-Urban land association

Deep, nearly level to steep, somewhat excessively drained or excessively drained, loamy and sandy soils formed in outwash deposits; areas where soils have been altered or obscured by urban works or structures

This association is on outwash plains, stream terraces, kames, and eskers. The areas are typically at a lower elevation than the surrounding land. The association makes up about 20 percent of the survey area and is about 30 percent Merrimac soils, 15 percent Hinckley soils, 9 percent Urban land, and 46 percent soils of minor extent (fig. 1).

Somewhat excessively drained, nearly level to moderately steep Merrimac soils are on outwash plains, terraces, and moraines. The soils have a loamy subsoil underlain by sand and gravel. Excessively drained, nearly level to steep Hinckley soils are on kames, eskers, outwash plains, and terraces. The soils have a sandy subsoil underlain by sand and gravel. Urban land consists of nearly level to moderately steep areas where the soils have been altered or obscured by urban works and structures. Buildings, industrial areas, paved areas, and railroad yards cover more than 90 percent of the land surface of these areas.

The dominant minor soils in this association are excessively drained Windsor soils, well drained Canton and Poquonock soils, moderately well drained Sudbury and Deerfield soils, poorly drained Walpole and Wareham soils, very poorly drained Freetown and Scarboro soils, and Udorthents.

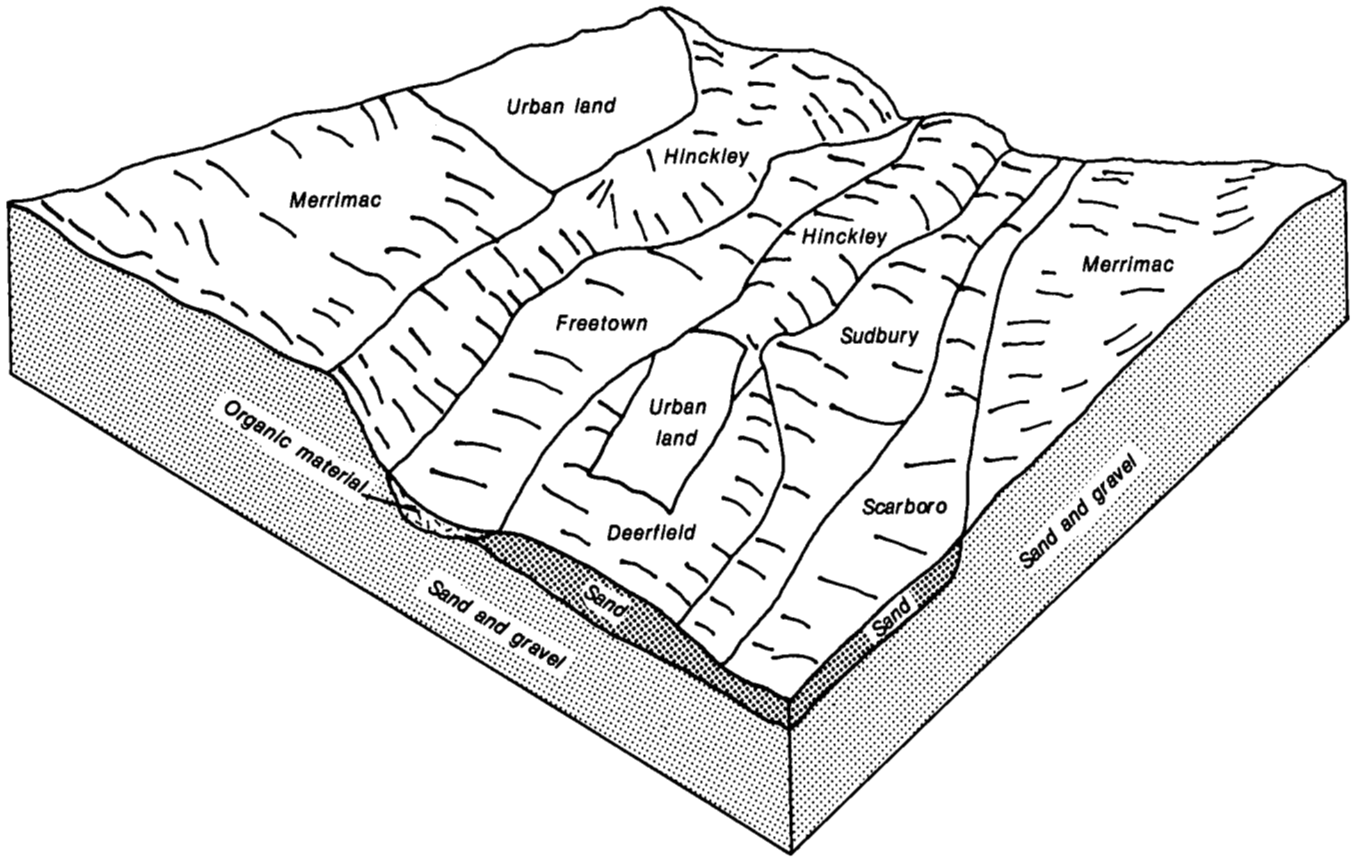


Figure 1.—Typical pattern of soils and parent material in the Merrimac-Hinckley-Urban land association.

Most of this association is wooded or in urban development. Some areas are used for dairy farms and horse farms, and a few are swamps and marshes.

The soils of this association are generally suitable for farming and residential development. Some parts of the association are droughty and steep, and most of the minor soils have a seasonal high water table in winter and spring.

3. Paxton-Montauk-Urban land association

Deep, nearly level to steep, well drained, loamy soils formed in glacial till; areas where soils have been altered or obscured by urban works or structures

This association is on hills and sloping uplands. Most of the higher elevations in the survey area are in this association. The association covers about 14 percent of the survey area and is about 34 percent Paxton soils, 14 percent Montauk soils, 9 percent Urban land, and 43 percent soils of minor extent (fig. 2).

Well drained Paxton and Montauk soils are on the sides of drumlins and hills. These soils have a loamy subsoil underlain by a compact layer at a depth of about 2 feet. The compact layer is loamy in the Paxton soils and sandy in the Montauk soils. Urban land consists of nearly level to moderately steep areas where the soils have been altered or obscured by urban works and structures. Buildings, industrial areas, paved areas, and railroad yards cover more than 90 percent of the surface area of these areas.

The dominant minor soils in this association are well drained Canton and Poquonock soils, moderately well drained Woodbridge and Scituate soils, poorly drained Ridgebury soils, very poorly drained Freetown, Swansea, and Whitman soils, and Udorthents.

Most areas of this association are wooded, and some are used for urban development. A few areas are used for dairy farms and apple orchards, and a few are in swamps and marshes.

The soils of this association are suitable for dairy farming, apples, and truck crops. They are well suited for residential development if sewage disposal facilities are available. The main limitations for residential

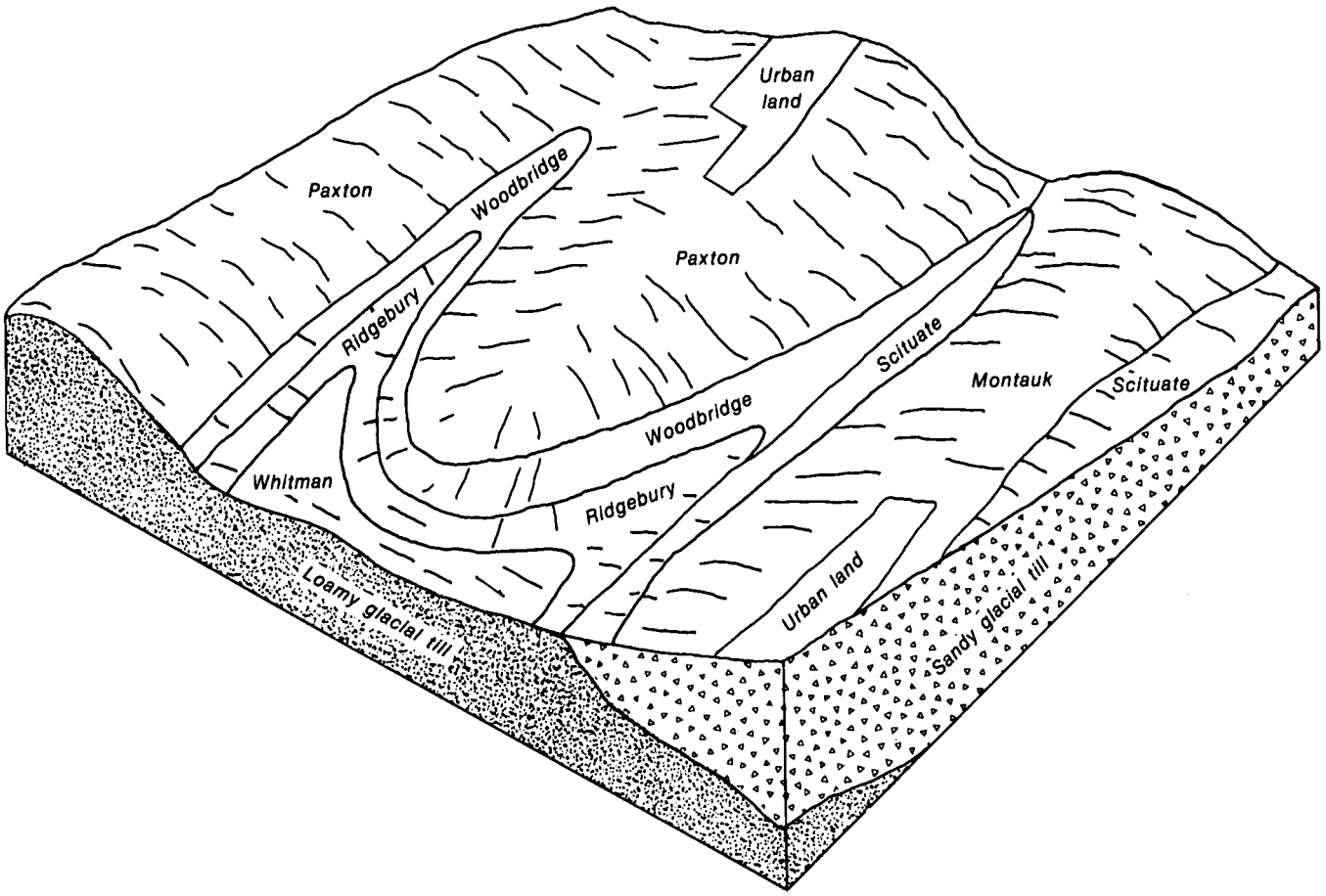


Figure 2.—Typical pattern of soils and parent material in the Paxton-Montauk-Urban land association.

development are the slowly permeable compact layer, steep slopes in some areas, and a brief seasonal high water table.

4. Canton-Woodbridge-Freetown association

Deep, nearly level to steep, well drained or moderately well drained, loamy soils formed in glacial till; deep, nearly level, very poorly drained, mucky soils formed in organic deposits

This association consists of low, irregular hills with a few bedrock exposures and some wet, organic and mineral soils. The association makes up about 8 percent of the survey area and is about 50 percent Canton soils, 10 percent Woodbridge soils, 10 percent Freetown soils, and 30 percent soils of minor extent (fig. 3).

Well drained, gently sloping to steep Canton soils are on the tops and sides of low hills. Moderately well drained, gently sloping to moderately steep Woodbridge soils are on concave toe slopes. Very poorly drained, nearly level Freetown soils are in slight depressions. The Canton soils have a loamy subsoil underlain by gravelly and sandy material. The Woodbridge soils are loamy throughout and have a compact substratum. Many areas have stones on the surface. The Woodbridge soils have a seasonal high water table in winter and spring. The Freetown soils are mucky to a depth of more than 51 inches. They have a high water table at or near the surface for most of the year.

The dominant minor soils in this association are somewhat excessively drained Hollis soils, excessively drained Hinckley soils, somewhat excessively drained Merrimac soils, well drained Chatfield and Paxton soils, moderately well drained Scituate, Woodbridge, and Sudbury soils, poorly drained Ridgebury soils, very poorly drained Whitman and Swansea soils, and Udorthents. Urban land is in most units.

Most areas of this association are in woodland. Some areas have been developed for residential or other

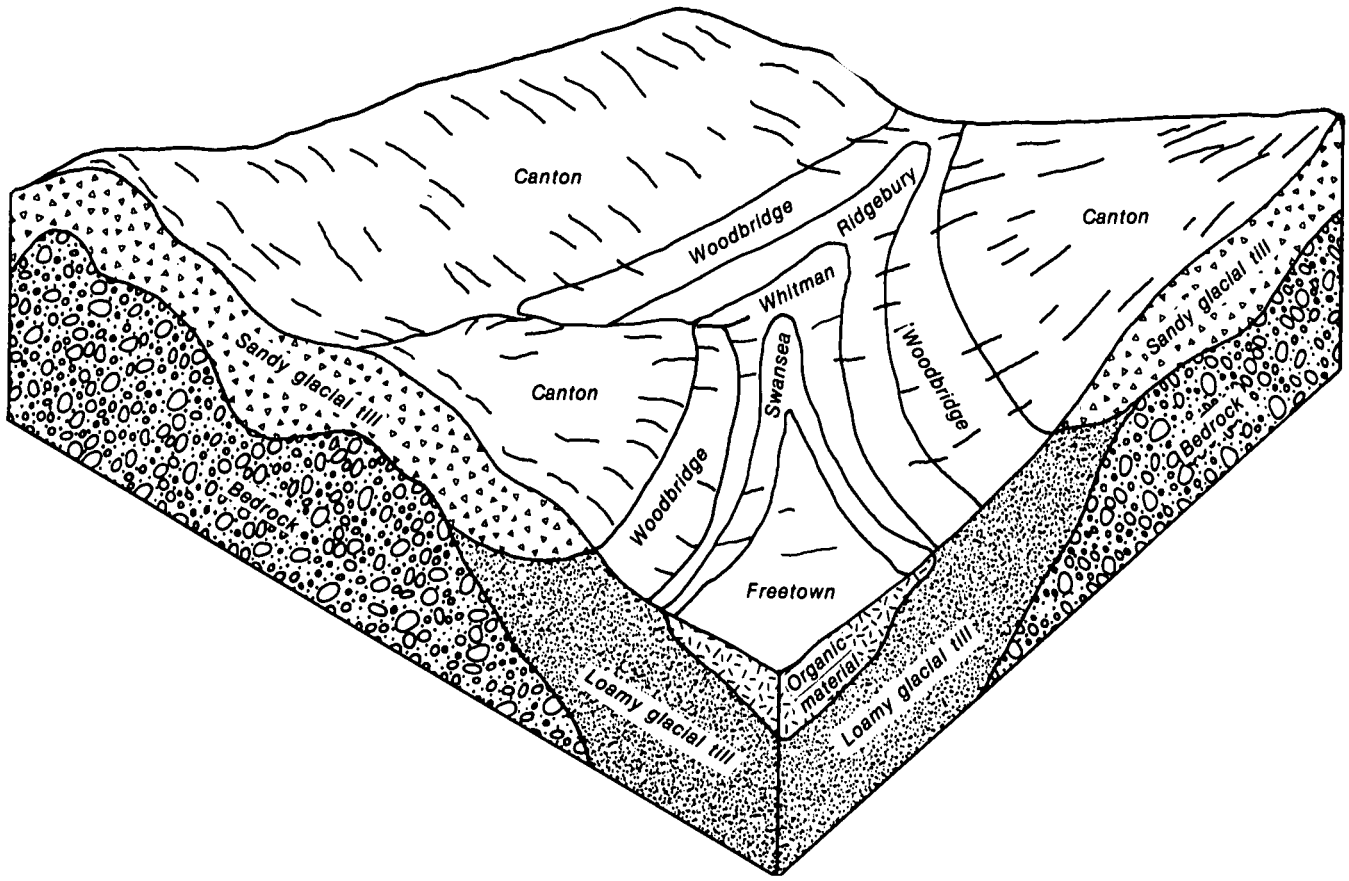


Figure 3.—Typical pattern of soils and parent material in the Canton-Woodbridge-Freetown association.

nonfarm purposes. A few are in dairy farms, horse farms, nurseries, and some small market gardens, and a few are in marshes and swamps.

The soils of this association are suitable for dairy farming, orchards, and truck crops. Most areas are well suited to residential development. The main limitation of the Canton soils for residential development is the slope. Use of the Woodbridge soils is limited by the seasonal high water table and the slowly permeable substratum. The Freetown soils are limited by wetness and the high organic matter content.

5. Boxford-Scitico-Maybid association

Deep, nearly level to strongly sloping, moderately well drained, poorly drained, or very poorly drained; loamy soils formed in lacustrine or marine sediments

This association is mainly in the northeastern part of the towns of Ipswich and Essex. The elevation of the areas ranges from near sea level to about 50 feet above sea level. This association makes up about 5 percent of the survey area and is about 25 percent Boxford soils, 21 percent Scitico soils, 11 percent Maybid soils, and 43 percent soils of minor extent (fig. 4). The Scitico soils in most places are slightly higher on the landscape than Maybid soils and lower than Boxford soils.

The Boxford soils are nearly level to strongly sloping and are moderately well drained, the Scitico soils are nearly level and gently sloping and are poorly drained, and the Maybid soils are nearly level and very poorly drained. All three soils have a loamy mantle underlain by clayey material. Most areas have a seasonal high water table in winter and spring.

The dominant minor soils in this association are excessively drained Windsor soils, somewhat excessively drained Merrimac soils, well drained Canton, Melrose, Paxton, and Chatfield soils, moderately well drained Elmridge soils, poorly drained Shaker soils, and very poorly drained Ipswich and Whately Variant soils.

The soils in this association are used mainly for pasture or hay. Some areas have a cover of water-

tolerant native grasses and a few shrubs. A few areas have been drained, but there are many swampy, undrained areas. Some areas of Boxford soils are used for corn or are developed for residential purposes.

The soils of this association are suitable for hay and pasture and poorly suited to residential development. The Boxford soils are suited to some cultivated crops. The soils have good potential for wetland wildlife habitat. Wetness is the main limitation for the use of these soils. Some areas have water ponded on the surface in winter and spring.

6. Chatfield-Hollis-Rock outcrop association

Moderately deep or shallow, gently sloping to steep, well drained or somewhat excessively drained, loamy soils formed in glacial till; areas of exposed bedrock

This association consists of low, irregular hills, ridges, and plains; common bedrock exposures; and depressions of very poorly drained, organic soils. The association makes up about 28 percent of the survey area and is about 26 percent Chatfield soils, 20 percent Hollis soils, 16 percent rock outcrop, and 38 percent soils of minor extent.

Well drained Chatfield soils and somewhat excessively drained Hollis soils are on the tops and sides of low hills and ridges. Many areas have stones and boulders on the surface. The Chatfield soils are moderately deep to bedrock, and the Hollis soils are shallow.

The dominant minor soils in this association are Udorthents, excessively drained Hinckley soils, somewhat excessively drained Merrimac soils, well drained Canton soils, moderately well drained Scituate and Woodbridge soils, poorly drained Ridgebury soils, and very poorly drained Freetown, Whitman, Ipswich, and Swansea soils. Urban land is in some areas.

Most areas of this association are in woodland. Some areas are in residential development, and some are in swamps and marshes.

The soils of this association are suitable for woodland. The main limitations for residential development are the areas of rock outcrop, the depth to bedrock, and slope.

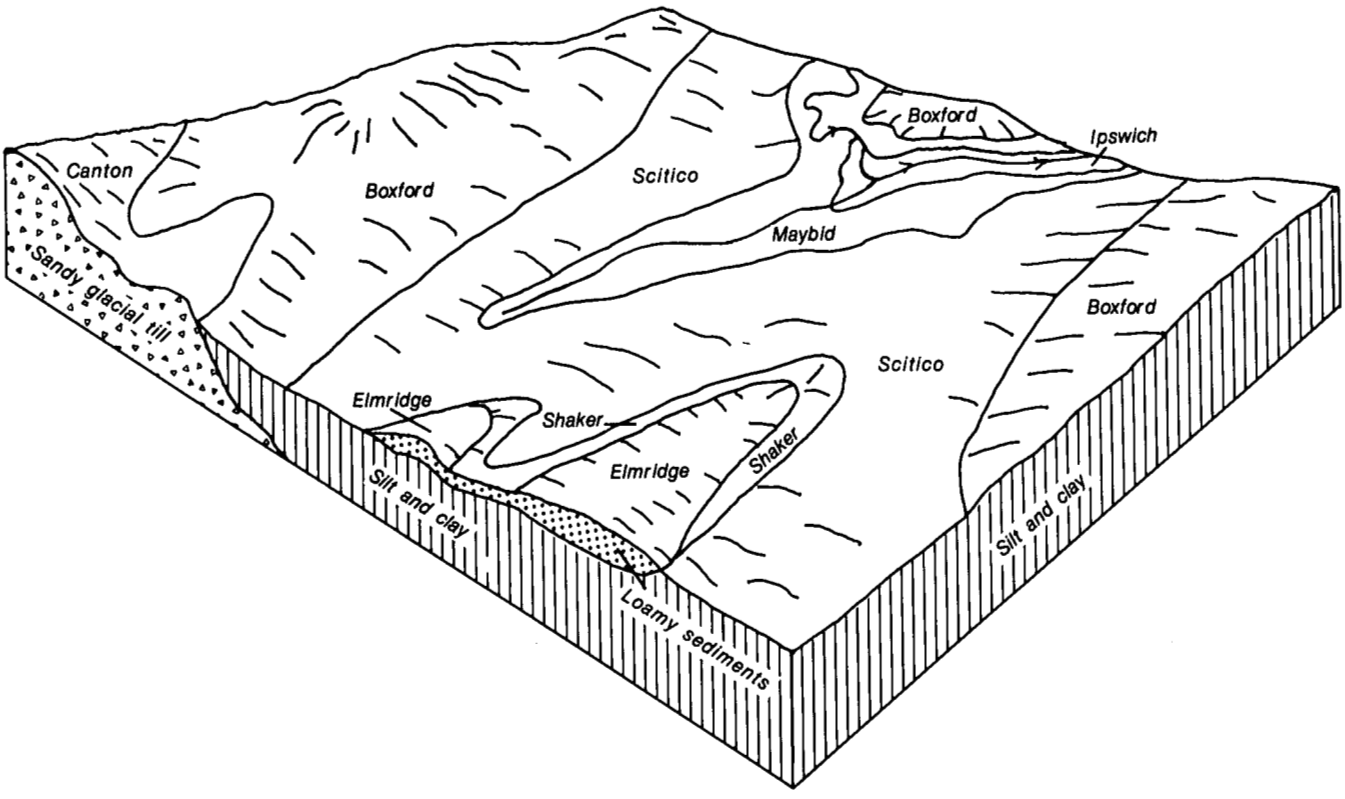


Figure 4.—Typical pattern of soils and parent material in the Boxford-Scitico-Maybid association.

Figure 5.—Typical profile of Annisquam extremely bouldery fine sandy loam, 15 to 35 percent slopes.

7. Annisquam-Scituate association

Deep, gently sloping to moderately steep, well drained or moderately well drained, loamy soils formed in compact glacial till

This association is on low, stony and bouldery hills that have bedrock exposures. The association makes up about 4 percent of the survey area and is about 43 percent Annisquam soils, 9 percent Scituate soils, and 48 percent soils of minor extent.

Well drained, gently sloping to moderately steep Annisquam soils are on the tops and sides of low hills. Moderately well drained, gently sloping or strongly sloping Scituate soils are on concave toe slopes and in some depressions. Both soils have a loamy subsoil underlain by a sandy compact layer. The Annisquam soils have a high percentage of rock fragments in the soil (fig. 5). The Scituate soils have a seasonal high water table in winter and spring.

The dominant minor soils in this association are somewhat excessively drained Hollis soils, excessively drained Hinckley soils, well drained Chatfield, Montauk, and Paxton soils, moderately well drained Sudbury soils, poorly drained Ridgebury soils, very poorly drained Freetown and Whitman soils, and Udorthents. Rock outcrop and Urban land are in some areas.

Most areas of this association are wooded, and some are used for urban development. A few areas are in farms, and a few are in swamps or marshes.

The soils of this association are suitable for woodland. They are poorly suited to farming or urban or recreational development. The main limitations for many uses are the many large stones in and on the surface layer, the seasonal high water table, and restricted permeability of the substratum.

8. Urban land-Udorthents association

Areas where soils have been altered or obscured by urban works or structures; areas where soil material has been excavated or deposited

This association covers most of the densely built-up areas in the survey area. The association makes up about 9 percent of the survey area and is about 70 percent Urban land, 8 percent Udorthents, and 22 percent soils of minor extent.

Urban land consists of nearly level to moderately steep areas where buildings, industrial areas, paved areas, and railroad yards cover about 90 percent of the surface area. Udorthents consist of areas from which soil material has been removed and areas on which soil material has been deposited (fig. 6). Such areas are capable of supporting vegetation and contain cobblestones, stones, and boulders in variable amounts. The thickness of each layer, the depth to bedrock or a seasonal high water table, and the permeability of these areas are also variable.

The dominant minor soils in this association are somewhat excessively drained Hollis and Merrimac soils, well drained Paxton and Chatfield soils, poorly drained Scitico soils, and very poorly drained Ipswich soils. Some areas have rock outcrop and beaches.

The areas of Urban land are used mainly for commercial, industrial, or residential purposes. Udorthents are used as athletic fields, playgrounds, cemeteries, or lawns or have been recently cut or filled.

The soil properties of the Udorthents are so variable that onsite investigation is needed to determine suitability for use.

9. Freetown-Fluvaquents association

Deep, nearly level, very poorly drained, mucky soils formed in organic deposits; deep, nearly level, very poorly drained and poorly drained, mucky and loamy soils formed in deposits of recent alluvium

This association consists of depressions or flood plains. The association makes up about 3 percent of the survey area and is about 75 percent Freetown soils, 10

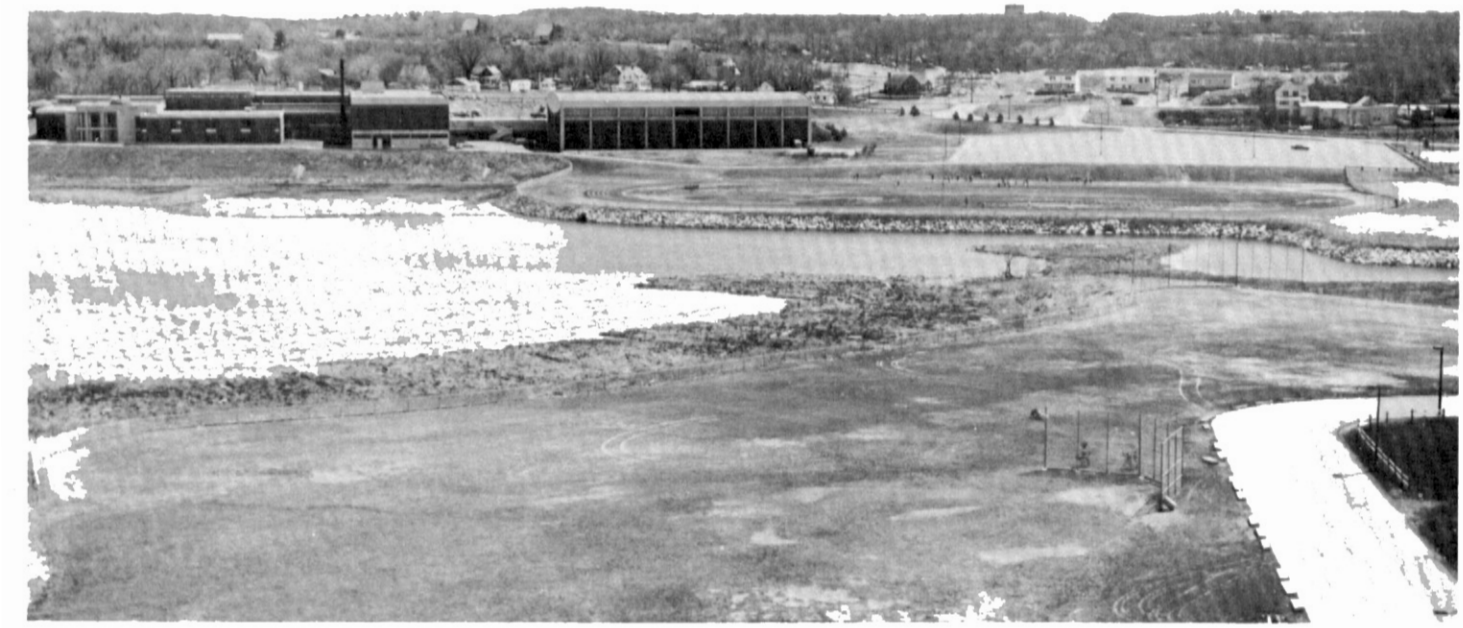


Figure 6.—An area of Udorthents, smoothed.

percent Fluvaquents, and 15 percent soils of minor extent.

The Freetown soils are in low, broad areas and narrow areas between hills. They are dominantly organic material to a depth of more than 51 inches. They are very poorly drained and have a high water table at or near the surface for most of the year. The Fluvaquents are in low areas along rivers and streams. They have a loamy subsoil underlain by sand. They are very poorly drained or poorly drained, are frequently flooded, and have a high water table at or near the surface for most of the year.

The dominant minor soils in this association are very poorly drained Swansea, Scarboro, and Maybid soils, somewhat excessively drained Merrimac soils, and excessively drained Hinckley soils.

Most areas of this association are wooded or are in marshes. The soils are suited to wetland wildlife habitat. The main limitations for most other uses are the water table and flooding.

detailed soil map units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, *Canton very stony fine sandy loam, 8 to 15 percent slopes,* is one of several phases in the Canton series.

Some map units are made up of two or more major soils. These map units are called soil complexes and undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. *Rock outcrop-Hollis 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 similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. *Ipswich and Westbrook mucky peats* is an undifferentiated group in this survey area.

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

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

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

soil descriptions

AnB—Annisquam extremely bouldery fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on ridgetops, knolls, and short side slopes. The areas are irregular in shape and range from 5 to 35 acres. Stones and boulders 1 to 9 feet in diameter are 1 to 30 feet apart on the surface (fig. 7).

Typically, the surface layer is very dark gray fine sandy loam about 4 inches thick. The subsoil is yellowish brown and is 24 inches thick. The upper part is gravelly fine sandy loam, and the lower part is very gravelly coarse sandy loam. The substratum is very firm, olive brown gravelly loamy coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of shallow Hollis soils, moderately deep Chatfield soils, well drained Montauk soils, poorly drained Ridgebury soils, moderately well drained Scituate soils, and exposed bedrock. Also included are a few areas with slopes of 0 to 3 percent. Included areas make up about 15 percent of the unit.

Figure 7.—An area of Annisquam extremely bouldery fine sandy loam, 3 to 8 percent slopes.

The permeability of this Annisquam soil is moderately rapid in the subsoil and moderately slow in the substratum. Available water capacity is moderate. This soil has a seasonal high water table perched above the substratum for brief periods in winter and spring. Reaction ranges from extremely acid to medium acid throughout the soil.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming. The soil is suited to trees but is poorly suited to woodland wildlife habitat. The stones and boulders on the surface limit the use of equipment for planting and harvesting trees and limit most types of recreational development.

The stones and boulders and the seasonal high water table limit the soil as a site for dwellings, small commercial buildings, and shallow excavations. Slope further limits the soil as a site for small commercial buildings, and the dense substratum is also a limitation for shallow excavations. The moderately slow permeability of the substratum limits the soil as a site for septic tank absorption fields.

This unit is in capability subclass VIIs.

AnC—Annisquam extremely bouldery fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is on the sides of hills and ridges. The areas are irregular in shape and range from 5 to 85 acres. Stones and boulders 1 to 9 feet in diameter are 1 to 30 feet apart on the surface.

Typically, the surface layer is very dark gray fine sandy loam about 4 inches thick. The subsoil is yellowish brown and is 24 inches thick. The upper part is gravelly fine sandy loam, and the lower part is very gravelly coarse sandy loam. The substratum is very firm, olive brown gravelly loamy coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of shallow Hollis soils, moderately deep Chatfield soils, well drained Montauk soils, poorly drained Ridgebury soils, moderately well drained Scituate soils, and exposed bedrock. Included areas make up about 15 percent of the unit.

The permeability of this Annisquam soil is moderately rapid in the subsoil and moderately slow in the substratum. Available water capacity is moderate. This soil has a seasonal high water table perched above the substratum for brief periods in winter and spring. Reaction ranges from extremely acid to medium acid throughout the soil.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming. The soil is suited to trees but is poorly suited to woodland wildlife habitat. Slope and the stones and boulders on the surface limit the use of equipment for planting and harvesting trees and limit most types of recreational development.

The stones and boulders and the seasonal high water table limit the soil as a site for dwellings, small commercial buildings, and shallow excavations. Slope further limits the soil for small commercial buildings, and the dense substratum is also a limitation for shallow excavations. The moderately slow permeability of the substratum limits the soil as a site for septic tank absorption fields.

This unit is in capability subclass VIIs.

AnD—Annisquam extremely bouldery fine sandy loam, 15 to 35 percent slopes. This soil is deep, moderately steep and steep, and well drained. It is on the sides of hills and ridges. The areas are irregular in shape and range from 5 to 60 acres. Stones and

boulders 1 to 9 feet in diameter are 1 to 30 feet apart on the surface.

Typically, the surface layer is very dark gray fine sandy loam about 4 inches thick. The subsoil is yellowish brown and is 24 inches thick. The upper part is gravelly fine sandy loam, and the lower part is very gravelly coarse sandy loam. The substratum is very firm, olive brown gravelly loamy coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of shallow Hollis soils, moderately deep Chatfield soils, well drained Montauk soils, poorly drained Ridgebury soils, moderately well drained Scituate soils, and exposed bedrock. Included areas make up about 15 percent of the unit.

The permeability of this Annisquam soil is moderately rapid in the subsoil and moderately slow in the substratum. Available water capacity is moderate. This soil has a seasonal high water table perched above the substratum for brief periods in winter and spring. Reaction ranges from extremely acid to medium acid throughout the soil.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface and the slope make this soil poorly suited to farming. The soil is suited to trees but is poorly suited to woodland wildlife habitat. The stones and boulders on the surface and the slope limit the use of equipment for planting and harvesting trees and limit most types of recreational development.

Slope, the stones and boulders on the surface, and the seasonal high water table limit the soil as a site for dwellings, small commercial buildings, and shallow excavations. The dense substratum is also a limitation for shallow excavations. The moderately slow permeability of the substratum and the slope limit the soil as a site for septic tank absorption fields.

This unit is in capability subclass VIIs.

Ba—Beaches. This unit consists of areas of barren quartz sand, gravel, and cobblestones that are adjacent to the ocean. Most areas have a zone of erosion from which sand is being removed and a zone of accumulation where sand is deposited by waves, currents, and wind. The areas are mainly used for recreation and are unsuitable for most other purposes (fig. 8).

This unit is not assigned to a capability subclass.

BeB—Belgrade very fine sandy loam, 0 to 8 percent slopes. This soil is deep, nearly level and gently sloping, and moderately well drained. It is on broad areas near the ocean and in stream valleys. The areas are irregular in shape and range from 5 to 20 acres. Slopes are smooth, undulating, and 100 to 600 feet long.

Typically, the surface layer is very dark grayish brown very fine sandy loam about 10 inches thick. The subsoil is light olive brown very fine sandy loam about 18 inches thick. It is mottled in the lower part. The substratum is mottled, olive silt loam and very fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of soils that are mottled in the upper part of the subsoil and small areas of soils with fine sandy loam in the surface layer and subsoil. These areas make up about 50 percent of the unit. Areas of soils with slopes of more than 8 percent make up about 5 percent of the unit.

The permeability of this Belgrade soil is moderate in the subsoil and slow to moderately rapid in the substratum. Available water capacity is high. Reaction ranges from strongly acid to slightly acid in the surface layer and subsoil and from medium acid to neutral in the substratum. A seasonal high water table is in the lower part of the subsoil during winter and spring.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is well suited to cultivated crops and to hay and pasture. Good tilth is easily maintained, and the erosion hazard is moderate. The main management concern is the seasonal high water table, which makes the soil wet and delays farming operations in the spring. Wet spots used for crops need drainage, but drainage generally is not needed for hay and pasture. Conservation tillage helps to reduce soil compaction. The use of cover crops and grasses and legumes in the cropping system helps to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species. Keeping livestock off the pasture when this soil is saturated helps to prevent damage to the sod.

The soil is suited to trees and to openland and woodland wildlife habitat. Wetness caused by the water table limits most types of recreational development. Slope also limits playground development in areas where slopes are more than 2 percent.

The seasonal high water table limits the use of the soil as a site for dwellings and small commercial buildings and for shallow excavations. Slope also limits the soil as a site for small commercial buildings, and sidewall instability is a hazard in shallow excavations. The water table and the slow permeability in the substratum are limitations for septic tank absorption fields.

This unit is in capability subclass IIe.

BuA—Boxford silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on broad areas near the ocean and in the larger valleys of the survey area. The areas are irregular in

Figure 8.—An area of Beaches.

shape and range from 5 to 35 acres. Slopes are smooth, gently undulating, and 100 to 1,000 feet long.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is about 35 inches thick. The upper 8 inches is friable, dark yellowish brown and yellowish brown silt loam; the lower 27 inches is firm, mottled, yellowish brown and light olive brown silty clay loam. The substratum is firm, mottled, light olive brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Maybid and Scitico soils in depressions that make up about 15 percent of the unit.

The permeability of this Boxford soil is slow to very slow. Available water capacity is high. Reaction is strongly acid to slightly acid in the upper part of the subsoil and medium acid to neutral in the lower part of the subsoil and in the substratum. A seasonal high water table is in the lower part of the subsoil in winter and spring.

Most areas of this soil are farmed. Some areas are in woodland, and some are used for homesites.

This soil is well suited to cultivated crops and to hay and pasture. Wetness caused by the seasonal high water table is the main limitation. The soil commonly is wet in spring, delaying farming operations. Drainage is needed in areas used for crops but is generally not needed for hay and pasture. Good tilth is easily maintained in cultivated areas, and the erosion hazard is slight. The use of cover crops and grasses and legumes in the cropping system and mixing crop residue and manure into the surface layer improve tilth and increase the organic matter content of the soil. Working this soil when wet will reduce the tilth of the surface layer and compact the upper part of the subsoil. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species. Keeping livestock off the pasture when the soil is wet helps to prevent damage to the sod.

The soil is suited to trees and to openland and woodland wildlife habitat. Wetness and slow permeability limit the soil for recreational development.

The seasonal high water table limits the soil as a site for dwellings and small buildings and for shallow excavations. The water table and slow permeability are limitations of the soil as a site for septic tank absorption fields.

This unit is in capability subclass IIw.

BuB—Boxford silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on broad areas near the ocean and in the larger valleys in the survey area. The areas are irregular in shape and range from 5 to 100 acres. Slopes are smooth, undulating, and 100 to 800 feet long.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 33 inches thick. It is friable, dark yellowish brown and yellowish brown silt loam in the upper 7 inches and firm, mottled, yellowish brown and light olive brown silty clay loam in the lower 26 inches. The substratum is firm, mottled, light olive brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Maybid and Scitico soils in depressions and a few areas of rock outcrop 100 to 300 feet apart. Included areas make up about 15 percent of the unit.

The permeability of this Boxford soil is slow to very slow. Available water capacity is high. Reaction is strongly acid to slightly acid in the upper part of the subsoil and medium acid to neutral in the lower part of the subsoil and in the substratum. A seasonal high water table is in the lower part of the subsoil in winter and spring.

Most areas of this soil are farmed. Some areas are in woodland, and some are used for homesites.

This soil is well suited to cultivated crops and to hay and pasture. The hazard of erosion and wetness caused by the water table are the main limitations. The soil commonly is wet in spring, delaying farming operations. Drainage is needed in areas used for crops but generally is not needed for hay and pasture. Installing surface drains helps to control wetness, and conservation tillage and the use of cover crops help to reduce runoff and control erosion. Using grasses and legumes in the cropping system and mixing crop residue and manure into the surface layer help to improve tilth and increase organic matter content of the soil. Working the soil when wet will reduce the tilth of the surface layer and compact the upper part of the subsoil. Use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species. Keeping livestock off the pasture when the soil is wet prevents damage to the sod.

The soil is suited to trees and to openland and woodland wildlife habitat. The water table and slow permeability limit the soil for recreational development. Slope is a limitation for playground development.

The seasonal high water table limits the soil as a site for dwellings and small commercial buildings and for shallow excavations. The water table and slow permeability limit the soil as a site for septic tank absorption fields.

This unit is in capability subclass IIe.

BuC—Boxford silt loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and moderately well drained. It is on broad areas near the ocean and in the larger valleys of the survey area. The areas are irregular in shape and range from 5 to 25 acres. Slopes are smooth, rolling, and 50 to 600 feet long.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil is about 30 inches thick. It is friable, dark yellowish brown and yellowish brown silt loam in the upper 5 inches and firm, mottled, yellowish brown and light olive brown silty clay loam in the lower 25 inches. The substratum is firm, mottled, light olive brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scitico soils in depressions. Also included are areas of rock outcrop 30 to 300 feet apart and a few areas with no mottling in the subsoil. Included areas make up about 15 percent of the unit.

The permeability of this Boxford soil is slow to very slow. Available water capacity is high. Reaction is strongly acid to slightly acid in the upper part of the subsoil and medium acid to neutral in the lower part of the subsoil and in the substratum. A seasonal high water table is in the lower part of the subsoil in winter and spring.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is suited to cultivated crops and to hay and pasture. Erosion and the seasonal high water table are the main limitations. The soil commonly is wet in spring, delaying farming operations. Drainage is needed in areas used for crops but generally is not needed for hay and pasture. Farming on the contour and using cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer helps to improve tilth and increase organic matter content of the soil. Working the soil when wet will reduce the tilth of the surface layer and compact the upper part of the subsoil. Use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species. Keeping livestock off the pasture when the soil is wet prevents damage to the sod.

This soil is suited to trees and to openland and woodland wildlife habitat. Slope limits the use of woodland equipment. Slope, wetness, and slow permeability limit the soil for recreational development.

The seasonal high water table and slope limit the soil as a site for dwellings and small commercial buildings and for septic tank absorption fields. The slow permeability is an additional limitation of the soil as a site for septic tanks, and the water table limits shallow excavations.

This unit is in capability subclass IIIe.

BxB—Boxford-Urban land complex, gently sloping. This unit is at low elevations near the ocean and tidal rivers. It consists of deep, moderately well drained Boxford soils and areas covered by streets, parking lots, buildings, and other structures. Slopes range from 3 to 15 percent. They are smooth, undulating, or rolling and are 100 to 600 feet long. The areas of this unit are irregular in shape and range from 10 to 50 acres. They consist of about 45 percent Boxford soils, 35 percent urbanized areas, and 20 percent other soils. The Boxford soils and urbanized areas are so intermingled that it was not practical to map them separately.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is about 35 inches thick. The upper 8 inches is friable, dark yellowish brown and yellowish brown silt loam; the lower 27 inches is firm, mottled, yellowish brown and light olive brown silty clay loam. The substratum is firm, mottled, light olive brown silty clay loam to a depth of 60 inches or more.

Included in this complex in mapping are small areas of Belgrade, Elmridge, Scitico, and Shaker soils.

The permeability of the Boxford soils is slow or very slow. Available water capacity is high. Reaction is very strongly acid to slightly acid in the upper part of the subsoil and strongly acid to neutral in the lower part of the subsoil and in the substratum. A seasonal high water table is at a depth of 1-1/2 to 3 feet during late fall, in winter, and in spring.

The Boxford soils, or open part of the unit, are used for lawns, gardens, parks, and building sites.

Wetness caused by the seasonal high water table is the main limitation of this unit for most purposes. The slow permeability also limits use for septic tank absorption fields and recreational development.

This unit is not assigned to a capability subclass.

CaB—Canton fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is mostly in rectangular or irregularly shaped areas on the lower slopes of hills. The areas range from 5 to 25 acres. Slopes are smooth or undulating, slightly convex, and 50 to 300 feet long.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is fine sandy loam about 21 inches thick. It is dark yellowish brown in the upper 3 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate and Swansea soils in small depressions, small areas of Montauk soils, and a few small areas of soils with slopes of less than 3 percent. Included soils make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are farmed, and a few are used for homesites.

This soil is well suited to cultivated crops and to hay and pasture. Good tilth is easily maintained in cultivated areas by mixing crop residue and manure into the surface layer. The erosion hazard is moderate. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion in cultivated areas. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is poorly suited to trees. The soil is suitable for most types of recreational development and for openland and woodland wildlife habitat. Slope limits playground development.

This soil has essentially no limitations as a site for dwellings, but slope is a limitation for small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent passing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass IIe.

CaC—Canton fine sandy loam, 8 to 20 percent slopes. This soil is deep, moderately sloping and moderately steep, and well drained. It is in rectangular or irregularly shaped areas on the lower slopes of hills. The areas range from 5 to 30 acres. Slopes are smooth, rolling, slightly convex, and 50 to 500 feet long.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is fine sandy loam about 21 inches thick. It is dark yellowish brown in the upper 3 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate and Swansea soils in small depressions and small areas of Montauk soils. Included soils make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are farmed, and a few are used for homesites.

This soil is suited to cultivated crops and to hay and pasture. Good tilth is easily maintained in cultivated areas. The erosion hazard is moderately severe. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion in cultivated areas. Mixing crop residue and manure into the surface layer helps to improve tilth and increase organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

The soil is poorly suited to trees. The soil is suitable for openland and woodland wildlife habitat and for most types of recreational development. Slope limits playground development.

Slope limits this soil as a site for dwellings and small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent passing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass IIIe.

CbB—Canton very stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is in irregularly shaped areas on the lower slopes of hills. The areas range from 10 to 150 acres. Slopes are smooth, undulating, slightly convex, and 50 to 800 feet long. The surface of the soil has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 24 inches thick. It is dark yellowish brown in the upper 6 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate and Swansea soils in depressions and small areas of Montauk soils. Included soils make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for pasture, and a few are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is poorly suited to trees but is suitable for woodland wildlife habitat. Stones on the surface limit most recreational uses.

This soil has essentially no limitations as a site for dwellings. Slope is a limitation for small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass VIs.

CbC—Canton very stony fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is in irregularly shaped areas on the lower slopes of hills. The areas range from 10 to 100 acres. Slopes are smooth, rolling, slightly convex, and 50 to 600 feet long. The surface of the soil has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 24 inches thick. It is dark yellowish brown in the upper 6 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate and Swansea soils in depressions and small areas of Montauk soils. Included soils make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for pasture, and a few are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is poorly suited to trees. Slope and the stony surface limit the soil for most recreational uses.

Slope limits this soil as a site for dwellings and small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass VIs.

CbD—Canton very stony fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is in irregularly shaped areas on the lower slopes of hills. The areas range from 10 to 60 acres. Slopes are smooth, convex, and 50 to 400 feet long. The surface of the soil has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 24 inches thick. It is dark yellowish brown in the upper 6 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Montauk and Scituate soils and a few areas of soils with no stones on the surface. Included soils make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum.

Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for pasture and homesites.

Slope and the stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is poorly suited to trees. Slope limits the use of equipment. Slope and the stony surface limit the soil for most recreational uses.

Slope limits this soil as a site for dwellings, small commercial buildings, shallow excavations, and septic tank absorption fields. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass VIs.

CcB—Canton extremely stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is in irregularly shaped areas on the lower slopes of hills. The areas range from 10 to 150 acres. Slopes are smooth, undulating, slightly convex, and 100 to 800 feet long. The surface of the soil has stones and boulders 1 to 3 feet in diameter that are 10 to 30 feet apart.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 26 inches thick. It is dark yellowish brown in the upper 8 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate and Swansea soils in depressions and small areas of Montauk soils. Included soils make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming, most recreational uses, and woodland. The soil is suitable for woodland wildlife habitat.

This soil has essentially no limitations as a site for dwellings, but slope is a limitation for small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass VIIs.

CcC—Canton extremely stony fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is in irregularly shaped areas on the lower slopes of hills. The areas range from 10 to 100 acres. Slopes are smooth, rolling, slightly convex, and 50 to 800 feet long. The surface of the soil has stones and boulders 1 to 3 feet in diameter that are 10 to 30 feet apart.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 26 inches thick. It is dark yellowish brown in the upper 8 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate soils in lower areas, areas of Hollis soils and rock outcrop mostly on south-facing slopes, and areas of Montauk soils. Included areas make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming and to most recreational uses.

This soil is poorly suited to trees. Stones on the surface limit the use of woodland equipment. The soil is suitable for woodland wildlife habitat.

Slope is a limitation of this soil as a site for dwellings or small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent flowing though the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass VIIs.

CcD—Canton extremely stony fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is in irregularly shaped areas on the sides and lower slopes of hills. The areas range from 10 to 75 acres. Slopes are smooth, convex, and 50 to 600 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 10 to 30 feet apart.

Typically, the surface layer is very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 24 inches thick. It is dark yellowish brown in the upper 7 inches and yellowish brown in the lower 17 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate soils in lower areas, areas of Hollis soils and rock outcrop mostly on south-facing slopes, and areas of

Montauk soils. Included areas make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for homesites.

Slope and the stones and boulders on the surface make this soil poorly suited to farming and to most recreational uses.

This soil is poorly suited to trees. Slope and the stones and boulders on the surface limit the use of woodland equipment. The soil is suitable for woodland wildlife habitat.

Slope is a limitation of this soil as a site for dwellings, small commercial buildings, shallow excavations, or septic tank absorption fields. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass VIIs.

CcE—Canton extremely stony fine sandy loam, 25 to 35 percent slopes. This soil is deep, steep, and well drained. It is in irregularly shaped areas on the sides of hills. The areas range from 10 to 100 acres. Slopes are smooth, convex, and 150 to 600 feet long. Stones and boulders 1 to 3 feet in diameter and 10 to 30 feet apart are on the surface.

Typically, the surface layer is very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 22 inches thick. It is dark yellowish brown in the upper 6 inches and yellowish brown in the lower 16 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Hollis and Montauk soils and rock outcrop. Included areas make up about 20 percent of the unit and generally are less than 5 acres each.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

Slope and stones and boulders on the surface make this soil poorly suited to farming and to most recreational uses. Most areas are wooded, but the soil is poorly suited to trees. Slope and the stones and boulders on the surface limit the use of woodland equipment. The soil is suitable for woodland wildlife habitat.

Slope is a limitation of this soil as a site for dwellings, small commercial buildings, shallow excavations, and septic tank absorption fields. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass VIIs.

ChC—Canton-Urban land complex, sloping. This unit is on uplands. It consists of deep, well drained Canton soils and areas covered by streets, parking lots, buildings, and other structures. Slopes range from 3 to 15 percent. They are gently sloping or moderately sloping; smooth, undulating, or rolling; and 100 to 600 feet long. The areas of this unit are irregular in shape and range from 10 to 50 acres. They consist of about 45 percent Canton soils, 35 percent urbanized areas, and 20 percent other soils. The Canton soils and urbanized areas are so intermingled that it was not practical to map them separately.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 24 inches thick. It is dark yellowish brown in the upper 6 inches and yellowish brown in the lower 18 inches. The substratum is grayish brown and olive gray gravelly loamy sand to a depth of 60 inches or more.

Included in this unit in mapping are small areas of Hollis, Ridgebury, Scituate, Swansea, and Whitman soils.

The permeability of the areas of Canton soils is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid.

The Canton soils, or open part of this unit, are used for lawns, gardens, parks, and building sites and are suited to such uses.

Slope limits this unit as a site for small commercial buildings or dwellings or for septic tank absorption fields in areas where slopes are more than 8 percent. The rapid permeability in the substratum causes a hazard of ground-water contamination in areas used for septic tank absorption fields. The sidewalls of shallow excavations in this unit are unstable, and steeper sides commonly collapse. In places, large stones on the surface limit the area for recreational development.

This unit is not assigned to a capability subclass.

CrC—Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes. This unit is on undulating and rolling ridges and hills. It consists of well drained, moderately deep Chatfield soils; somewhat excessively drained, shallow Hollis soils; and exposed bedrock. The areas are irregularly shaped and range from 10 to 200 acres. Slopes range from 50 to 1,000 feet long. The areas of exposed bedrock are 10 to 100 feet apart. The surface of the unit has stones and boulders 1 to 4 feet in diameter that are 10 to 100 feet apart. The unit consists of about 40 percent Chatfield soils, 25 percent Hollis soils, 20 percent Rock outcrop, and 15 percent other

soils. The soils and exposed rock are so intermingled that it was not practical to map them separately.

Typically, the Chatfield soils have a surface layer of very dark grayish brown very fine sandy loam about 1 inch thick. The subsoil is 16 inches thick. It is dark brown very fine sandy loam in the upper 5 inches and dark yellowish brown gravelly very fine sandy loam in the lower 11 inches. The substratum is very firm, light olive brown gravelly very fine sandy loam 17 inches thick. Granite bedrock is at a depth of 34 inches.

Typically, the Hollis soils have a surface layer of dark brown fine sandy loam about 3 inches thick. The subsoil is dark yellowish brown fine sandy loam about 15 inches thick. Hard granite bedrock is at a depth of about 18 inches.

Included with this complex in mapping are small areas of Canton, Freetown, Montauk, Paxton, Ridgebury, Swansea, Whitman, and Woodbridge soils.

The permeability of these Chatfield and Hollis soils is moderate or moderately rapid. Available water capacity is low or moderate in the Chatfield soils and very low in the Hollis soils. Reaction of both soils ranges from very strongly acid to medium acid.

Most areas of this unit are wooded. A few areas are used for homesites.

The areas of exposed bedrock and the stones and boulders on the surface make the soils in this unit poorly suited to farming. The Chatfield soils are suited to trees, but the Hollis soils are poorly suited. The stones and boulders on the surface, the shallow depth to rock in the Hollis soils, and the outcroppings of bedrock limit the areas of this unit for recreational development.

The depth to bedrock limits this unit as a site for dwellings, small commercial buildings, septic tank absorption fields, or shallow excavations. Slope is also a limitation for small commercial buildings.

This unit is in capability subclass VIIs.

CrD—Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes. This unit is on ridges and hills. It consists of well drained, moderately deep Chatfield soils; somewhat excessively drained, shallow Hollis soils; and exposed bedrock. The areas are irregularly shaped and range from 15 to 1,250 acres. Slopes are complex and range from 100 to 1,200 feet long. The areas of exposed bedrock are 10 to 100 feet apart. The surface of the unit has stones and boulders 1 to 4 feet in diameter that are 10 to 100 feet apart. The unit consists of about 40 percent Chatfield soils, 25 percent Hollis soils, 20 percent exposed bedrock, and 15 percent other soils. The soils and exposed rock are so intermingled that it was not practical to map them separately.

Typically, the Chatfield soils have a surface layer of very dark grayish brown very fine sandy loam about 1 inch thick. The subsoil is 16 inches thick. It is dark brown very fine sandy loam in the upper 5 inches and dark yellowish brown gravelly very fine sandy loam in the lower 11 inches. The substratum is very firm, light olive brown gravelly very fine sandy loam 17 inches thick. Granite bedrock is at a depth of 34 inches.

Typically, the Hollis soils have a surface layer of dark brown fine sandy loam about 3 inches thick. The subsoil is dark yellowish brown fine sandy loam about 15 inches thick. Hard granite bedrock is at a depth of about 18 inches.

Included with this complex in mapping are small areas of Canton, Freetown, Montauk, Paxton, Ridgebury, Swansea, Whitman, and Woodbridge soils.

The permeability of these Chatfield and Hollis soils is moderate or moderately rapid. Available water capacity is low or moderate in the Chatfield soils and very low in the Hollis soils. Reaction in both soils is very strongly acid to medium acid.

Most areas of this unit are wooded. A few areas are used for homesites.

The areas of exposed bedrock, the stones and boulders on the surface, and the slope make this unit poorly suited to farming. The Chatfield soils are suited to trees, but the Hollis soils are poorly suited. The stones and boulders on the surface, the shallow depth to bedrock in the Hollis soils, the outcroppings of bedrock, and slope limit the unit for recreational development.

Slope and depth to rock limit the use of these soils as a site for dwellings, small commercial buildings, septic tank absorption fields, or shallow excavations.

This unit is in capability subclass VIIs.

De—Deerfield loamy fine sand. This soil is deep, nearly level and gently sloping, and moderately well drained. It is on broad areas near streams. The areas are irregularly shaped and range from 5 to 40 acres. Slopes range from 0 to 8 percent, are smooth, and are 100 to 800 feet long.

Typically, the surface layer is black loamy fine sand about 6 inches thick. The subsoil is dark brown loamy fine sand about 18 inches thick. The substratum is mottled and extends to a depth of 60 inches or more. It is stratified light brownish gray loamy sand, brown sand, and light yellowish brown fine sand.

Included with this soil in mapping are small areas of Windsor soils on knolls and Wareham soils in depressions. They make up about 15 percent of the unit.

The permeability of this Deerfield soil is rapid in the subsoil and rapid to very rapid in the substratum. Available water capacity is low. Reaction ranges from very strongly acid to medium acid. A seasonal high water table is at a depth of about 24 inches during winter and spring.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is suited to cultivated crops and to hay and pasture. The seasonal high water table commonly keeps the soil wet in early spring and delays farming operations. Drainage is needed in some areas used for

crops but is generally not needed for hay or pasture. The soil is droughty in summer. The main management practices in cultivated areas are frequent irrigation, application of fertilizer, adding organic matter to the surface layer, and using cover crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is suited to trees. It is suited to openland wildlife habitat but is poorly suited to woodland wildlife habitat. Wetness caused by the water table limits the soil for most types of recreational development. Slope is an added limitation for playground development in areas where the slope is more than 2 percent.

The seasonal high water table limits the soil as a site for dwellings, small commercial buildings, shallow excavations, or septic tank absorption fields. The rapid permeability of the substratum causes a hazard of ground-water contamination in areas used for septic tanks. The sidewalls of shallow excavations are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIIw.

Du—Dumps. This unit consists of areas used for trash disposal. Most are in or near urban areas throughout the survey area and are adjacent to poorly drained and very poorly drained soils. The areas range from 3 to 90 acres.

Dumps are commonly called landfills or sanitary landfills and consist mostly of paper, metal, plastic, glass, rubble, cinders, and organic debris. The characteristics of each area vary according to the kinds of refuse and the manner in which it has been deposited and packed and whether the areas have been leveled, covered, or graded. All areas are subject to some degree of subsidence.

Included with this unit in mapping are small areas of Ridgebury, Walpole, Scarboro, and Whitman soils and some poorly drained and very poorly drained soils. Also included are a few areas that have been reclaimed and used for recreational sites.

Onsite investigation and evaluation of these areas are required to determine the suitability of the areas for any use.

This unit is not assigned to a capability subclass.

ElA—Elmridge fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on broad, gently undulating areas. The areas are irregularly shaped and range from 5 to 45 acres. Slopes are smooth and are 100 to 600 feet long.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is about 24 inches thick. It is very friable, dark yellowish brown and light olive brown fine sandy loam in the upper 15 inches and firm, mottled, olive silty clay loam in the lower 9 inches. The substratum is very firm, mottled, olive silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Shaker soils in depressions and Melrose soils on knolls and a few areas in which the subsoil extends to a depth of more than 40 inches. Also included are a few areas that have some fine gravel in the surface layer and subsoil. Included soils make up about 15 percent of the unit.

The permeability of this Elmridge soil is moderately rapid in the upper part of the subsoil and slow in the lower part of the subsoil and in the substratum. Available water capacity is high. Reaction ranges from strongly acid to slightly acid in the subsoil and is slightly acid or neutral in the substratum. A seasonal high water table is perched above the lower part of the subsoil for brief periods in winter and early spring.

Most areas of this soil are farmed. Some areas are used for homesites. A few areas are in woodland.

This soil is well suited to cultivated crops and to hay and pasture. Good tilth is easily maintained in cultivated areas, and the erosion hazard is slight. The seasonal high water table commonly keeps the soil wet in early spring and delays farming operations. Drainage is needed in areas used for crops but is generally not needed for hay or pasture. The use of cover crops and grasses and legumes in the cropping system and mixing crop residue and manure into the surface layer help to improve tilth and increase organic matter content in cultivated areas. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

The soil is well suited to trees and to openland and woodland wildlife habitat. Wetness caused by the water table and slow permeability in the lower part of the subsoil and in the substratum limit the soil for recreational development.

The seasonal high water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, or shallow excavations. The slow permeability of the lower part of the soil also limits the soil as a site for septic tank absorption fields. The firm part of the subsoil further limits shallow excavations.

This unit is in capability subclass IIw.

ElB—Elmridge fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on broad, undulating areas. The areas are irregularly shaped and range from 5 to 45 acres. Slopes are smooth or undulating and are 100 to 800 feet long.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is about 24 inches thick. It is very friable, dark yellowish brown and light olive brown fine sandy loam in the upper 15 inches and firm, mottled, olive silty clay loam in the lower 9 inches. The substratum is very firm, mottled, olive silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Shaker soils in depressions and Melrose soils on knolls. Also included are areas of Elmridge soils with slopes of more than 8 percent. Included soils make up about 15 percent of the unit.

The permeability of this Elmridge soil is moderately rapid in the upper part of the subsoil and slow in the lower part of the subsoil and in the substratum. Available water capacity is high. Reaction ranges from strongly acid to slightly acid in the subsoil and is slightly acid or neutral in the substratum. A seasonal high water table is perched above the lower part of the subsoil for brief periods in winter and early spring.

Most areas of this soil are farmed. Some areas are used for homesites, and some are in woodland.

This soil is well suited to cultivated crops and to hay and pasture. Good tilth is easily maintained in cultivated areas, and the erosion hazard is moderate. The seasonal high water table commonly keeps the soil wet in early spring and delays farming operations. Drainage is needed in areas used for crops but is generally not needed for hay or pasture. Mixing crop residue and manure into the surface layer helps to improve tilth and increase the organic matter content in cultivated areas. Using cover crops and grasses and legumes in the cropping system helps to reduce erosion. The use of proper stocking rates, deferred grazing, and rotational grazing are management practices that help to maintain desirable plant species.

The soil is well suited to trees and to openland and woodland wildlife habitat. Wetness caused by the water table and slow permeability in the lower part of the soil limit recreational development.

The seasonal high water table limits the soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. Slope is also a limitation for small commercial buildings, and the slow permeability in the lower part of the soil is a limitation for septic tank absorption fields. The firm part of the subsoil further limits shallow excavations.

This unit is in capability subclass IIw.

FF—Fluvaquents, frequently flooded. This unit consists of deep, nearly level, very poorly drained and poorly drained soils on flood plains adjacent to rivers and streams. The areas range from 5 to 60 acres. They mainly are irregular in shape, but some are long and narrow. Slopes are short and irregular and are less than 3 percent.

These soils commonly have a surface layer of very dark gray, mucky very fine sandy loam about 12 inches thick. The substratum extends to a depth of 60 inches or more. The upper part is mottled, gray very fine sandy loam. The middle part is gray silt loam. The lower part is gray stratified medium and fine sand to a depth of 60 inches or more. The areas of these soils adjacent to the Ipswich River generally contain more silt than do the areas adjacent to smaller streams.

Included with this unit in mapping are small areas of Swansea soils and a few areas of soils that are not mottled. Included soils make up about 15 percent of the unit.

The permeability of these Fluvaquents is moderate in the loamy material and rapid in the sandy material. Available water capacity is high. Reaction ranges from strongly acid to slightly acid in the upper part of the soil and medium acid to neutral in the lower part. A high water table is at or near the surface during most of the year. Most areas are flooded at least once each year for up to a week.

Most areas of these soils are covered with water-tolerant weeds, sedges, grasses, and shrubs. A few areas have water-tolerant woody vegetation such as alder, red maple, river birch, and willow.

Wetness caused by the high water table and the frequency of flooding make these soils poorly suited to farming. Drainage of these soils is difficult because of the lack of adequate outlets.

These soils are poorly suited to trees but are suited to wetland wildlife habitat. Flooding limits use of the soils for recreational development.

Flooding and the water table limit the use of these soils as a site for dwellings, small commercial buildings, septic tank absorption fields, or shallow excavations. Flooding and the rapid permeability in the lower part of the soil cause a hazard of ground-water contamination in areas used for septic tank absorption fields. The sidewalls of shallow excavations in these soils are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass VIw.

Fm—Freetown muck. This soil is deep, nearly level, and very poorly drained. It is in depressions and along streams and rivers. The areas are irregular in shape and range from about 5 to 1,000 acres. Slopes are 0 to 1 percent.

Typically, the upper part of the soil is black muck about 30 inches thick. The lower part is dark reddish brown muck to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of Swansea soils near the edges of the unit and a few areas of Freetown muck, ponded. Also included are a few areas with an upper layer of organic material less than 18 inches thick. Included areas make up about 15 percent of the unit.

The permeability of this Freetown soil is moderate or moderately rapid. Available water capacity is very high. Reaction is extremely acid. A high water table is at or near the surface during most of the year.

Most areas of this soil are in woodland or moisture-tolerant shrubs or grasses.

Wetness caused by the high water table makes this soil poorly suited to farming. Drainage of the soil is difficult because of the lack of adequate outlets.

The soil is poorly suited to trees but is well suited to wetland wildlife habitat. Wetness and the organic material limit use of the soil for recreational development.

Wetness limits the use of this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The organic material is an added limitation for shallow excavations, and low strength of the soil limits use as a site for dwellings and small commercial buildings.

This unit is in capability subclass Vw.

Fp—Freetown muck, ponded. This soil is deep, nearly level, and very poorly drained. It is in depressions and along streams and rivers. The soil has water on the surface during most of the year. The areas of the soil are irregular in shape and range from about 5 to 65 acres. Slopes range from 0 to 1 percent.

Typically, the upper part of the soil is black muck about 30 inches thick. The lower part is dark reddish brown, highly decomposed muck to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of Swansea soils near the edges of the unit and a few areas that do not have water on the surface. Also included are a few areas with an upper layer of organic material less than 18 inches thick. Included areas make up about 15 percent of the unit.

The permeability of this soil is moderate or moderately rapid. Available water capacity is very high. Reaction is extremely acid. The rooting zone is restricted by a water table that is at the surface during most of the year.

Most areas of this soil have water-tolerant shrubs and grasses on at least part of the area.

The water on the surface makes this soil generally unsuitable for most uses other than as wetland wildlife habitat. Drainage is difficult because of a lack of suitable outlets.

This unit is in capability subclass VIIw.

HfA—Hinckley gravelly fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and excessively drained. It is in broad, irregularly shaped areas and in small areas adjacent to the flood plains of streams. The areas range from 5 to 200 acres. Slopes are smooth and are 100 to 2,000 feet long.

Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 8 inches thick. The subsoil is dark yellowish brown gravelly loamy sand about 9 inches thick. The substratum is yellowish brown stratified gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Sudbury, Swansea, Wareham, and Windsor soils. Included soils make up about 15 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. Some areas are in farmland or are used for homesites.

This soil is suitable for cultivated crops and for hay and pasture. The erosion hazard is slight, and the soil is droughty. The main management needs are irrigation, frequent applications of fertilizer, and adding organic matter to the surface layer.

This soil is poorly suited to trees and to woodland and openland wildlife habitat. The soil is suitable for most types of recreational development, but small stones on the surface are a limitation for playground development.

This soil has essentially no limitations as a site for dwellings or small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. The soil is a poor filter for septic tank absorption fields; effluent passing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass IIIs.

HfB—Hinckley gravelly fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and excessively drained. It is in broad, irregularly shaped areas and in small areas adjacent to the flood plains of streams. The areas range from 5 to 120 acres. Slopes are smooth or undulating and are 100 to 1,000 feet long.

Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 8 inches thick. The subsoil is dark yellowish brown gravelly loamy sand about 9 inches thick. The substratum is yellowish brown stratified gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Sudbury, Swansea, Wareham, and Windsor soils. Also included are small areas of Hinckley soils with stones 20 to 50 feet apart on the surface. Included soils make up about 15 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. Some areas are farmland or are used for homesites.

This soil is suitable for cultivated crops and for hay and pasture. The erosion hazard is slight, and the soil is droughty. The main management needs are irrigation, frequent applications of fertilizer, use of cover crops, and adding organic matter to the surface layer.

The soil is poorly suited to trees and to openland and woodland wildlife habitat. The soil is suited to most types

of recreational development, but small stones on the surface limit its use for playground development.

This soil has essentially no limitations as a site for dwellings, but slope limits its use for small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. This soil is a poor filter for septic tank absorption fields; effluent passing through the substratum causes a hazard of ground-water contamination.

This unit is in capability subclass IIIs.

HfC—Hinckley gravelly fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and excessively drained. It is in broad, irregularly shaped areas, in areas adjacent to drainageways, and in areas on the tops of hills and short ridges. The areas range from 5 to 45 acres. Slopes are rolling and complex and are 100 to 800 feet long.

Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 7 inches thick. The subsoil is dark yellowish brown gravelly loamy sand about 9 inches thick. The substratum is yellowish brown stratified gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Sudbury, Swansea, Wareham, and Windsor soils. Also included are small areas of Hinckley soils with stones 20 to 50 feet apart on the surface. Included soils make up about 15 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. Some areas are in farmland or are used for homesites.

This soil is poorly suited to cultivated crops and to hay and pasture. The erosion hazard is moderate, and the soil is droughty. The main management needs are irrigation, frequent applications of fertilizer, use of cover crops, and adding organic matter to the surface layer.

The soil is poorly suited to trees and to openland and woodland wildlife habitat. Slope limits use of the soil for most types of recreational development.

Slope limits the use of this soil as a site for dwellings or small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. The permeability of the substratum causes a hazard of ground-water contamination in areas used for septic tank absorption fields.

This unit is in capability subclass IVs.

HfD—Hinckley gravelly fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and excessively drained. It is on the sides of hills and ridges. The areas are long and narrow or irregular in shape and range from 5 to 80 acres. Slopes are complex and are 100 to 800 feet long.

Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 3 inches thick. The subsoil is dark yellowish brown gravelly loamy sand about 15 inches thick. The substratum is yellowish brown stratified gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Hinckley soils with stones 20 to 50 feet apart on the surface and areas with rock outcrop. Included areas make up about 15 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for homesites.

This soil is poorly suited to farming. The soil is droughty, and slope limits the use of equipment. The erosion hazard is moderate.

The soil is poorly suited to trees and to openland and woodland wildlife habitat. Slope limits the use of woodland equipment and is the main limitation for recreational development.

Slope limits the use of this soil as a site for dwellings or small commercial buildings. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. The permeability of the substratum causes a hazard of ground-water contamination in areas used for septic tank absorption fields.

This unit is in capability subclass VIs.

HfE—Hinckley gravelly fine sandy loam, 25 to 45 percent slopes. This soil is deep, steep, and excessively drained. It is on the sides of hills and ridges. The areas are long and narrow or irregular in shape and range from 10 to 150 acres. Slopes are smooth and 50 to 200 feet long.

Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 3 inches thick. The subsoil is dark yellowish brown gravelly loamy sand about 14 inches thick. The substratum is yellowish brown stratified gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Hinckley soils with stones 20 to 50 feet apart on the surface, areas of rock outcrop, and areas of Swansea soils. Included areas make up about 15 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland, but the soil is poorly suited to trees or to openland and woodland wildlife habitat.

Slope makes the soil poorly suited to farming and is the main limitation for most other uses. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse. The permeability of the substratum causes a hazard of ground-water contamination in areas used for septic tank absorption fields.

This unit is in capability subclass VIIs.

HuC—Hollis-Urban land-Rock outcrop complex, sloping. This unit is on uplands. It consists of shallow, somewhat excessively drained Hollis soils; areas covered by streets, parking lots, buildings, and other structures; and areas of exposed bedrock. Slopes range from 3 to 15 percent. They are gently sloping or moderately sloping; smooth, undulating, or rolling; and 100 to 1,000 feet long. The areas of this unit are irregular in shape and range from 10 to 150 acres. They are about 35 percent Hollis soils, 35 percent urbanized areas, 15 percent exposed bedrock, and 15 percent included soils. The soils and the urbanized areas and areas of rock are so mixed that it was not practical to map them separately.

Typically, the Hollis soils have a surface layer of dark brown fine sandy loam about 3 inches thick. The subsoil is dark yellowish brown fine sandy loam about 15 inches thick. Hard granite bedrock is at a depth of about 18 inches.

Included in this complex in mapping are small areas of Canton, Montauk, Paxton, Ridgebury, Scituate, Whitman, and Woodbridge soils.

The permeability of the areas of Hollis soils is moderate or moderately rapid. Available water capacity is very low. Reaction is very strongly acid to medium acid.

The Hollis soils, or open part of this unit, are used for lawns, gardens, and parks. The depth to bedrock is the main limitation for most uses. Because the soil is droughty, irrigation is needed for continued plant growth during the dry parts of the year.

This unit is not assigned to a capability subclass.

Iw—Ipswich and Westbrook mucky peats. These soils are deep, nearly level, and very poorly drained. They are in irregularly shaped areas that are subject to daily tidal flooding (fig. 9). The areas range from 10 to 1,000 acres or more. Slopes are less than 1 percent. Some areas consist dominantly of Ipswich soils, some of Westbrook soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 60 percent Ipswich soils, 30 percent Westbrook soils, and 10 percent other soils.

Typically, the Ipswich soils have a surface layer of very dark grayish brown mucky peat about 17 inches thick. It consists of many live herbaceous roots and decaying plant remains. Below the surface layer is a layer about 25 inches thick of brown, slightly more decomposed organic material. The underlying layer is very dark grayish brown, highly decomposed organic material that extends to a depth of 60 inches or more.

Typically, the Westbrook soils have a surface layer of very dark brown mucky peat about 18 inches thick. This is underlain by black, decomposed organic material 19 inches thick. A layer of very firm, dark greenish gray silty clay extends to a depth of 60 inches or more.

Included with these soils in mapping are areas with 2 to 4 feet of organic material over loamy sand or sand that make up as much as 40 percent of some units. Also included are small areas of soils with less than 16 inches of organic material over mineral material and a few small areas of rock outcrop.

Permeability is moderate to rapid in the organic layers of these Ipswich and Westbrook soils and moderate in the substratum of the Westbrook soils. Available water capacity is high in both soils. Reaction in the Ipswich soils ranges from strongly acid to neutral. Reaction in the Westrbook soils is strongly acid to neutral in the organic material and medium acid to neutral in the substratum. Acidity increases if these soils are drained.

Most areas of this unit are in salt-tolerant grasses and forbs. The twice-daily tidal flooding limits the soils for most uses other than as wetland wildlife habitat.

This unit is in capability subclass VIIIw.

Ma—Maybid silt loam. This soil is deep, nearly level, and very poorly drained. It is in depressions and low areas near the larger streams in the survey area and near tidal marshes. The areas are irregular in shape and range from 5 to 120 acres. Slopes range from 0 to 2 percent. They are smooth, gently undulating, and 100 to 800 feet long.

Typically, the surface layer is very dark grayish brown silt loam about 5 inches thick. The subsoil is firm, mottled, olive gray silty clay loam about 14 inches thick. The substratum is very firm, mottled silty clay to a depth of 60 inches or more. It is greenish gray to a depth of 42 inches and gray at a depth of more than 42 inches.

Included with this soil in mapping are small areas of Scitico soils on low knolls and Swansea soils in lower areas. Also included are soils with up to 16 inches of organic material on the surface and soils with silt or silt loam in the substratum. Included soils make up about 15 percent of the unit.

The permeability of this Maybid soil is slow or very slow. Available water capacity is high. Reaction is medium acid to neutral in the subsoil and slightly acid or neutral in the substratum. A high water table is at or near the surface most of the year. Some areas have water on the surface.

Figure 9.—The background is an area of Ipswich and Westbrook mucky peats.

Most areas of this soil are farmland or are covered by moisture-tolerant shrubs and trees.

This soil is poorly suited to farming. The high water table is the major limitation. Installing drainage is difficult because of the clayey texture of the soil and a lack of adequate outlets.

The soil is poorly suited to trees but is suited to wetland wildlife habitat. The water on the surface and the slow permeability limit the use of the soil for recreational development.

The water on the surface limits the use of this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, or shallow excavations. The slow permeability is an added limitation for septic tank absorption fields.

This unit is in capability subclass VIw.

MeA—Melrose fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and well drained. It is in irregularly shaped areas that range from 5 to 50 acres. Slopes are smooth and typically are 200 to 700 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is fine sandy loam 21 inches thick. It is dark yellowish brown in the upper 17 inches and light olive brown in the lower 4 inches. The substratum is firm, olive silty clay loam or silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elmridge and Shaker soils in lower areas or depressions. Included soils make up about 15 percent of the unit.

The permeability of this Melrose soil is moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate.

Reaction ranges from strongly acid to medium acid in the subsoil and from strongly acid to neutral in the substratum.

Most areas of this soil are in woodland. Some of the acreage is farmed, and some is used for homesites.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas, and the hazard of erosion is slight. Where this soil is farmed, conservation tillage and using cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is suitable for trees and for openland and woodland wildlife habitat. The slow permeability of the substratum limits development of playgrounds and camp areas.

The substratum of this soil is susceptible to shrinking and swelling, which is a limitation of the soil as a site for dwellings and small commercial buildings. Use of the soil for septic tank absorption fields is limited by the slow or very slow permeability in the substratum. The clayey texture of the substratum limits shallow excavations.

This unit is in capability class I.

MeB—Melrose fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is in irregularly shaped areas that range from 5 to 50 acres. Slopes are smooth or undulating and typically are 100 to 600 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is fine sandy loam 21 inches thick. It is dark yellowish brown in the upper 17 inches and light olive brown in the lower 4 inches. The substratum is firm, olive silty clay loam or silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elmridge and Shaker soils in lower areas or depressions and areas of Melrose soils that have slopes of 8 to 25 percent. Included soils make up about 25 percent of the unit.

The permeability of this Melrose soil is moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from strongly acid to medium acid in the subsoil and from strongly acid to neutral in the substratum.

Most areas of this soil are in woodland. Some of the acreage is farmed, and some is used for homesites.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas, and the hazard of erosion is moderate. Where this soil is farmed, conservation tillage and using cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is suitable for trees and for openland and woodland wildlife habitat. The slow permeability of the substratum limits development of playgrounds and camp areas.

The substratum of this soil is susceptible to shrinking and swelling, which is a limitation of the soil as a site for dwellings and small commercial buildings. Use of the soil for septic tank absorption fields is limited by the slow or very slow permeability in the substratum. The clayey texture of the substratum limits shallow excavations.

This unit is in capability subclass IIe.

MmA—Merrimac fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and somewhat excessively drained. It is in large, broad areas and in small areas adjacent to streams. The areas are irregular in shape and range from 5 to 100 acres. Slopes are smooth and are 50 to 2,000 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 10 inches thick. The subsoil is dark yellowish brown and is about 12 inches thick. It is gravelly fine sandy loam in the upper 5 inches and gravelly sandy loam in the lower 7 inches. The substratum is yellowish brown gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Hinckley, Sudbury, and Walpole soils. Also included are soils that have a surface layer and subsoil of silt loam and soils that have less sand in the subsoil than this Merrimac soil. Included soils make up about 15 percent of the unit.

The permeability of this Merrimac soil is moderately rapid to rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction is extremely acid to medium acid.

Some areas of this soil are in woodland. Some others are farmed or used for homesites.

This soil is well suited to farming. Droughtiness is the main limitation. Good tilth is easily maintained in cultivated areas, and the erosion hazard is slight. Where this soil is farmed, conservation tillage and using cover crops and grasses and legumes in the cropping system help to improve tilth and increase the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing are practices that maintain desirable pasture plant species.

This soil is suited to trees and to woodland and openland wildlife habitat. The soil is suited to most types of recreational development, but small stones on the surface are a limitation for playground development.

This soil has essentially no limitations as a site for dwellings or small commercial buildings. The rapid permeability of the substratum provides a poor filter for

septic tank absorption fields; effluent passing through the substratum causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides cmmonly collapse.

This unit is in capability subclass IIs.

MmB—Merrimac fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and somewhat excessively drained. It is in broad, irregularly shaped areas. The areas range from 5 to 75 acres. Slopes are smooth and convex or undulating and are 50 to 1,000 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 10 inches thick. The subsoil is dark yellowish brown and is about 12 inches thick. It is gravelly fine sandy loam in the upper 5 inches and gravelly sandy loam in the lower 7 inches. The substratum is yellowish brown gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Hinckley, Sudbury, and Walpole soils. Also included are soils that have a surface layer and subsoil of silt loam and soils that have less sand in the subsoil than this Merrimac soil. Included soils make up about 15 percent of the unit.

The permeability of this Merrimac soil is moderately rapid to rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction is extremely acid to medium acid.

Some areas of this soil are farmed. Some others are in woodland or are used for homesites.

This soil is well suited to farming. Droughtiness is the main limitation. Good tilth is easily maintained in cultivated areas, and the erosion hazard is moderate. Where this soil is farmed, conservation tillage and using cover crops and grasses and legumes in the cropping system help to control erosion, improve tilth, and increase the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

This soil is suitable for trees, for openland and woodland wildlife habitat, and for most types of recreational development. Slope and small stones on the surface are limitations for playground development.

The soil is suitable as a site for dwellings, but slope is a limitation for small commercial buildings. The rapid permeability in the substratum provides a poor filter for septic tank absorption fields; effluent passing through the substratum causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIs.

MmC—Merrimac fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and somewhat excessively drained. It is in broad areas with a rolling topography, on the tops of small conical hills, or on the tops of ridges. The areas are irregular in shape and range from 5 to 40 acres. Slopes are smooth and convex or rolling and are 50 to 800 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is dark yellowish brown and is about 12 inches thick. It is gravelly fine sandy loam in the upper 5 inches and gravelly sandy loam in the lower 7 inches. The substratum is yellowish brown gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Hinckley and Walpole soils. Also included are a few areas of soils that have a surface layer and subsoil of silt loam and soils with less sand in the subsoil than this Merrimac soil. Included soils make up about 15 percent of the unit.

The permeability of this Merrimac soil is moderately rapid to rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction is extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are farmed, and some areas are used for homesites.

This soil is suited to farming. A moderately severe hazard of erosion and droughtiness are the main limitations. Good tilth is easily maintained in cultivated areas. Where this soil is farmed, conservation tillage and the use of cover crops and grasses and legumes in the cropping system help to control erosion, improve tilth, and increase the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

The soil is suitable for trees and for openland and woodland wildlife habitat. Slope is a limitation for most types of recreational development.

Slope limits the soil as a site for dwellings and small commercial buildings. The rapid permeability of the substratum provides a poor filter for septic tank absorption fields and causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and steeper sides commonly collapse.

This unit is in capability subclass IIIe.

MmD—Merrimac fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and somewhat excessively drained. It is on the sides of conical hills, on the sides of ridges, and adjacent to drainageways. The areas are long and narrow or irregular in shape and range from 5 to 40 acres. Slopes are smooth and convex and are 50 to 600 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is dark yellowish brown and is about 19 inches thick. It is gravelly fine sandy loam in the upper 12 inches and gravelly sandy loam in the lower 7 inches. The substratum is yellowish brown gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Hinckley soils and soils that have a surface layer and subsoil of silt loam. Included soils make up about 15 percent of the unit.

The permeability of this Merrimac soil is moderately rapid to rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction is extremely acid to medium acid.

Most areas of this soil are in woodland. Some areas are used for homesites.

This soil is suited to farming. A severe erosion hazard and droughtiness are the main limitations. Good tilth is easily maintained in cultivated areas. Where this soil is farmed, conservation tillage, contour cultivation, and the use of cover crops and grasses and legumes in the cropping system help to control erosion, improve tilth, and increase the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

The soil is suitable for trees, but slope is a limitation for equipment use. The soil is suited to openland and woodland wildlife habitat. Slope limits most types of recreational development.

Slope also limits the soil as a site for dwellings and small commercial buildings. The rapid permeability of the substratum provides a poor filter for septic tank absorption fields and causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IVe.

MnB—Merrimac-Urban land complex, gently sloping. This unit is on broad upland areas. It consists of deep, somewhat excessively drained Merrimac soils and areas covered by streets, parking lots, buildings, and other structures (fig. 10). Slopes range from 3 to 15 percent. They are gently sloping or moderately sloping; smooth, undulating, or rolling; and 100 to 2,000 feet long. The areas of this unit are irregular in shape and range from about 10 to 1,000 acres. They consist of about 45 percent Merrimac soils, 35 percent urbanized areas, and 20 percent included soils. The soils and urbanized areas are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Merrimac soils is very dark grayish brown fine sandy loam about 10 inches thick. The subsoil is dark yellowish brown and is about 12 inches thick. It is gravelly fine sandy loam in the upper 5 inches and gravelly sandy loam in the lower 7 inches. The substratum is yellowish brown gravelly sand and very gravelly sand to a depth of 60 inches or more.

Included in this complex in mapping are small areas of Deerfield, Hinckley, Ninigret, Pipestone, Scarboro, Sudbury, Walpole, Wareham, and Windsor soils.

The permeability of the areas of Merrimac soils is moderately rapid to rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction is extremely acid to medium acid.

The Merrimac soils, or open part of this unit, are used for lawns, gardens, and parks and are suited to such uses. Slope limits use of the soils as a site for small commercial buildings or playgrounds or for dwellings and septic tank absorption fields in areas with slopes of more than 8 percent. Small stones on the surface limit the soil for playground development. The rapid permeability in the substratum provides a poor filter for septic tank absorption fields; effluent flowing through the soil causes a hazard of ground-water contamination. The sidewalls of excavations in the soil are unstable, and the steeper sides commonly collapse.

This unit is not assigned to a capability subclass.

MoB—Montauk fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on the top and upper parts of hills and ridges. The areas range from 3 to 100 acres and are irregularly shaped or rectangular. Slopes are smooth and slightly convex and are 50 to 400 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam about 17 inches thick. It is brown in the upper 5 inches and dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and firm, olive gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scituate and Ridgebury soils in low areas or depressions and small areas of Montauk soils with slopes of 0 to 3 percent. Included areas make up about 15 percent of this unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. Available water capacity is moderate. Reaction in unlimed areas ranges from extremely acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas, and the erosion is moderate. Where this soil is farmed, stripcropping, conservation tillage, and using cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is well suited to trees and to openland and woodland wildlife habitat. Slope and small stones on the surface are limitations for playground development.

Figure 10.—An area of Merrimac-Urban land complex, gently sloping.

Wetness caused by the seasonal high water table limits the use of this soil as a site for dwellings, small commercial buildings, and shallow excavations. Slope is an additional limitation for small commercial buildings. The slow or moderately slow permeability in the substratum limits the use of this soil for septic tank absorption fields. The firmness of the substratum is a further limitation for shallow excavations.

This unit is in capability subclass IIe.

MoC—Montauk fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is on the sides of hills and ridges. The areas range from 3 to 40 acres and are irregularly shaped or rectangular. Slopes are smooth and slightly convex and are 50 to 500 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam about 17 inches thick. It is brown in the upper 5 inches and dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and very firm, olive gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are Scituate and Ridgebury soils in low areas or depressions. Included areas make up about 15 percent of this unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. Available water capacity is moderate. Reaction in unlimed areas ranges from extremely acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas, and the erosion is moderate. Where this soil is farmed, stripcropping, conservation tillage, and using cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is well suited to trees and to openland and woodland wildlife habitat. Slope is a limitation for most types of recreational development.

Slope and wetness caused by the seasonal high water table limit this soil as a site for dwellings or small commercial buildings. The slow or moderately slow permeability in the substratum limits the use of this soil for septic tank absorption fields. Wetness, slope, and the firmness of the substratum are limitations for shallow excavations.

This unit is in capability subclass IIIe.

MsB—Montauk very stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on the top and upper sides of hills and ridges. The areas are oval or irregular in shape and range from 20 to 80 acres. Slopes are smooth and slightly convex and are 50 to 500 feet long. The surface of the soil has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is black fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 21 inches thick. It is brown in the upper 9 inches and dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and very firm, olive gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are Scituate and Ridgebury soils in lower areas and depressions. Included soils make up about 15 percent of this unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. Available water capacity is moderate. Reaction in unlimed areas ranges from extremely acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. A few areas are used for pasture or homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

The soil is well suited to trees and to woodland wildlife habitat. The stones on the surface limit most types of recreational development.

Wetness caused by the seasonal high water table limits the use of this soil as a site for dwellings, small commercial buildings, and shallow excavations. Slope is an additional limitation for small commercial buildings. The slow or moderately slow permeability in the substratum limits the use of this soil for septic tank absorption fields. The firmness of the substratum is a limitation for shallow excavations.

This unit is in capability subclass VIs.

MsC—Montauk very stony fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is on the sides of hills and ridges. The areas are irregularly shaped and range from 10 to 60 acres. Slopes are smooth and convex and are 100 to 600 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is black fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 21 inches thick. It is brown in the upper 9 inches an dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and very firm, olive gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are Scituate and Ridgebury soils in lower areas and depressions. Included areas make up about 15 percent of this unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. Available water capacity is moderate. Reaction in unlimed areas ranges from extremely acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some areas are used for homesites, and a few are used for pasture.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

This soil is well suited to trees and to woodland wildlife habitat. Slope and the stones and boulders on the surface are limitations for most types of recreational development.

Slope and wetness caused by the seasonal high water table limit this soil as a site for dwellings or small commercial buildings. The slow or moderately slow permeability in the substratum limits the use of this soil for septic tank absorption fields. Wetness, slope, and the firmness of the substratum are limitations for shallow excavations.

This unit is in capability subclass VIs.

MsD—Montauk very stony fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is in irregularly shaped areas on the sides of hills and ridges. The areas range from 10 to 50 acres. Slopes are smooth and convex and are 50 to 300 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is black fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 20 inches thick. It is brown in the upper 8 inches and dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and very firm, olive gravelly loamy sand to a depth of 60 inches or more.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. Available water capacity is moderate. Reaction in unlimed areas ranges from extremely acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some areas are used for homesites, and a few are used for pasture.

The stones and boulders on the surface and the slope make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

The soil is well suited to trees, but slope limits the use of woodland equipment. The soil is well suited to woodland wildlife habitat. Slope and the stones and boulders on the surface limit its use for recreational development.

Slope is the main limitation of the soil as a site for dwellings, small commercial buildings, or shallow excavations. Slope and the slow or moderately slow permeability in the substratum limit use of the soil for septic tank absorption fields. The seasonal high water table and the firmness of the substratum are limitations for shallow excavations.

This unit is in capability subclass VIs.

MxC—Montauk extremely stony fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is in irregularly shaped areas on the sides of hills and ridges. The areas range from 10 to 50 acres. Slopes are smooth and convex and are 100 to 400 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 10 to 30 feet apart.

Typically, the surface layer is black fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 21 inches thick. It is brown in the upper 9 inches and dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and very firm, olive gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are Ridgebury and Scituate soils in low areas and depressions and Hollis soils and rock outcrop mostly on south-facing slopes. Included areas make up about 15 percent of the unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. Available water capacity is moderate. Reaction in unlimed areas ranges from extremely acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming or to most types of recreational development. The soil is well suited to trees and is suited to woodland wildlife habitat. The stones and boulders on the surface and the slope, however, limit the use of equipment in woodland.

Slope and wetness caused by the seasonal high water table limit this soil as a site for dwellings or small commercial buildings. The slow or moderately slow permeability in the substratum limits the use of this soil for septic tank absorption fields. Wetness, slope, and the firmness of the substratum are limitations for shallow excavations.

The unit is in capability subclass VIIs.

MxD—Montauk extremely stony fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is in irregularly shaped areas on the sides of hills and ridges. The areas range from 10 to 50 acres. Slopes are smooth and convex and are 50 to 400 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 10 to 30 feet apart.

Typically, the surface layer is black fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 20 inches thick. It is brown in the upper 8 inches and dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and very firm, olive gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are Scituate soils in lower areas and Hollis soils and rock outcrop mostly on south-facing slopes. Included areas make up about 15 percent of the unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. Available water capacity is moderate. Reaction in unlimed areas ranges from extremely acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming or to most types of recreational development. The soil is well suited to trees and is suited to woodland wildlife habitat. The stones and

boulders on the surface and the slope, however, limit the use of equipment in woodland.

Slope is the main limitation of the soil as a site for dwellings, small commercial buildings, or shallow excavations. Slope and the slow or moderately slow permeability in the substratum limit use of the soil for septic tank absorption fields.

This unit is in capability subclass VIIs.

NnA—Ninigret fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and moderately well drained. It is in broad, irregularly shaped areas near streams. The areas range from 5 to 25 acres. Slopes are smooth or gently undulating and are 100 to 500 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is fine sandy loam 24 inches thick. It is dark yellowish brown and yellowish brown in the upper 13 inches and is mottled and yellowish brown and light brownish gray in the lower 11 inches. The substratum extends to a depth of 60 inches or more and is mottled throughout. It is light brownish gray loamy fine sand to a depth of 40 inches and light olive brown fine sand from 40 inches to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Scarboro and Walpole soils in depressions and Windsor soils on knolls. Included areas make up about 15 percent of this unit.

The permeability of this Ninigret soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction is very strongly acid to medium acid. A seasonal high water table is in the lower part of the subsoil during winter and spring.

Most areas of this soil are in woodland. Some of the acreage is farmed, and some is used for homesites.

This soil is well suited to farming. Good tilth is easily maintained, and the hazard of erosion is slight. The seasonal high water table commonly keeps the soil wet in early spring and delays farming operations. Drainage is needed in areas used for crops but is generally not needed for hay and pasture. Where this soil is farmed, the use of cover crops and grasses in the cropping system and mixing crop residue and manure into the surface layer help to improve tilth and increase the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is well suited to trees and to openland and woodland wildlife habitat. Wetness caused by the seasonal high water table limits the soil for most types of recreational development.

Wetness is a limitation of this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, or shallow excavations. The substratum of this soil is a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of shallow excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIw.

NnB—Ninigret fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is in broad, irregularly shaped areas near streams. The areas range from 5 to 20 acres. Slopes are smooth or gently undulating and are 100 to 300 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is fine sandy loam 24 inches thick. It is dark yellowish brown and yellowish brown in the upper 13 inches and is mottled and yellowish brown and light brownish gray in the lower 11 inches. The substratum extends to a depth of 60 inches or more and is mottled throughout. It is light brownish gray loamy fine sand to a depth of 40 inches and light olive brown fine sand from 40 inches to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Walpole soils in depressions and Windsor soils on low knolls. Included areas make up about 15 percent of this unit.

The permeability of this Ninigret soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction is very strongly acid to medium acid. A seasonal high water table is in the lower part of the subsoil during winter and spring.

Most areas of this soil are in woodland. Some of the acreage is farmed, and some is used for homesites.

This soil is well suited to farming. Good tilth is easily maintained, and the hazard of erosion is moderate. The seasonal high water table commonly keeps the soil wet in early spring and delays farming operations. Drainage is needed in areas used for crops but is generally not needed for hay and pasture. Where this soil is farmed, conservation tillage and using cover crops and grasses and legumes in the cropping system help to reduce runoff and erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

The soil is well suited to trees and to openland and woodland wildlife habitat. Wetness caused by the seasonal high water table limits the soil for most types of recreational development, and slope is a limitation for playground development.

Wetness is a limitation for this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. Slope also limits the soil as a site for small commercial buildings. The substratum of this soil is a poor filter for septic tank

absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of shallow excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIw.

PaB—Paxton fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is mainly on the top and upper side slopes of hills. The soil is in rectangular areas that range from 5 to 20 acres and oval or irregularly shaped areas that range from 10 to 40 acres. Slopes are smooth and slightly convex and are 100 to 800 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 9 inches thick. The subsoil is fine sandy loam 14 inches thick. The upper 7 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are Woodbridge and Ridgebury soils in lower areas and in depressions. These areas make up about 10 percent of this unit. Also included are a few small areas of soils with a subsoil of very fine sandy loam and a few areas that have a friable substratum. These areas make up about 15 percent of the unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. In unlimed areas this soil is very strongly acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Some of the acreage of this soil is farmed, some is in woodland, and some is used for homesites.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas, and the hazard of erosion is moderate. Where this soil is farmed, stripcropping, conservation tillage, and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is well suited to trees and to openland and woodland wildlife habitat. The slow permeability in the substratum limits the soil for most types of recreational development, and slope and small stones on the surface limit playground development.

A moderate susceptibility to frost action and wetness caused by the seasonal high water table limit this soil as a site for dwellings or small commercial buildings. Slope is a further limitation for small commercial buildings. The slow or very slow permeability of the substratum limits the use of the soil for septic tank absorption fields. The seasonal high water table and firmness of the substratum limit shallow excavations.

This unit is in capability subclass IIe.

PaC—Paxton fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is mainly on the upper sides of hills. The soil is in rectangular areas that range from 5 to 15 acres and is in oval and irregularly shaped areas that range from 10 to 30 acres. Slopes are smooth and slightly convex and are 50 to 1,400 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam 14 inches thick. The upper 7 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are Woodbridge and Ridgebury soils in lower areas and depressions. These areas make up about 10 percent of this map unit. Also included are areas of soils with a subsoil of very fine sandy loam and a few areas that have a friable substratum. These areas make up about 10 percent of the unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. In unlimed areas this soil is very strongly acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some of the acreage is farmed, and some is used for homesites.

This soil is suited to farming and to orchards. Good tilth is easily maintained in cultivated areas, and the hazard of erosion is moderately severe. Where this soil is farmed, stripcropping, terracing, conservation tillage, and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is well suited to trees and to openland and woodland wildlife habitat. Slope and the slow permeability in the lower part of the subsoil limit most types of recreational development.

Slope limits this soil as a site for dwellings, small commercial buildings, or shallow excavations. The slow or very slow permeability in the substratum limits the soil as a site for septic tank absorption fields.

This unit is in capability subclass IIIe.

PaD—Paxton fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is mainly on the upper sides of hills. The soil is in rectangular or irregularly shaped areas that range from 10 to 80 acres. Slopes are smooth and slightly convex and are 100 to 1,000 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 7 inches thick. The subsoil is fine sandy loam about 13 inches thick. The upper 6 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge soils in lower areas and soils with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. In unlimed areas this soil is very strongly acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some of the acreage is farmed, and some is used for homesites.

This soil is suited to farming and to orchards. Good tilth is easily maintained in cultivated areas, but the hazard of erosion is severe. Where this soil is farmed, stripcropping, terracing, conservation tillage, and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content of the soil. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is well suited to trees and to woodland wildlife habitat. Slope limits use of equipment in woodland and is the main limitation of the soil as a site for dwellings, small commercial buildings, or shallow excavations. The slow or very slow permeability in the substratum limits the soil as a site for septic tank absorption fields.

This unit is in capability subclass IVe.

PbB—Paxton very stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is mainly on the top and upper sides of hills. The areas are oval or irregular in shape and range from 5 to 80 acres. Slopes are smooth and slightly convex and are 100 to 1,300 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is very dark brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam 14 inches thick. The upper 7 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are Woodbridge and Ridgebury soils in lower areas and depressions. These included areas make up about 10 percent of this unit. Also included are a few small areas of soils with a subsoil of very fine sandy loam and areas with a friable substratum. These areas make up about 15 percent of the unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. In unlimed areas this soil is very strongly acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland, and a few are used for pasture or homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is well suited to trees and to woodland wildlife habitat. The stones and boulders on the surface limit its use for most types of recreational development. Wetness caused by the seasonal high water table and a moderate susceptibility to frost action limit this soil as a site for dwellings or small commercial buildings. Slope is also a limitation for small commercial buildings. The slow or very slow permeability in the substratum limits the use of the soil for septic tank absorption fields. Wetness and the firmness of the substratum limit shallow excavations.

This unit is in capability subclass VIs.

PbC—Paxton very stony fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is in irregularly shaped areas mainly on the sides of hills. The areas range from 5 to 80 acres. Slopes are smooth and convex and are 100 to 1,000 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is very dark brown fine sandy loam about 7 inches thick. The subsoil is fine sandy loam about 14 inches thick. The upper 7 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are Woodbridge and Ridgebury soils in lower areas and depressions. These areas make up about 10 percent of this unit. Also included are areas of soils with a subsoil of very fine sandy loam and areas with a friable substratum. These areas make up about 15 percent of the unit.

The permeabiity of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. In unlimed areas this soil is very strongly acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. Some areas are used for homesites, and a few are used for pasture.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is well suited to trees and to woodland wildlife habitat. Slope and the stones and boulders on the surface are limitations for most types of recreational development. Slope and wetness caused by the seasonal high water table are limitations of the soil as a site for dwellings or small commercial buildings. The slow or very slow permeability of the substratum limits use of the soil for septic tank absorption fields. The firmness of the substratum and wetness are limitations for shallow excavations.

This unit is in capability subclass VIs.

PbD—Paxton very stony fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is in irregularly shaped areas mainly on the sides of hills. The areas range from 5 to 90 acres. Slopes are smooth and convex and are 100 to 800 feet long. Stones and boulders are 30 to 100 feet apart on the surface.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is fine sandy loam about 18 inches thick. The upper 11 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are Woodbridge soils in lower areas that make up about 5 percent of the unit. Also included are areas of soils with a subsoil of very fine sandy loam, areas with a friable substratum, and areas of Paxton soils with stones on the surface less than 30 feet apart. These included areas make up about 15 percent of the unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. In unlimed areas this soil is very strongly acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. A few areas are used for homesites or pasture.

Slope and the stones and boulders on the surface make this soil poorly suited to cultivated crops. In pastured areas the use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable plant species.

The soil is well suited to trees and to woodland wildlife habitat. Slope limits use of equipment in woodland. Slope and the stones and boulders on the surface are limitations for playground development.

Slope is the main limitation of this soil as a site for dwellings, small commercial buildings, or shallow excavations. Slope and the slow or very slow permeability in the substratum limit the soil for septic tank absorption fields.

This unit is in capability subclass VIs.

PcE—Paxton and Montauk extremely stony fine sandy loams, 25 to 45 percent slopes. This unit is mainly on the sides of hills and ridges. It consists of deep, steep and very steep, well drained soils in irregularly shaped areas. Slopes are smooth and convex and are 50 to 1,500 feet long. Stones and boulders 1 to 3 feet in diameter are 10 to 100 feet apart on the surface. The areas of the unit range from 5 to 60 acres. Some consist almost entirely of Paxton soils, some almost entirely of Montauk soils, and some of both. The soils are mapped together because there are no major differences in their use and management. The total acreage of the unit is about 65 percent Paxton soils, 20 percent Montauk soils, and 15 percent other soils.

Typically, the Paxton soils have a surface layer of very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is fine sandy loam 18 inches thick. The upper 11 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

The Montauk soils typically have a surface layer of black fine sandy loam about 2 inches thick. The subsoil is fine sandy loam about 20 inches thick. It is brown in the upper 8 inches and dark yellowish brown in the lower 12 inches. The substratum is firm, olive brown loamy sand in the upper 9 inches and very firm, olive gravelly loamy sand to a depth of 60 inches or more.

Included with this unit in mapping are small areas of Hollis soils, rock outcrop, and soils with a friable substratum.

The permeability in the subsoil of these Paxton and Montauk soils is moderate or moderately rapid in the subsoil. The permeability of the substratum is slow or moderately slow in the Montauk soils and slow or very slow in the Paxton soils. Available water capacity is moderate. Reaction is very strongly acid to slightly acid in the Paxton soils and extremely acid to medium acid in the Montauk soils. A seasonal high water table is perched on the substratum of each soil for brief periods in winter and early spring.

Slope and the stones and boulders on the surface make these soils poorly suited to farming and are major limitations for most types of recreational development.

Most areas of this unit are wooded. The soils are well suited to trees and are suited to woodland wildlife habitat. The stones and boulders on the surface and the slope, however, limit the use of woodland equipment.

Slope limits these soils as a site for dwellings, small commercial buildings, or shallow excavations. Slope and permeability of the substratum are limitations of the soils for septic tank absorption fields.

This unit is in capability subclass VIIs.

PdC—Paxton-Urban land complex, sloping. This unit is on uplands. It consists of deep, well drained Paxton soils and areas covered by streets, parking lots,

buildings, and other structures. Slopes range from 3 to 15 percent. They are gently sloping or moderately sloping; smooth, undulating, or rolling; and 100 to 1,600 feet long. The areas of this unit are irregular in shape and range from 10 to 500 acres. They are about 45 percent Paxton soils, 35 percent urbanized areas, and 20 percent included soils. The Paxton soils and urbanized areas are so mixed that it was not practical to map them separately.

Typically, the Paxton soils have a surface layer of very dark brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam about 14 inches thick. The upper 7 inches is dark yellowish brown, and the lower 7 inches is olive brown. The substratum is very firm and brittle, olive brown fine sandy loam to a depth of 60 inches or more.

Included in this unit in mapping are small areas of Hollis, Ridgebury, Swansea, Whitman, and Woodbridge soils.

The permeability of these Paxton soils is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to slightly acid. A seasonal high water table is perched on the substratum for brief periods during winter and early spring.

The Paxton soils, or open part of this unit, are used for lawns, gardens, and parks and are suited to such uses.

A moderate susceptibility to frost action and wetness caused by the seasonal high water table limit the Paxton soils as a site for dwellings or small commercial buildings. Slope is an added limitation for small commercial buildings in areas where it is more than 8 percent. The slow or very slow permeability of the substratum limits the use of the Paxton soils for septic tank absorption fields or for most types of recreational development. The firmness of the substratum and wetness limit shallow excavations. Slope and small stones on the surface limit playground development.

This unit is not assigned to a capability subclass.

Pe—Pipestone loamy fine sand. This soil is deep, nearly level, and somewhat poorly drained. It is in broad, irregularly shaped areas near streams. The areas range from 5 to 25 acres. Slopes are smooth or gently undulating and are 100 to 600 feet long.

Typically, the surface layer is black loamy fine sand about 9 inches thick. The subsurface layer is gray loamy sand about 5 inches thick. The subsoil is mottled loamy sand about 14 inches thick. It is firm and dark reddish brown in the upper 2 inches and very friable and dark yellowish brown in the lower 12 inches. The substratum is mottled, strong brown sand to a depth of 43 inches and loose, mottled, yellowish brown fine sand from 43 inches to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Deerfield, Wareham, and Scarboro soils. Also included are a few small areas of gently sloping Pipestone soils. Included areas make up about 15 percent of this unit.

The permeability of this Pipestone soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from very strongly acid to neutral. A seasonal high water table is at or near the surface in late fall, in winter, and in spring. The soil is droughty when the water table recedes during summer and early fall.

Most areas of this soil are in woodland. A few areas are used for pasture.

The water table makes this soil poorly suited to cultivated crops, but the soil is suited to moisture-tolerant hay and pasture plants. The erosion hazard is slight. The main management needs include installing drainage where suitable outlets can be located, increasing organic matter content, and improving tilth. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is well suited to trees but is poorly suited to most types of wildlife habitat. The wetness caused by the water table limits use of the soil for recreational development.

Wetness limits the soil as a site for dwellings, commercial buildings, septic tank absorption fields, or shallow excavations. The rapidly permeable substratum provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IVw.

Pg—Pits, sand and gravel. This unit consists of pits from which sand and gravel have been removed for construction purposes. The pits are 3 to 50 feet deep and range from about 2 to 100 acres. The sides typically are steep, and the floor is level to rolling, depending upon the nature of the underlying material and the presence of bedrock. Piles of stones and boulders commonly are on the pit floor. The excavations are commonly irregular in shape, depending on the nature of the deposits and ownership boundaries. Included in mapping in some pits are small pools of water or areas or rock outcrop.

These pits are generally devoid of vegetation, although some older ones have scattered bushes, grasses, and annuals. Most pits are droughty because of very low available water capacity. Some pits have been excavated to a depth below the seasonal high water table.

This unit is poorly suited to farming and woodland because of very low available water for plant use. The unit is also poorly suited to wildlife habitat, although some birds inhabit these areas. Pollution of ground water is a hazard in areas of this unit used for waste disposal.

Onsite investigation is necessary to determine the suitability of the unit for any use.

This unit is not assigned to a capability subclass.

PlB—Pollux fine sandy loam, 0 to 8 percent slopes. This soil is deep, nearly level and gently sloping, and well drained. It is on the sides and tops of low knolls. The areas are irregular in shape and range from 4 to 15 acres. Slopes are smooth or undulating and are 100 to 600 feet long.

Typically, the surface layer is dark brown fine sandy loam about 10 inches thick. The subsoil is fine sandy loam about 25 inches thick. It is dark yellowish brown in the upper 10 inches and yellowish brown in the lower 15 inches. The substratum is firm and mottled. It is olive silt loam in the upper 11 inches and light olive brown very fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas with slopes of more than 8 percent. Also included are areas where the subsoil extends below a depth of 40 inches. Included areas make up about 15 percent of this unit.

The permeability of this Pollux soil is moderately rapid in the surface layer and subsoil and moderately slow or slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to medium acid above a depth of 30 inches and from very strongly acid to neutral below 30 inches.

Most areas of this soil are used for homesites or are farmed. Some areas are in woodland.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas. The erosion hazard is moderate. Where the soil is farmed, conservation tillage, use of cover crops, and incorporating grasses and legumes into the cropping system are management practices that help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help maintain desirable pasture plant species.

The soil is suitable for trees and for openland and woodland wildlife habitat. The slow permeability of the substratum limits development of playgrounds, camp areas, and picnic areas.

The soil has few limitations as a site for shallow excavations and dwellings, but slope is a limitation for small commercial buildings. The slow permeability of the substratum limits use of the soil for septic tank absorption fields.

This unit is in capability subclass IIe.

PoB—Poquonock very stony loamy sand, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on the upper parts of hills and ridges. The areas are irregular in shape and range from 5 to 50 acres. Slopes are smooth, slightly convex, and 50 to 300 feet long. Stones and boulders 1 to 3 feet in diameter are on the surface 30 to 100 feet apart.

Typically, the surface layer is dark yellowish brown loamy sand about 7 inches thick. The subsoil is loamy fine sand about 17 inches thick. The upper 10 inches is dark yellowish brown, and the lower 7 inches is yellowish brown. The substratum is very firm and brittle, light olive brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Hollis and Woodbridge soils, rock outcrop, and Poquonock soils with no stones on the surface. Included areas make up about 15 percent of this unit.

The permeability of this Poquonock soil is rapid or very rapid in the subsoil and slow or very slow in the substratum. Available water capacity is low. Reaction in this soil ranges from very strongly acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is suited to trees and to woodland wildlife habitat. The stones and boulders on the surface limit the soil for most types of recreational development.

Wetness caused by the seasonal high water table limits the soil as a site for dwellings and small commercial buildings. Slope is also a limitation for small commercial buildings. The slow or very slow permeability in the substratum limits the soil for septic tank absorption fields. The firmness of the substratum and wetness limit shallow excavations.

This unit is in capability subclass VIs.

PoC—Poquonock very stony loamy sand, 8 to 15 percent slopes. This soil is deep, moderately sloping, and well drained. It is on the sides of hills and ridges. The areas are irregular in shape and range from 5 to 40 acres. Slopes are smooth, convex, and 50 to 800 feet long. Stones and boulders 1 to 3 feet in diameter are on the surface 30 to 100 feet apart.

Typically, the surface layer is dark yellowish brown loamy sand about 6 inches thick. The subsoil is loamy fine sand about 17 inches thick. The upper 10 inches is dark yellowish brown, and the lower 7 inches is yellowish brown. The substratum is very firm and brittle, light olive brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge and Hollis soils, rock outcrop, and Poquonock soils with no stones on the surface. Included areas make up about 15 percent of this unit.

The permeability of this Poquonock soil is rapid or very rapid in the subsoil and slow or very slow in the

substratum. Available water capacity is low. Reaction in this soil ranges from very strongly acid to medium acid. A seasonal high water table is perched above the substatum for brief periods in winter and early spring.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is suited to trees and to woodland wildlife habitat. The stones and boulders on the surface and slope limit this soil for most types of recreational development.

Slope and wetness caused by the seasonal high water table limit this soil as a site for dwellings, small commercial buildings, or shallow excavations. The permeability of the substratum limits the soil for septic tank absorption fields. The firmness of the substratum also limits shallow excavations.

This unit is in capability subclass VIs.

PoD—Poquonock very stony loamy sand, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on the sides of hills and ridges. The areas are irregular in shape and range from 5 to 100 acres. Slopes are smooth, convex, and 50 to 600 feet long. There are stones and boulders on the surface 1 to 3 feet in diameter and 30 to 100 feet apart.

Typically, the surface layer is dark yellowish brown loamy sand about 5 inches thick. The subsoil is loamy fine sand about 17 inches thick. The upper 10 inches is dark yellowish brown, and the lower 7 inches is yellowish brown. The substratum is very firm and brittle, light olive brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge and Hollis soils and rock outcrop. Included areas make up about 15 percent of this unit.

The permeability of this Poquonock soil is rapid or very rapid in the subsoil and slow or very slow in the substratum. Available water capacity is low. Reaction ranges from very strongly acid to medium acid. A seasonal high water table is perched above the substratum for brief periods in winter and early spring.

Most of the acreage of this soil is in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain desirable pasture plant species.

This soil is suited to trees and to woodland wildlife habitat. Slope limits the use of some types of woodland equipment. The stones and boulders on the surface and slope limit this soil for most types of recreational development.

Slope limits this soil as a site for dwellings, small commercial buildings, and shallow excavations. The permeability of the substratum and slope limit the soil for septic tank absorption fields. The firmness of the substratum also limits shallow excavations.

This unit is in capability subclass VIs.

Qu—Quarries. This unit consists of areas that have been excavated for granite or other rock material. The areas typically are on the sides and tops of ridges and consist of layers of exposed bedrock. The walls are mainly vertical, and the bottom is generally excavated in steps. Small pools of water are at the bottom of many quarries, and some quarries have small piles of broken stones at the bottom and along the edges.

The lack of soil material and difficulty of excavation prevent reclamation of these areas, and very few areas have been reclaimed. Very little vegetation is in or around the quarries. The areas are severely limited for most uses because of exposed bedrock, a high percentage of large and small stone fragments, and very low available water capacity.

This unit is not assigned to a capability subclass.

RdA—Ridgebury fine sandy loam, 0 to 6 percent slopes. This soil is deep, nearly level and gently sloping, and poorly drained. It is in depressions and along drainageways. The areas are irregular in shape or long and narrow and mainly range fom 3 to 10 acres. Slopes are smooth, slightly concave, and 50 to 300 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 9 inches thick. The subsoil is mottled and is about 11 inches thick. It is olive fine sandy loam in the upper 5 inches and olive gray gravelly sandy loam in the lower 6 inches. The substratum is firm, mottled, olive gray gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Whitman soils in lower areas and Scituate and Woodbridge on low knolls. These areas make up about 10 percent of the unit. Also included are areas of Ridgebury soils with a few stones on the surface, some with a friable substratum, and some with slopes of more than 6 percent. These areas make up about 15 percent of the unit.

The permeability of this Ridgebury soil is moderate to moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is low. Reaction mainly ranges from very strongly acid to medium acid, but the surface layer is slightly acid in some limed areas. A seasonal high water table is at or near the surface during late fall, in winter, and in spring.

Most areas of this soil are in woodland. A few areas are used for pasture.

This soil is suited to farming. Wetness caused by the seasonal high water table is the main limitation. Drainage

and the use of water-tolerant plants will help overcome the wetness.

This soil is suited to trees, but wetness limits the use of woodland equipment. The soil also is suited to woodland and wetland wildlife habitat, but wetness limits recreational development.

The seasonal high water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The slow or very slow permeability of the substratum is an added limitation for septic tank absorption fields.

This unit is in capability subclass IIIw.

RIA—Ridgebury extremely stony fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and poorly drained. It is in depressions and along drainageways. The areas are irregular in shape or long and narrow and mainly range from 5 to 25 acres. Slopes are smooth, slightly concave, and 50 to 400 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 5 to 100 feet apart.

Typically the surface layer is very dark brown fine sandy loam about 9 inches thick. The subsoil is mottled and is about 11 inches thick. It is olive fine sandy loam in the upper 5 inches and olive gray gravelly sandy loam in the lower 6 inches. The substratum is firm, mottled, olive gray gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Whitman soils in lower areas and Scituate and Woodbridge on low knolls. Also included are areas of Ridgebury soils with no stones on the surface or with a friable substratum. Included areas make up about 5 percent of this unit.

The permeability of this Ridgebury soil is moderate to moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is low. Reaction mainly ranges from very strongly acid to medium acid, but the surface layer is slightly acid in some limed areas. A seasonal high water table is at or near the surface during late fall, in winter, and in spring.

Most areas of this soil are in woodland. A few areas are used for pasture.

The stones and boulders on the surface make this soil poorly suited to farming. The soil is suited to trees, but the stones and boulders and the wetness caused by the seasonal high water table limit the use of woodland equipment. The soil is suited to woodland and wetland wildlife habitat, but wetness limits recreational development.

The seasonal high water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The slow or very slow permeability of the substratum is an added limitation for septic tank absorption fields.

This unit is in capability subclass VIIs.

RIB—Ridgebury extremely stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and poorly drained. It is in depressions and along drainageways. The areas are irregular in shape or long and narrow and mainly range from 5 to 40 acres. Slopes are smooth, slightly concave, and 50 to 600 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 5 to 100 feet apart.

Typically, the surface layer is very dark brown fine sandy loam about 9 inches thick. The subsoil is mottled and is about 11 inches thick. It is olive fine sandy loam in the upper 5 inches and olive gray gravelly sandy loam in the lower 6 inches. The substratum is firm, mottled, olive gray gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Whitman soils in lower areas and Scituate and Woodbridge on low knolls. Also included are areas of Ridgebury soils with no stones on the surface or with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Ridgebury soil is moderate to moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is low. Reaction mainly ranges from very strongly acid to medium acid, but the surface layer is slightly acid in some limed areas. A seasonal high water table is at or near the surface during late fall, in winter, and in spring.

Most areas of this soil are in woodland. A few areas are used for pasture.

The stones and boulders on the surface make this soil poorly suited to farming. The soil is suited to trees, but the stones and boulders and wetness caused by the seasonal high water table limit the use of woodland equipment. The soil is suited to woodland and wetland wildlife habitat, but wetness limits recreational development.

The seasonal high water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The slow or very slow permeability of the substratum is an added limitation for septic tank absorption fields.

This unit is in capability subclass VIIs.

Rx—Rock outcrop-Hollis complex. This unit is on ridges and hills. It consists of areas of exposed bedrock and somewhat excessively drained, shallow, nearly level to steep Hollis soils. The areas are irregularly shaped and range from 10 to 50 acres. Slopes are 40 to 500 feet long and range from 3 to 35 percent. The areas of exposed bedrock are mainly less than 50 feet apart, and stones are on the surface of some areas of the unit. The unit consists of about 65 percent exposed bedrock, 20 percent Hollis soils, and 15 percent other soils. The soils and exposed rock are so intermingled that it was not practical to map them separately.

Typically, the Hollis soils have a surface layer of dark brown fine sandy loam about 3 inches thick. The subsoil is dark yellowish brown fine sandy loam about 15 inches thick. Hard granite is at a depth of 18 inches.

Included with this complex in mapping are small areas of well drained soils that have bedrock between depths of 20 and 40 inches in some places and between depths of 2 and 8 inches in others.

The permeability of the Hollis soils in this unit is moderate or moderately rapid. Available water capacity is very low. Reaction ranges from very strongly acid to medium acid. The rooting zone extends to the bedrock.

Most areas of this unit are in woodland. The bedrock exposures and shallow depth to bedrock limit the unit for most uses other than for esthetic value and some types of recreation.

This unit is in capability subclass VIIIs.

Sb—Scarboro mucky loamy fine sand. This soil is deep, very poorly drained, and nearly level. It is in depressions and along streams. Slopes range from 0 to 3 percent. The areas are long and narrow or irregular in shape and range from 5 to 80 acres. Slopes are 50 to 800 feet long.

Typically, the surface is covered by a 3-inch-thick layer of black mucky peat. The surface layer is very dark brown mucky loamy fine sand about 8 inches thick. The subsurface layer is mottled, gray loamy sand about 5 inches thick. The substratum extends to a depth of 60 inches or more. It is grayish brown loamy sand to a depth of 19 inches and stratified grayish brown gravelly coarse sand, light yellowish brown coarse sand, grayish brown loamy sand, and gray fine sand from 19 inches to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Swansea, Walpole, and Wareham soils that make up about 15 percent of this unit.

The permeability of this Scarboro soil is rapid or very rapid. Available water capacity is moderate. Reaction is very strongly acid to medium acid. A high water table is at or near the surface during most of the year. Many areas have water ponded on the surface for short periods.

Most areas of this soil are in woodland. Some areas are in pasture.

Wetness caused by the seasonal high water table makes this soil poorly suited to farming. Drainage of the soil is difficult because of the lack of adequate outlets.

The soil is poorly suited to trees. It is suited to wetland wildlife habitat, but the water on the surface limits recreational development.

The water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, or shallow excavations. The rapid permeability provides a poor filter for septic tank absorption fields. Effluent flowing through the soil causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass Vw.

ScA—Scitico silt loam, 0 to 5 percent slopes. This soil is deep, nearly level and gently sloping, and poorly drained. It is in depressions, along drainageways, and on broad areas near tidal marshes. The areas are irregular in shape or long and narrow and mainly range from 5 to 60 acres. Slopes are smooth and concave and are 50 to 1,000 feet long.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is firm silty clay loam about 34 inches thick and is mottled throughout. The upper 8 inches is grayish brown, the middle 8 inches is gray, and the lower 18 inches is grayish brown. The substratum is firm, mottled, light olive brown silty clay loam to a depth of 57 inches and firm, olive silty clay from 57 inches to a depth of 70 inches or more.

Included with this soil in mapping are small areas of Boxford soils on low knolls and Maybid soils in low areas. Included areas make up about 15 percent of this unit.

The permeability of this Scitico soil is slow or very slow. Available water capacity is high. Reaction ranges from strongly acid to neutral in the upper part of the subsoil and from medium acid to neutral in the lower part of the subsoil and in the substratum. A seasonal high water table is at or near the surface in late fall, in winter, and in spring.

Most areas of this soil are covered with grass or are in woodland.

This soil is poorly suited to cultivated crops but is suited to hay and pasture. The seasonal high water table is the main limitation for farming, and drainage is difficult to establish because of the slow or very slow permeability and a lack of outlets. The use of proper stocking rates, deferred and rotational grazing, and restricted grazing when the soil is saturated are practices that help to maintain desirable pasture plant species.

Wetness makes the soil poorly suited to trees. The soil is suitable for most types of wildlife habitat, but wetness and slow permeability are limitations for recreational development.

The high water table limits the soil as a site for dwellings, small commercial buildings, shallow excavations, and septic tank absorption fields. The slow or very slow permeability is an added limitation for septic tank absorption fields.

This unit is in capability subclass IVw.

SgB—Scituate fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is mainly on the tops and lower slopes of hills. The areas are irregular in shape and range from 5

to 20 acres. Slopes are smooth or undulating, are slightly concave, and are 100 to 1,000 feet long.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is about 25 inches thick. It is yellowish brown fine sandy loam in the upper 12 inches; light olive brown fine sandy loam in the next 9 inches; and mottled, light olive brown gravelly fine sandy loam in the lower 4 inches. The substratum is very firm, mottled, light olive brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury and Whitman soils in depressions and areas of Scituate soils with slopes of more than 8 percent. These included areas make up about 10 percent of the unit. Another 20 percent of the unit consists of areas of Scituate soils with slopes of 0 to 3 percent and a few areas with a friable substratum.

The permeability of this Scituate soil is moderately rapid in the subsoil and slow in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas. The erosion hazard is moderate. Wetness caused by the seasonal high water table is the major management concern. The main management needs are installing drainage where needed, improving tilth, and increasing the organic matter in the surface layer. Mixing crop residues and manure into the surface layer helps to improve tilth and increase the organic matter content. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

This soil is suited to trees and to openland and woodland wildlife habitat. The wetness limits the soil for most types of recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, and septic tanks. Slope is also a limitation for small commercial buildings, and the slow permeability in the substratum further limits the use of the soil for septic tank absorption fields. Wetness and the firmness of the substratum limit shallow excavations.

This unit is in capability subclass IIw.

ShB—Scituate very stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is mainly on the tops and lower slopes of hills. The areas are irregular in shape and range from 5 to 80 acres. Slopes are smooth or undulating, are slightly concave, and are 100 to 1,000 feet long. The surface has stones and boulders 1 to 3 feet in diameter that are 30 to 100 feet apart.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is about 25 inches thick. It is yellowish brown fine sandy loam in the upper 12 inches; light olive brown fine sandy loam in the next 9 inches; and mottled, light olive brown gravelly fine sandy loam in the lower 4 inches. The substratum is very firm, mottled, light olive brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury and Whitman soils in depressions. These included areas make up about 10 percent of the unit. Another 15 percent of the unit consists of areas of Scituate soils with slopes of 0 to 3 percent and areas with a friable substratum.

The permeability of this Scituate soil is moderately rapid in the subsoil and slow in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred and rotational grazing, and pasture rotation help to maintain desirable pasture plant species.

This soil is suited to trees and to woodland wildlife habitat. Most areas are wooded. The stones and boulders on the surface, the slow permeability of the substratum and wetness caused by the water table limit the soil for most types of recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, and septic tanks. Slope is also a limitation for small commercial buildings, and the slow permeability in the substratum further limits the use of the soil for septic tank absorption fields. Wetness and the firmness of the substratum limit shallow excavations.

This unit is in capability subclass VIs.

ShC—Scituate very stony fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and moderately well drained. It is mainly on the sides of hills and ridges. The areas are irregular in shape and range from 10 to 40 acres. Slopes are smooth or rolling, are slightly concave, and are 100 to 500 feet long. Stones and boulders 1 to 3 feet in diameter are 30 to 100 feet apart on the surface.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is about 25 inches thick. It is yellowish brown fine sandy loam in the upper 12 inches; light olive brown fine sandy loam in the middle 9 inches; and mottled, light olive brown gravelly fine sandy loam in the lower 4 inches. The substratum is very firm, mottled, light olive brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury soils in depressions, Hollis and Montauk soils on knolls, and soils with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Scituate soil is moderately rapid in the subsoil and slow in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. A few areas are pastured, and a few are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates, deferred and rotational grazing, and pasture rotation help to maintain desirable pasture plant species.

The soil is suited to trees and to woodland wildlife habitat. Slope, the stones and boulders on the surface, the slow permeability of the substratum, and wetness caused by the water table limit recreational development.

Slope and the seasonal high water table limit this soil as a site for dwellings and small commercial buildings. The slow permeability in the substratum and the water table limit the use of the soil for septic tank absorption fields, and the water table and firmness of the substratum limit shallow excavations.

This unit is in capability subclass VIs.

SmB—Scituate extremely stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is mainly on the tops and sides of hills. The areas are irregular in shape and range from 5 to 30 acres. Slopes are smooth or undulating, are slightly concave, and are 50 to 600 feet long. Stones and boulders 1 to 3 feet in diameter are 10 to 30 feet apart on the surface.

Typically, the surface layer is dark brown fine sandy loam about 3 inches thick. The subsoil is about 30 inches thick. It is yellowish brown fine sandy loam in the upper 17 inches; light olive brown fine sandy loam in the middle 9 inches; and mottled, light olive brown gravelly fine sandy loam in the lower 4 inches. The substratum is very firm, mottled, light olive brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury and Whitman soils in depressions. Also included are areas of extremely stony Scituate soils with slopes of 0 to 3 percent and areas with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Scituate soil is moderately rapid in the subsoil and slow in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make the soil poorly suited to farming. The soil is suited to trees and to woodland wildlife habitat. The stones and boulders on the surface limit the use of woodland equipment. The stones and boulders, the slow permeability of the substratum, and the high water table limit the soil for most types of recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, and septic tanks. Slope is also a limitation for small commercial buildings, and the slow permeability in the substratum further limits the use of the soil for septic tank absorption fields. Wetness and the firmness of the substratum limit shallow excavations.

This unit is in capability subclass VIIs.

SoB—Scituate extremely bouldery fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is mainly on the tops and lower sides of hills and ridges. The areas are irregular in shape and range from 5 to 25 acres. Slopes are smooth or rolling, are slightly concave, and are 100 to 500 feet long. Stones and boulders 1 to 9 feet in diameter are 1 to 30 feet apart on the surface.

Typically, the surface layer is dark brown fine sandy loam about 3 inches thick. The subsoil is about 30 inches thick. It is yellowish brown fine sandy loam in the upper 17 inches; light olive brown fine sandy loam in the middle 9 inches; and mottled, light olive brown gravelly fine sandy loam in the lower 4 inches. The substratum is very firm, mottled, light olive brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury soils in depressions, Hollis and Annisquam soils on knolls, and of soils with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Scituate soil is moderately rapid in the subsoil and slow in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming. The soil is suited to trees and to woodland wildlife habitat. The stones and boulders limit the use of woodland equipment and, along with wetness, limit the soil for recreational development.

The seasonal high water table and the stones and boulders limit the soil as a site for dwellings, small commercial buildings, or shallow excavation. Slope also is a limitation for small commercial buildings, and wetness and the firmness of the substratum limit shallow excavations. The slow permeability of the substratum and the water table limit the use of the soil for septic tank absorption fields.

This unit is in capability subclass VIIs.

SoC—Scituate extremely bouldery fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and moderately well drained. It is mainly on the sides of hills and ridges. The areas are irregular in shape and range from 5 to 40 acres. Slopes are smooth or rolling, are slightly concave, and are 100 to 500 feet long. Stones and boulders 1 to 9 feet in diameter are 1 to 30 feet apart on the surface.

Typically, the surface layer is dark brown fine sandy loam about 3 inches thick. The subsoil is about 30 inches thick. It is yellowish brown fine sandy loam in the upper 17 inches; light olive brown fine sandy loam in the middle 9 inches; and mottled, light olive brown gravelly fine sandy loam in the lower 4 inches. The substratum is very firm, mottled, light olive brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury and Whitman soils in depressions. Also included are areas of extremely stony Scituate soils with slopes of 0 to 3 percent and areas with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Scituate soil is moderately rapid in the subsoil and slow in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to slightly acid. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to farming. The soil is suited to trees and to woodland wildlife habitat, but the stones and boulders limit the use of woodland equipment. Slope, the stones and boulders, and the seasonal high water table limit the soil for recreational development.

Slope, the water table, and the stones and boulders limit the soil as a site for dwellings and small commercial buildings. The slow permeability of the substratum and wetness limit the use of the soil for septic tank absorption fields. Wetness, the stones and boulders, and the firm substratum limit shallow excavations.

This unit is in capability subclass VIIs.

SpA—Shaker fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and poorly drained. It is in depressions. The areas range from 5 to 40 acres. Slopes are smooth and slightly concave or gently undulating and are 100 to 800 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 9 inches thick. The subsoil is mottled and is about 22 inches thick. It is dark brown fine sandy loam in the upper 10 inches and grayish brown sandy loam in the lower 12 inches. The substratum is very firm, mottled, gray silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elmridge soils on low knolls and Whately Variant soils in low areas. Included areas make up about 15 percent of this unit.

The permeability of this Shaker soil is moderately rapid in the subsoil and slow to very slow in the substratum. Available water capacity is high. Reaction ranges from strongly acid to medium acid in the subsoil and from medium acid to neutral in the substratum. A seasonal high water table is at or near the surface in late fall, in winter, and in spring.

Most areas of this soil are in woodland. Some areas are farmed, and a few are used for homesites.

This soil is suited to farming. The erosion hazard is slight. The seasonal high water table keeps the soil saturated through late spring and delays farming operations. The main management needs include drainage, proper timing of farming operations, and the use of water-tolerant plant species. The use of proper stocking rates, deferred and rotational grazing, and restricted grazing when the soil is saturated help to maintain desirable pasture plant species.

The soil is poorly suited to trees but is suited to most types of wildlife habitat. The seasonal high water table and the slow permeability of the substratum are limitations for recreational development.

The seasonal high water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The slow permeability of the substratum is an added limitation for septic tank absorption fields.

This unit is in capability subclass IIIw.

SpB—Shaker fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and poorly drained. It is in depressions. The areas range from 5 to 25 acres. Slopes are smooth and concave or undulating and are 100 to 400 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 8 inches thick. The subsoil is mottled and is about 22 inches thick. It is dark brown fine sandy loam in the upper 10 inches and grayish brown sandy loam in the lower 12 inches. The substratum is very firm, mottled, gray silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Elmridge soils on low knolls and Whately Variant soils in low areas. Included areas make up about 15 percent of this unit.

The permeability of this Shaker soil is moderately rapid in the subsoil and slow to very slow in the substratum. Available water capacity is high. Reaction ranges from strongly acid to medium acid in the subsoil and from medium acid to neutral in the substratum. A seasonal high water table is at or near the surface in late fall, in winter, and in spring.

Most areas of this soil are in woodland. Some areas are farmed, and a few areas are used for homesites.

This soil is suited to farming. The erosion hazard is moderate. The seasonal high water table keeps the soil

saturated through late spring and delays farming operations. The main management needs include drainage, proper timing of farming operations, use of water-tolerant plant species, and erosion-control practices. The use of proper stocking rates, deferred and rotational grazing, and restricted grazing when the soil is saturated help maintain desirable pasture plant species.

The soil is poorly suited to trees but is suited to most types of wildlife habitat. The seasonal high water table and the slow permeability of the substratum are limitations for recreational development.

The seasonal high water table limits the soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The slow permeability of the substratum is an added limitation for septic tank absorption fields.

This unit is in capability subclass IIIw.

SrA—Sudbury fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and moderately well drained. It is in broad areas. The areas are irregular in shape and range from 5 to 50 acres. Slopes are smooth or gently undulating and are 100 to 500 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 13 inches thick. The subsoil is about 13 inches thick. The upper 6 inches is yellowish brown sandy loam, and the lower 7 inches is mottled, yellowish brown gravelly coarse sand. The substratum is mottled, light olive brown very gravelly coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Merrimac soils on knolls, Walpole soils in depressions, and soils with a surface layer and subsoil of very fine sandy loam. Included areas make up about 15 percent of this unit.

The permeability of this Sudbury soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid. A seasonal high water table is in the lower part of the subsoil during winter and spring.

Most areas of this soil are in woodland. Some areas are used for homesites, and some are farmed.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas, and the erosion hazard is slight. The seasonal high water table commonly keeps the soil wet in early spring and delays farming operations. Drainage is needed in areas used for crops but is generally not needed for hay and pasture. Where this soil is farmed, the use of cover crops and grasses and legumes in the cropping system and mixing crop residue and manure into the surface layer help to improve tilth and increase organic matter content. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

The soil is suited to trees and to openland and woodland wildlife habitat. Wetness caused by the water table is a limitation for most types of recreational development.

The water table limits this soil as a site for dwellings, small commercial buildings, and septic tanks. The rapid permeability of the substratum causes a hazard of ground-water pollution in areas used for septic tanks. Shallow excavations are limited by wetness and unstable sidewalls that commonly collapse if they are too steep.

This unit is in capability subclass IIw.

SrB—Sudbury fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is in broad areas and in narrow areas along streams. The areas are irregular in shape and range from 5 to 40 acres. Slopes are smooth or undulating and are 100 to 800 feet long.

Typically, the surface layer is very dark grayish brown fine sandy loam about 10 inches thick. The subsoil is about 15 inches thick. The upper 8 inches is yellowish brown sandy loam, and the lower 7 inches is mottled, yellowish brown gravelly coarse sand. The substratum is mottled, light olive brown very gravelly coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Merrimac soils on knolls and Walpole soils in depressions. Included areas make up about 15 percent of this unit.

The permeability of this Sudbury soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to medium acid. A seasonal high water table is in the lower part of the subsoil during winter and spring.

Most areas of this soil are in woodland. Some areas are used for homesites, and some are farmed.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas. The erosion hazard is moderate, and wetness caused by the seasonal high water table is a main limitation. The main management needs include installing drainage where needed, controlling erosion, improving tilth, and increasing organic matter content. Where this soil is farmed, conservation tillage and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

The soil is suited to trees and to woodland and openland wildlife habitat. Wetness is a limitation for most types of recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, and septic tanks. Slope also limits small commercial buildings, and the rapid

permeability of the substratum causes a hazard of ground-water pollution in areas used for septic tank absorption fields. Shallow excavations are limited by wetness and unstable sidewalls that commonly collapse if they are too steep.

This unit is in capability subclass IIw.

Ss—Swansea mucky peat. This soil is deep, nearly level, and very poorly drained. It is in depressions and along streams. The areas are irregular in shape and range from 5 to 200 acres. Slopes are less than 1 percent and are 50 to 800 feet long.

Typically, the surface layer is black mucky peat about 3 inches thick. It consists of live plant roots and decaying plant remains. Below the surface layer is a layer about 19 inches thick of black, decomposed organic material. The lower layer is dark gray and extends to a depth of 60 inches or more. The upper part is gravelly coarse sand, the middle part is loamy fine sand, and the lower part is sand.

Included with this soil in mapping are a few small areas of Freetown soils and a few areas with less than 18 inches of organic material on the surface. Included areas make up about 15 percent of this unit.

The permeability of this Swansea soil is moderate or moderately rapid in the organic material and very rapid in the lower layer. Available water capacity is very high. Reaction is extremely acid in the organic material and extremely acid to strongly acid in the lower layer. A high water table is at or near the surface during most of the year. Water is ponded on the surface of some areas of the soil for 2 to 4 months in winter and spring.

Most areas of this soil are in woodland. A few areas are in moisture-tolerant grasses or shrubs.

Wetness caused by the seasonal high water table makes this soil poorly suited to farming. Drainage of the soil is difficult because of the lack of adequate outlets.

The soil is poorly suited to trees but is suited to wetland wildlife habitat. Wetness and the organic material on the surface limit its use for recreational development.

The water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. Low strength is an added limitation for small commercial buildings. The rapid permeability in the lower layer causes a hazard of ground-water pollution in areas used for septic tank absorption fields. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass Vw.

UAC—Udipsamments, rolling. These soils are deep, gently sloping to very steep, and excessively drained to moderately well drained. They are on sand dunes adjacent to coastal beaches and tidal marshes. The areas are irregular in shape and range from 10 to 950 acres. Slopes range from 3 to 50 percent. Slopes are irregular and complex and are 50 to 500 feet long.

These soils are too variable to have a typical profile, but commonly the surface layer is grayish brown fine sand about 5 inches thick. This is underlain by light brownish gray sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Ipswich and Westbrook soils and small areas of Scarboro soils. Also included are a few small areas in depressions that have a seasonal high water table at a depth of less than 2 feet, areas of Beaches, and a few areas of Udorthents, smoothed. Included areas make up about 15 percent of this unit.

The permeability in these Udipsamments is rapid to very rapid, and available water capacity is very low. Reaction ranges from strongly acid to slightly acid.

Most areas of this unit are in grasses and shrubs. Some areas are used for homesites.

Droughtiness, slope, and exposure to salt spray make these soils poorly suited to farming, woodland, and wildlife habitat. The sandy texture of the soils, slope, and the extreme susceptibility to wind erosion limit the soils for recreational development. Most of the vegetation on these soils is fragile and easily destroyed by foot and vehicular traffic.

Slope and the instability of the sidewalls of excavations limit the soils for residential development. The very rapid permeability provides a poor filter for septic tank absorption fields and causes a hazard of contamination of ground water.

This unit is in capability subclass VIIIs.

UD—Udorthents, smoothed. This unit consists of areas from which soil material has been excavated and areas where this material has been deposited. This unit is in long and narrow or irregularly shaped areas that range from 4 to 200 acres. The depth of excavation and the thickness of the fill material are 6 feet or more. Slopes range from 0 to 45 percent. Some areas of this unit have a central portion that is level or nearly level and that has moderately sloping to steep sides.

These soils are too variable to have a typical profile, but commonly the surface layer is very dark brown loam about 19 inches thick. Below this are layers of firm, dark grayish brown and olive gray loam and friable, dark grayish brown gravelly sandy loam. The thickness of each layer and the texture of the material are variable.

Included with this unit in mapping are small areas of Urban land. Also included are small areas used for disposal of nonsoil material. Included areas make up about 20 percent of this unit.

The permeability of these Udorthents ranges from slow to very rapid, and available water capacity ranges from high to very low. Gravel and cobblestones are abundant in some areas of this unit and stones and boulders in other areas.

Most areas of this unit are used for roads, highways, schools, and athletic fields. Most areas have structures on the level part and plants on the slopes.

The characteristics and properties of this unit are variable, and onsite investigation is needed to determine the limitations and suitabilities for any use.

This unit is not assigned to a capability subclass.

Ur—Urban land. This unit consists of nearly level to moderately steep areas where the soils have been altered or obscured by urban works and structures. Buildings, industrial areas, paved areas, and railroad yards cover more than 75 percent of the surface. The areas are irregular in shape and range mainly from 10 to 1,000 acres. Slopes are smooth, rolling, or irregular and are about 100 to 1,000 feet in length.

Included with this unit in mapping are many small areas of Udorthents, smoothed. Also included are small areas of Freetown, Hollis, Maybid, Scarboro, Swansea, Whately Variant, and Whitman soils and Rock outcrop. Included areas make up about 20 percent of the unit.

The properties and characteristics of this unit are so variable that onsite investigation is needed to determine the limitations and suitabilities for any use.

This unit is not assigned to a capability subclass.

WaA—Walpole fine sandy loam, 0 to 3 percent slopes. This soil is deep, nearly level, and poorly drained. It is in low areas and depressions near streams. The areas range from 5 to 90 acres. Slopes are smooth and concave and are 100 to 800 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 9 inches thick. The subsoil is mottled and is about 13 inches thick. The upper 4 inches is grayish brown fine sandy loam, and the lower 9 inches is light olive gray sandy loam. The substratum is mottled and extends to a depth of 60 inches or more. It is olive stratified sand, gravel, and gravelly sand.

Included with this soil in mapping are areas of Scarboro soils in low areas and Ninigret and Sudbury soils on low knolls. Also included are areas that have a substratum of silt loam. Included areas make up about 15 percent of this unit.

The permeability of this Walpole soil is moderately rapid in the subsoil and rapid to very rapid in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid. A seasonal high water table is at or near the surface in late fall, in winter, and in spring.

Most areas of this soil are in woodland. A few areas are farmed, and a few are used for homesites.

This soil is suited to farming. The seasonal high water table keeps this soil wet in spring and delays farming operations. The major management needs are installation of drainage where suitable outlets can be located, increasing organic matter content, and improving tilth. The use of proper stocking rates, deferred and rotational grazing, and restricted grazing when the soil is wet help to maintain desirable pasture plant species.

The soil is suited to trees and to openland and woodland wildlife habitat. Wetness caused by the water table limits the use of woodland equipment or the use of the soil for recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The rapidly permeable substratum provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIIw.

WaB—Walpole fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and poorly drained. It is in long and narrow and irregularly shaped areas near streams. The areas range from 5 to 40 acres. Slopes are 50 to 600 feet long.

Typically, the surface layer is very dark brown fine sandy loam about 8 inches thick. The subsoil is mottled and is about 13 inches thick. The upper 4 inches is grayish brown fine sandy loam, and the lower 9 inches is light olive gray sandy loam. The substratum is mottled and extends to a depth of 60 inches or more. It is olive stratified sand, gravel, and gravelly sand.

Included with this soil in mapping are areas of Scarboro soils in low areas and Ninigret and Sudbury soils on low knolls. Also included are some areas that have a substratum of silt loam. Included areas make up about 15 percent of this unit.

The permeability of this Walpole soil is moderately rapid in the subsoil and rapid to very rapid in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid. A seasonal high water table is at or near the surface in late fall, in winter, and in spring.

Most areas of this soil are in woodland. Some areas have been drained and are farmed. A few areas are used for homesites.

This soil is suited to farming. The seasonal high water table keeps this soil wet in spring and delays farming operations. The major management needs are installation of drainage where suitable outlets can be located, increasing organic matter content, and improving tilth. The use of proper stocking rates, deferred and rotational grazing, and restricted grazing when the soil is wet help to maintain desirable pasture plant species.

The soil is suited to trees and to wildlife habitat. Wetness caused by the water table restricts the use of woodland equipment and limits the soil for recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The rapidly permeable substratum provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIIw.

We—Wareham loamy sand. This soil is deep, nearly level, and poorly drained. It is in irregularly shaped areas near streams. The areas range from 5 to 30 acres. Slopes range from 0 to 3 percent. They are smooth and slightly concave or gently undulating and are 50 to 500 feet long.

Typically, the surface layer is black loamy sand about 10 inches thick. The subsoil is mottled, dark brown loamy fine sand 6 inches thick. The substratum is mottled and extends to a depth of 60 inches or more. The upper part is grayish brown loamy sand, the middle part is light brownish gray sand, and the lower part is grayish brown sand.

Included with this soil in mapping are small areas of Scarboro soils in low areas. Also included are areas with slopes of more than 3 percent. Included areas make up about 15 percent of this unit.

The permeability of this Wareham soil is rapid. Available water capacity is low. Reaction is very strongly acid to slightly acid. A seasonal high water table is at or near the surface in late fall, in winter, and in spring. The soil is droughty, however, when the water table recedes during summer and early fall.

This soil is poorly suited to cultivated crops but is suited to moisture-tolerant hay and pasture plants. The main limitation for crops is the seasonal high water table. The main management needs include drainage where suitable outlets can be located and appropriate timing of farming operations. Good tilth and the organic matter content are easy to maintain in this soil. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

The soil is suited to trees and to openland and woodland wildlife habitat. Most areas are wooded. The wetness limits the use of woodland equipment and the use of the soil for recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The rapidly permeable substratum provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IVw.

Wf—Whately Variant mucky fine sandy loam. This soil is deep, nearly level, and very poorly drained. It is in low areas and depressions near streams and tidal marshes. Slopes range from 0 to 3 percent. The areas are long and narrow or irregular in shape and range from 5 to 60 acres.

Typically, the surface layer is black mucky fine sandy loam about 10 inches thick. The subsoil is mottled, grayish brown loamy sand about 14 inches thick. The substratum is firm, greenish gray, and mottled. It extends to a depth of 60 inches or more. It is silty clay to a depth of 30 inches and clay at a depth of more than 30 inches.

Included with this soil in mapping are small areas of Shaker soils on low knolls, Swansea soils in depressions, and soils with a substratum of silt loam. Included areas make up about 15 percent of this unit.

The permeability of this Whately Variant soil is moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction is very strongly acid to slightly acid in the subsoil and slightly acid or neutral in the substratum. A seasonal high water table is at or near the surface during fall, winter, and spring. Water is ponded on the surface of some areas of this soil for 1 to 2 months in the spring.

Most areas of this soil are in woodland. Some areas are in farmland.

Wetness caused by the seasonal high water table makes this soil poorly suited to farming. Drainage of the soil is difficult because of the slow or very slow permeability in the substratum and lack of adequate outlets.

The soil is poorly suited to trees but is suitable for wetland wildlife habitat. The water on the surface, the slow permeability of the substratum, and the organic matter in the surface layer limit the soil for recreational development.

The water table limits the soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The slow or very slow permeability of the substratum is an added limitation for septic tank absorption fields.

This unit is in capability subclass Vw.

Wh—Whitman extremely stony loam. This soil is deep, nearly level and gently sloping, and very poorly drained. It is in depressions and low areas. The areas are long and narrow or irregular in shape and range from 5 to 40 acres. Slopes range from 0 to 5 percent. They are smooth and slightly concave and are 50 to 500 feet long. Stones and boulders 1 to 3 feet in diameter are 5 to 100 feet apart on the surface.

Typically, the surface layer is very dark brown loam about 4 inches thick. The subsoil is dark gray fine sandy loam about 10 inches thick. The substratum is firm and extends to a depth of 60 inches or more. It is light brownish gray fine sandy loam to a depth of 22 inches

and dark grayish brown gravelly loamy sand at a depth of more than 22 inches.

Included with this soil in mapping are small areas of Ridgebury soils on low knolls, Whitman soils with no stones on the surface, and Whitman soils with slopes of 5 to 8 percent. Included areas make up about 15 percent of this unit.

The permeability of this Whitman soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is low. Reaction is very strongly acid to slightly acid. A seasonal high water table is at or near the surface in fall, winter, and spring. In some areas this soil has water ponded on the surface for 1 to 2 months in spring.

The seasonal high water table and stones and boulders on the surface make this soil poorly suited to farming. Most areas are wooded, but the soil is poorly suited to trees. It is suited to wetland wildlife habitat. The water table and stones and boulders limit recreational development.

The water table limits this soil as a site for dwellings, small commercial buildings, septic tank absorption fields, and shallow excavations. The slow or very slow permeability of the substratum is an added limitation for septic tank absorption fields.

This unit is in capability subclass VIIs.

WnA—Windsor loamy sand, 0 to 3 percent slopes. This soil is deep, nearly level, and excessively drained. It is in broad, irregularly shaped areas and in long, narrow areas next to flood plains. The areas range from 5 to 40 acres. Slopes are smooth and 100 to 1,000 feet long.

Typically, the surface layer is dark brown loamy sand about 10 inches thick. The subsoil is yellowish brown loamy sand about 20 inches thick. The substratum is light olive brown sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Deerfield, Wareham, Pipestone, and Scarboro soils in low areas and depressions. Also included are areas of soils that are coarse sand throughout. Included areas make up about 15 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid, and available water capacity is low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is suitable for farming. The low available water capacity makes irrigation a major management concern. The erosion hazard is slight. Mixing crop residue and manure into the surface layer maintains tilth and increases the organic matter content. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

This soil is poorly suited to trees and to wildlife habitat. It is suited to most types of recreational development.

The soil has essentially no limitations for dwellings and small commercial buildings. The rapid permeability provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of shallow excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIIs.

WnB—Windsor loamy sand, 3 to 8 percent slopes. This soil is deep, gently sloping, and excessively drained. It is in broad, irregularly shaped areas and in long, narrow areas adjacent to streams. The areas range from 5 to 30 acres. Slopes are undulating or smooth, slightly convex, and 50 to 800 feet long.

Typically, the surface layer is dark brown loamy sand about 10 inches thick. The subsoil is yellowish brown loamy sand about 20 inches thick. The substratum is light olive brown sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Deerfield, Wareham, and Pipestone soils in low areas and depressions. Also included are areas of Windsor soils with rock outcrop on the surface and soils that are coarse sand throughout. Included areas make up about 15 percent of this unit.

The permeability of this Windsor soil is rapid or very rapid. Available water capacity is low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. Some areas are farmed, and some are used for homesites.

This soil is suitable for farming. The low available water capacity makes irrigation a major management concern. The erosion hazard is slight. Mixing crop residue and manure into the surface layer maintains tilth and increases the organic matter content. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

The soil is poorly suited to trees and to wildlife habitat development. It is suited to most types of recreational development, but slope is a limitation for playground development.

The soil has essentially no limitations as a site for dwellings. Slope is a limitation for small commercial buildings. The rapid permeability provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water pollution. The sidewalls of shallow excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IIIs.

WnC—Windsor loamy sand, 8 to 15 percent slopes. This soil is deep, moderately sloping, and excessively drained. It is on the sides of small hills. It is in irregularly shaped areas that range from 5 to 25 acres. Slopes are 50 to 800 feet long.

Typically, the surface layer is dark brown loamy sand 5 inches thick. The subsoil is yellowish brown loamy sand 25 inches thick. The substratum is light olive brown sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Deerfield, Pipestone, Wareham, Scarboro, and Swansea soils in low areas and depressions. Also included are areas of Windsor soils with stones and rock outcrop on the surface and areas of soils that are coarse sand throughout. Included areas make up about 15 percent of this map unit.

The permeability of this Windsor soil is rapid or very rapid. Available water capacity is low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. A few areas are farmed, and some are used for homesites.

This soil is poorly suited to farming. The low available water capacity makes irrigation a major concern. The erosion hazard is moderate. Where this soil is farmed, stripcropping, conservation tillage, and the use of cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer maintains tilth and increases the organic matter content. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

This soil is poorly suited to trees and to wildlife habitat development. Slope is a limitation for most types of recreational development.

Slope is a limitation of this soil as a site for dwellings or small commercial buildings. The rapid permeability provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water contamination. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass IVs.

WnD—Windsor loamy sand, 15 to 25 percent slopes. This soil is deep, moderately steep and hilly, and excessively drained. It is on the sides of hills. The areas range from 5 to 20 acres. Slopes are 100 to 400 feet long.

Typically, the surface layer is dark brown loamy sand 3 inches thick. The subsoil is yellowish brown loamy sand 25 inches thick. The substratum is light olive brown sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Windsor soils with stones and rock outcrop on the surface. These included areas compose about 10 percent of the map unit. Another 30 percent of the unit consists of areas with slopes of more than 25 percent.

The permeability of this Windsor soil is rapid or very rapid. Available water capacity is low. Reaction is very strongly acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for homesites.

The low available water capacity and a severe erosion hazard make this soil poorly suited to farming. The soil also is poorly suited to trees or to wildlife habitat. Slope limits the soil as a site for dwellings, small commercial buildings, or recreational development. The rapidly permeable substratum provides a poor filter for septic tank absorption fields; effluent flowing through the substratum causes a hazard of ground-water pollution. The sidewalls of excavations in this soil are unstable, and the steeper sides commonly collapse.

This unit is in capability subclass VIs.

WrB—Woodbridge fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is in rectangular, oval, and irregularly shaped areas on hills and on broad flats at lower elevations. The areas range from 5 to 30 acres. Slopes are smooth, slightly concave, and 100 to 500 feet long.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam about 17 inches thick. The upper 12 inches is dark yellowish brown, and the lower 5 inches is mottled and yellowish brown. The substratum is very firm and brittle, mottled, light olive brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury and Whitman soils in depressions and areas of Woodbridge soils with slopes of less than 3 percent. Also included are areas of soils with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow to very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid in the subsoil and very strongly acid to slightly acid in the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. A few areas are farmed, and some are used for homesites.

This soil is well suited to farming. Good tilth is easily maintained in cultivated areas. The erosion hazard is moderate. Wetness caused by the seasonal high water table is the major management concern. The main farming management needs include installing drainage where needed, improving tilth, and increasing the organic matter in the soil. Mixing crop residue and manure into the surface layer helps to improve tilth and increase the organic matter content. Using grasses and legumes in the cropping system helps reduce erosion. The use of proper stocking rates and deferred and rotational grazing are pasture management practices that maintain desirable plant species.

This soil is well suited to trees and to openland and woodland wildlife habitat. The slow permeability in the substratum and wetness are limitations for recreational development. Slope is an additional limitation for playground development.

Wetness limits the use of this soil as a site for dwellings and small commercial buildings and for shallow excavations. Slope is an added limitation for small commercial buildings, and the firm substratum further

limits shallow excavations. The slow or very slow permeability of the substratum and wetness limit the use of the soil for septic tank absorption fields.

This unit is in capability subclass IIw.

WrC—Woodbridge fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and moderately well drained. It is in rectangular, oval, and irregularly shaped areas on hills and ridges. The areas range from 5 to 40 acres. Slopes are smooth, slightly concave, and 100 to 500 feet long.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The subsoil is fine sandy loam about 19 inches thick. The upper 14 inches is dark yellowish brown, and the lower 5 inches is mottled and yellowish brown. The substratum is very firm and brittle, mottled, light olive brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury and Whitman soils in depressions and areas of soils with a friable substratum. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow to very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid in the subsoil and very strongly acid to slightly acid in the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. A few areas are farmed, and some are used for homesites.

This soil is suited to farming. Good tilth is easily maintained in cultivated areas. The erosion hazard is moderate. Wetness caused by the seasonal high water table is the major management concern. The main farming management needs include installing drainage where needed, improving tilth, and increasing the organic matter in the soil. Mixing crop residue and manure into the surface layer helps to improve tilth and increase the organic matter content. Using grasses and legumes in the cropping system helps reduce erosion. The use of proper stocking rates and deferred and rotational grazing are pasture management practices that maintain desirable plant species.

This soil is well suited to trees and to openland and woodland wildlife habitat. The slow permeability in the substratum and wetness are limitations for recreational development. Slope is an additional limitation for playground development.

Wetness limits this soil as a site for dwellings and small commercial buildings and for shallow excavations. Slope is an added limitation for small commercial buildings and dwellings without basements, and the firm substratum further limits shallow excavations. The slow or very slow permeability of the substratum and wetness limit the use of the soil for septic tank absorption fields.

This unit is in capability subclass IIIe.

WsB—Woodbridge very stony fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is in irregularly shaped areas on hills and is on broad flats at lower elevations. The areas range from 5 to 50 acres. Slopes are smooth, slightly concave, and 100 to 500 feet long. Stones and boulders 1 to 3 feet in diameter are 30 to 100 feet apart on the surface.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is fine sandy loam about 18 inches thick. It is dark yellowish brown in the upper part and mottled and yellowish brown in the lower part. The substratum is very firm and brittle, mottled, light olive brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury and Whitman soils in depressions. These included areas make up about 10 percent of the unit. Another 25 percent of the unit consists of areas of very stony Woodbridge soils with slopes of less than 3 percent, areas of Woodbridge soils with surface stones less than 30 feet apart, and areas with a friable substratum.

The permeability of this Woodbridge soil is moderate in the subsoil and slow to very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid in the subsoil and very strongly acid to slightly acid in the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. Some areas are in pasture or are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

The soil is well suited to trees and to woodland wildlife habitat. The slow permeability in the substratum, the stones and boulders on the surface, and wetness caused by the seasonal high water table limit most types of recreational development.

Wetness limits this soil as a site for dwellings and small commercial buildings and for shallow excavations. Slope is also a limitation for small commercial buildings, and the firm substratum further limits shallow excavations. The slow or very slow permeability in the substratum and wetness limit the use of the soil for septic tank absorption fields.

This unit is in capability subclass VIs.

WsC—Woodbridge very stony fine sandy loam, 8 to 15 percent slopes. This soil is deep, moderately sloping, and moderately well drained. It is in irregularly shaped areas on hills and ridges. The areas range from 5 to 50 acres. Slopes are smooth, slightly concave, and 100 to 500 feet long. Stones and boulders 1 to 3 feet in diameter are 30 to 100 feet apart on the surface.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The subsoil is fine sandy loam about 19 inches thick. It is dark yellowish brown in the upper part and mottled and yellowish brown in the lower part. The substratum is mottled, light olive brown, very firm and brittle gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury soils in depressions and Paxton soils on knolls. These included areas make up about 10 percent of the unit. Another 15 percent of the unit consists of areas of Woodbridge soils with surface stones less than 30 feet apart and areas with a friable substratum.

The permeability of this Woodbridge soil is moderate in the subsoil and slow to very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid in the subsoil and very strongly acid to slightly acid in the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. Some areas are pastured, and some are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

The soil is suited to trees and to woodland wildlife habitat. Slope, the stones and boulders on the surface, and the slow permeability in the substratum limit most types of recreational development.

Wetness limits this soil as a site for dwellings and small commercial buildings and for shallow excavations. Slope is also a limitation for small commercial buildings, and the firm substratum further limits shallow excavations. The slow or very slow permeability in the substratum and wetness limit the use of the soil for septic tank absorption fields.

This unit is in capability subclass VIs.

WsD—Woodbridge very stony fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and moderately well drained. It is in irregularly shaped areas on the lower slopes of hills. The areas range from 5 to 50 acres. Slopes are smooth, slightly concave, and 100 to 800 feet long. Stones and boulders 1 to 3 feet in diameter are 30 to 100 feet apart on the surface.

Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The subsoil is fine sandy loam about 19 inches thick. It is dark yellowish brown in the upper part and mottled and yellowish brown in the lower part. The substratum is mottled, light olive brown, very firm and brittle gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ridgebury soils in depressions and Paxton soils on knolls. These included areas make up about 10 percent of the unit. Another 30 percent of the unit consists of areas of Woodbridge soils with surface stones less than 30 feet apart and areas with a friable substratum.

The permeability of this Woodbridge soil is moderate in the subsoil and slow to very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid in the subsoil and very strongly acid to slightly acid in the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring.

Most areas of this soil are in woodland. A few areas are used for homesites.

The stones and boulders on the surface make this soil poorly suited to cultivated crops. The use of proper stocking rates and deferred and rotational grazing help to maintain desirable pasture plant species.

The soil is well suited to trees and to woodland wildlife habitat. Slope and the stones and boulders on the surface limit the soil for recreational development.

Slope and the seasonal high water table limit the soil as a site for dwellings and small commercial buildings. Slope, wetness, and the slow or very slow permeability of the substratum limit the use of the soil for septic tank absorption fields. Wetness and the firm substratum limit shallow excavations.

This unit is in capability subclass VIs.

prime farmland

Prime farmland is one of several kinds of important farmlands defined by the U. S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U. S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season and acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 13,770 acres, or nearly 10 percent of the survey area, meets the soil requirements for prime farmland. The areas are scattered throughout the county, but most are in the northern and western parts of the survey area.

A recent trend in land use in some parts of the survey area has been toward the loss of some prime farmlands to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible and droughty and are difficult to cultivate and usually less productive.

The soil map units that make up prime farmland in the survey area are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

BeB	Belgrade very fine sandy loam, 0 to 8 percent slopes
BuA	Boxford silt loam, 0 to 3 percent slopes
BuB	Boxford silt loam, 3 to 8 percent slopes
CaB	Canton fine sandy loam, 3 to 8 percent slopes
ElA	Elmridge fine sandy loam, 0 to 3 percent slopes
ElB	Elmridge fine sandy loam, 3 to 8 percent slopes
MeA	Melrose fine sandy loam, 0 to 3 percent slopes
MeB	Melrose fine sandy loam, 3 to 8 percent slopes
MmA	Merrimac fine sandy loam, 0 to 3 percent slopes
MmB	Merrimac fine sandy loam, 3 to 8 percent slopes
MoB	Montauk fine sandy loam, 3 to 8 percent slopes
NnA	Ninigret fine sandy loam, 0 to 3 percent slopes
NnB	Ninigret fine sandy loam, 3 to 8 percent slopes
PaB	Paxton fine sandy loam, 3 to 8 percent slopes
PlB	Pollux fine sandy loam, 0 to 8 percent slopes
SgB	Scituate fine sandy loam, 3 to 8 percent slopes
SrA	Sudbury fine sandy loam, 0 to 3 percent slopes
SrB	Sudbury fine sandy loam, 3 to 8 percent slopes
WrB	Woodbridge fine sandy loam, 3 to 8 percent slopes

use and management of the soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

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

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

crops and pasture

Christopher G. Moustakis, resource conservationist, Soil Conservation Service, assisted in preparing this section.

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

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The survey area has about 7,000 acres used for crops and pasture. An estimated 64 percent of this acreage is used for hay and pasture; 30 percent for row crops, mainly corn and vegetables; and 6 percent for orchards and nursery plants. The acreage in crops and pasture has been gradually decreasing as more and more land is used for urban development. Urban pressure from the greater Boston area, as well as from cities within the survey area, has been a factor in this decline. In 1961, about 27,500 acres of urban and built-up land was in the area. This figure has been growing at the rate of about 700 acres per year.

Erosion is a hazard on much of the cropland and pasture in the survey area. All sloping soils are subject to erosion. Productivity is reduced when the surface layer is eroded and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging to soils with a clayey subsoil, such as the Boxford, Elmridge, and Melrose soils. It is also damaging to soils in which the root zone is limited by a hard layer, called a fragipan, in or below the subsoil or by bedrock that is near the surface. The Paxton, Montauk, and Woodbridge soils, for example, have a dense substratum, and the Chatfield-Hollis-Rock outcrop complex has bedrock near the surface. Soil erosion further results in sediment entering streams, thereby lowering the water quality for municipal use, recreation, fish, and wildlife.

Erosion control practices provide a protective surface cover, reduce runoff, and increase the infiltration rate. A cropping system that keeps plant cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion of sloping land and provide nitrogen and improved tilth for the next crop.

Practices that help control erosion are terracing, stripcropping, and cover cropping. Terraces and

diversions are effective in shortening the length of the slope, thereby reducing runoff and erosion, but many parts of the survey area have short and irregular slopes that are not suited to terraces. Diversions are effective in intercepting water and thus protecting fields downslope. Stripcropping is effective when installed on the contour and is best suited to soils that have long uniform slopes.

Conservation tillage—a system that includes strip tillage, stubble mulching, and no-till farming—further helps to protect the soil from erosion.

A *seasonal high water table* is a major concern for many soils in the survey area. Some soils are naturally so wet that the production of crops common to the area is generally not feasible and the soils are poorly suited to pasture.

The very poorly drained soils are generally too wet for crop production unless they are drained. Drainage is usually difficult because adequate outlets are not available in most areas. Scarboro, Whitman, Maybid, and Freetown soils are examples of very poorly drained soils.

The poorly drained soils, including Scitico, Pipestone, and Walpole soils, are too wet for good crop production during most years unless they are drained.

The moderately well drained soils generally cannot be tilled or worked until late spring or early summer because of the seasonal high water table. They are poorly suited to early-season crops. The Woodbridge, Sudbury, and Deerfield soils are the moderately well drained soils in this survey area.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and pipe or subsurface drainage is needed in some areas if the soils are to be farmed intensively.

Natural fertility is low in the soils of the survey area. Most of the soils are naturally strongly acid or very strongly acid and require applications of lime to raise the soil reaction to the level needed by the plant for optimum growth. The available phosphorus and potassium levels are also naturally low, and fertilizer is needed for good production.

Tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular, friable, and porous. Many of the soils in the survey area have a low organic matter content and poor tilth. Regular additions of crop residue, manure, and other organic material will help to increase the organic matter content and improve soil tilth.

Field crops suited to the soils and climate of the survey area include many that are not commonly grown in the area. Potatoes, corn, grain sorghum, oats, wheat, barley, and buckwheat are examples of crops that are suited to the soils and climate of the area.

Specialty crops grown in the survey area included vegetables, bush fruits and other fruits, and nursery plants. Sweet corn, tomatoes, squash, pumpkins, and snap beans are the common commercial vegetables. Many other vegetables are suited to the soils in the area and are grown to some extent. Small acreages throughout the survey area are used for strawberries, raspberries, and blueberries. Apples are the main tree fruit grown, though orcharding has decreased by 65 percent in the past 20 years. Pears are suited to the area, and peaches are suited where local climatic conditions are favorable.

Deep soils with good natural drainage, for example, Merrimac, Canton, Melrose, and Paxton soils, warm up early in the spring and are especially well suited to vegetables, fruit trees, bush or vine fruits, and nursery crops.

yields per acre

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

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

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

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops

that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main 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 very cold or very dry.

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

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant

competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

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

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

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

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

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

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

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

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

wildlife habitat

Robert W. Franzen, biologist, Soil Conservation Service, Amherst, Massachusetts, assisted with this section.

Town conservation areas, town forests, privately owned properties, and Federal and State lands, including two wildlife sanctuaries operated by the Massachusetts Division of Fisheries and Wildlife, provide much of the wildlife habitat in the area. The largest parcel of dedicated wildlife land is the Parker River National Wildlife Refuge, owned and operated by the U. S. Fish

and Wildlife Service. It consists of 4,650 acres, 1,400 of which is within the survey area. It encompasses Plum Island, a coastal island bordered by the ocean and tidal marsh, and serves as a resting and feeding area for ducks, geese, and shorebirds.

South of Plum Island is the Crane Reservation, a 1,300-acre property owned and operated by the Trustees of Reservations, a privately administered, nonprofit organization. The Crane Wildlife Refuge encompasses a large part of the Crane Reservation. Although this refuge is within 30 miles of Boston, it supports a high density population of white-tailed deer. The beaches, dunes, salt marshes, and uplands of the refuge provide a habitat for at least 250 bird species.

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, buckwheat, oats, and rye.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are northern red oak, black cherry, red maple, quaking aspen, and hickory.

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

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of fruit-producing shrubs are honeysuckle, silky dogwood, blueberry, privet, and autumn-olive. The potential of the soils for shrubs was not rated.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, cattail, arrowhead, cordgrass, rushes, and sedges.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include woodchuck, mourning dove, meadowlark, field sparrow, eastern cottontail rabbit, and meadow vole.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, chipmunk, raccoon, and deer mice.

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

engineering

William P. Annable, conservation engineer, Soil Conservation Service, assisted with this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

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

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

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

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

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

building site development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the

depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

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

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the

lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

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

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

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

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

construction materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

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

water management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

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

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

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

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

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

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

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

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

physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

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

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

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

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

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Some soils in table 16 are assigned to two hydrologic soil groups. Dual grouping is used for some soils that are less than 20 inches deep to bedrock. The first letter applies to areas where the bedrock is cracked and pervious and the second letter to areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface of the soil.

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

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, 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.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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

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

susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fragiochrepts (*Fragi*, meaning brittle horizonation, plus *ochrept*, the suborder of the Inceptisols that have a pale surface).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fragiochrepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, mesic, Typic Fragiochrepts.

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

soil series and their morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Annisquam series

The Annisquam series consists of deep, well drained soils on upland till plains and moraines. The soils formed in compact, stony and bouldery glacial till derived mainly from granitic materials. Slopes range from 3 to 35 percent.

The Annisquam soils are similar to Canton and Montauk soils but have more rock fragments in the control section and are firmer in the substratum than the Canton soils.

Typical pedon of Annisquam fine sandy loam, in a wooded area of Annisquam extremely bouldery fine

sandy loam, 15 to 35 percent slopes, in the city of Gloucester, on the south bank of a borrow area at the southeastern corner of the Gloucester sanitary landfill:

A1—0 to 4 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine and medium granular structure; very friable; many fine and medium and few coarse roots; 30 percent boulders and stones, 5 percent cobblestones, 10 percent gravel; very strongly acid; abrupt wavy boundary.

B21—4 to 18 inches; yellowish brown (10YR 5/6) gravelly fine sandy loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; 25 percent boulders and stones, 10 percent cobblestones, 25 percent gravel; strongly acid; gradual wavy boundary.

B22—18 to 28 inches; yellowish brown (10YR 5/6) very gravelly coarse sandy loam; weak fine and medium subangular blocky structure parting to weak fine granular; friable; few fine and medium roots; 5 percent stones and boulders, 25 percent cobblestones, 40 percent gravel; strongly acid; clear wavy boundary.

IICx—28 to 60 inches; olive brown (2.5Y 4/4) gravelly loamy coarse sand; weak thick platy structure; very firm; very few fine roots in upper part; 5 percent stones and boulders, 15 percent cobblestones, 30 percent gravel; brittle when moist or dry; medium acid.

The thickness of the solum ranges from 18 to 30 inches and corresponds to the depth to the fragipan. The content of fragments larger than 10 inches in diameter ranges from 5 to 30 percent in the surface layer, 5 to 25 percent in the subsoil, and 5 to 30 percent in the substratum. The content of fragments 3 to 10 inches in diameter ranges from 0 to 10 percent in the surface layer, 5 to 25 percent in the subsoil, and 5 to 25 percent in the substratum. The content of fragments less than 3 inches in diameter ranges from 5 to 10 percent in the surface layer, 20 to 40 percent in the subsoil, and 20 to 55 percent in the substratum. The soil ranges from extremely acid to medium acid.

The A1 horizon has hue of 10YR through 5YR, value of 2 through 4, and chroma of 1 through 4. It is very fine sandy loam, fine sandy loam, loam, or sandy loam. It has weak fine or medium granular structure. Consistence is friable or very friable. Some pedons do not have an A1 horizon but have an O horizon underlain by an A2 horizon.

The B21 horizon has hue of 10YR through 5YR, value of 3 through 5, and chroma of 4 through 6. The B22 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. The B horizon is gravelly or cobbly analogs of fine sandy loam, sandy loam, or coarse sandy loam. It has weak fine or medium subangular blocky or granular structure. Consistence is friable or very friable.

The Cx horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is gravelly or cobbly analogs of loamy sand, loamy coarse sand, loam very coarse sand, or loamy fine sand. It has weak or moderate thin to thick platy structure. Consistence is firm or very firm and brittle. Some pedons have a C horizon that is above and similar to the Cx horizon but that is friable.

Belgrade series

The Belgrade series consists of deep, moderately well drained soils on terraces. The soils formed in very fine sandy loam and silt loam lakebed deposits derived mainly from granite and gneiss. Slopes range from 0 to 8 percent.

The Belgrade soils are similar to the Ninigret soils but have less fine sand and medium sand and more very fine sand.

Typical pedon of Belgrade very fine sandy loam, 0 to 8 percent slopes, in the town of Ipswich, in a wooded area 100 feet east of Town Farm Road from a point 1.5 miles north of its junction with High Street:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; weak fine granular structure; very friable; many fine roots; medium acid; abrupt irregular boundary.

B21—10 to 20 inches; light olive brown (2.5Y 5/4) very fine sandy loam; weak fine granular structure; very friable; few fine roots; medium acid; clear wavy boundary.

B22—20 to 28 inches; light olive brown (2.5Y 5/4) very fine sandy loam; few fine faint light brownish gray (2.5Y 6/2) mottles; weak fine granular structure; very friable; very few fine roots; slightly acid; clear wavy boundary.

C—28 to 60 inches; olive (5Y 5/3) varved silt loam (80 percent) and very fine sandy loam (20 percent); light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) mottles; massive; firm; slightly acid.

The thickness of the solum ranges from 20 to 30 inches. The depth to mottling ranges from 12 to 24 inches. The coarse fragment content is 0 to 5 percent within 40 inches of the surface. In some pedons there are thin strata of sand or gravel below a depth of 40 inches. The reaction is strongly acid to slightly acid in the solum and medium acid to neutral in the substratum.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is very fine sandy loam or silt loam.

The B21 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 or 6. The B22 horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 4 or 6 and is mottled. The B horizon is silt loam or very fine sandy loam.

The C horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 1 through 4 and is mottled. It typically is

very fine sandy loam but in some places is varves of very fine sand, loamy very fine sand, or silt loam.

Boxford series

The Boxford series consists of deep, moderately well drained soils on old lakebeds. The soils formed in silty and clayey marine or lacustrine sediments. Slopes range from 0 to 15 percent.

Boxford soils and poorly drained Scitico soils formed in the same kinds of materials, and Boxford soils are similar to Elmridge soils. The Boxford soils have more silt and less sand in the solum than the Elmridge soils.

Typical pedon of Boxford silt loam, 0 to 3 percent slopes, in the town of Ipswich, in a field 750 feet north of the intersection of Essex Road and Northgate Road and 200 feet east of Northgate Road (fig. 11):

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; 1 percent gravel; medium acid; abrupt smooth boundary.

B1—9 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many pores and root channels filled with dark grayish brown (10YR 4/2) Ap material; common fine roots; 1 percent gravel; medium acid; clear wavy boundary.

B21—12 to 17 inches; yellowish brown (10YR 5/4) silt loam; common medium faint grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; friable; many fine very dark grayish brown (10YR 3/2) oxide stains on ped faces; common fine roots; 1 percent gravel; medium acid; clear wavy boundary.

B22—17 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; many patchy brown (10YR 4/3) films and many fine very dark grayish brown (10YR 3/2) oxide stains on ped faces; common fine roots; 1 percent gravel; medium acid; clear wavy boundary.

B23—20 to 34 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium coarse and very coarse blocky; firm; many continuous grayish brown (10YR 5/2) and dark gray (10YR 4/1) and common patchy black (5YR 2/1) oxide stains on ped faces and in root channels; few fine roots; 1 percent gravel; slightly acid; gradual wavy boundary.

B24—34 to 44 inches; light olive brown (2.5Y 5/4) silty clay loam; weak very coarse prismatic structure parting to moderate medium subangular blocky; firm; continuous grayish brown (10YR 5/2) films on prism faces and discontinuous dark brown (10YR 3/3) films on ped faces; common patchy black (5YR 2/1) oxide stains on ped faces and in root channels; few fine roots; 1 percent gravel; slightly acid; gradual wavy boundary.

C—44 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; weak very coarse prismatic structure parting to weak medium platy; firm; continuous grayish brown (10YR 5/2) films on prism faces; many medium black (5YR 2/1) oxide stains; 1 percent gravel; slightly acid.

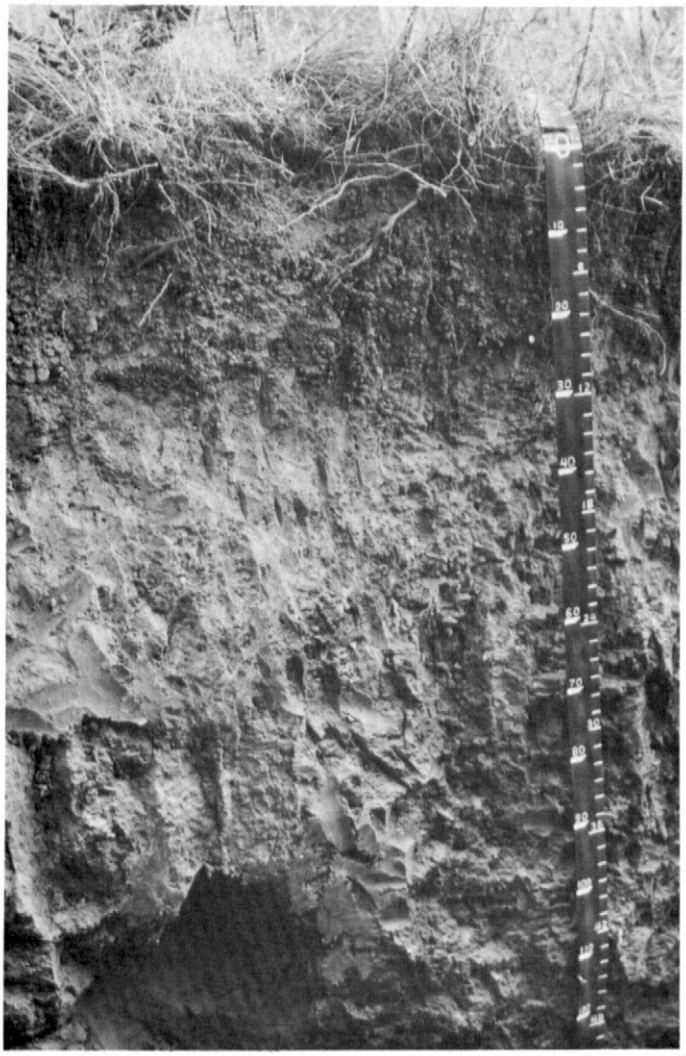


Figure 11.—Typical profile of Boxford silt loam, 0 to 3 percent slopes.

The thickness of the solum ranges from 22 to 50 inches. The depth to mottling ranges from 12 to 24 inches. The coarse fragment content is less than 5 percent throughout the soil. The reaction in unlimed areas ranges from strongly acid to slightly acid in the

upper part of the solum and from medium acid to neutral in the lower part of the solum and in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 through 4, and chroma of 2 or 3. It is silt loam or silty clay loam.

The upper part of the B horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 3 through 6. It is silt loam or silty clay loam and is friable or firm. Structure is weak or moderate, fine or medium granular or weak or moderate, very fine or fine subangular blocky. The lower part of the B horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 3 or 4. It is silty clay loam or silty clay. It has weak or moderate, medium coarse or very coarse prismatic structure parting to weak or moderate, medium coarse or very coarse, subangular blocky or angular blocky. Most pedons have coatings on prism faces with hue of 10YR through 5Y, value of 3 through 6, and chroma of 0 through 3. Films range from thin to thick and appear to be fine silt.

The C horizon has hue of 2.5Y of 5Y, value of 4 through 6, and chroma of 3 or 4. It is silty clay loam, silty clay, or clay. It has weak coarse or very coarse prismatic structure parting to weak thin to thick platy, or it is massive.

Canton series

The Canton series consists of deep, well drained soils on uplands. The soils formed in glacial till derived mainly from gneiss and granite. Slopes range from 3 to 35 percent.

Canton soils are similar to Annisquam, Paxton, and Montauk soils. The Canton soils have fewer rock fragments in the control section and are less firm in the substratum than the Annisquam soils. The Canton soils have more sand in the substratum than the Paxton soils and do not have a fragipan, which is typical of the Paxton and Montauk soils.

Typical pedon of Canton fine sandy loam, in an area of Canton very stony fine sandy loam, 3 to 8 percent slopes, in the town of Danvers, in a wooded area 2,400 feet southwest of Massachusetts Route 114 from a point 0.8 mile northwest of its junction with U.S. Route 1:

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse tree roots; 10 percent gravel; very strongly acid; abrupt smooth boundary.

B21—4 to 10 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; many fine and medium and few coarse tree roots; 10 percent gravel; very strongly acid; clear wavy boundary.

B22—10 to 28 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; very friable; common fine and few medium tree roots; 5 percent stones, 10 percent gravel; strongly acid; clear wavy boundary.

IIC1—28 to 36 inches; grayish brown (2.5Y 5/2) gravelly loamy sand; massive; very friable; 5 percent stones, 5 percent cobblestones, 20 percent gravel; strongly acid; gradual wavy boundary.

IIC2—36 to 60 inches; olive gray (5Y 5/2) gravelly loamy sand; massive; very friable; 5 percent stones, 10 percent cobblestones, 25 percent gravel; strongly acid.

The solum thickness ranges from 18 to 36 inches and corresponds closely to the depth to the underlying coarse-textured till. The content of coarse fragments less than 10 inches in diameter ranges from 5 to 25 percent in the solum and from 15 to 40 percent in the IIC horizon. The reaction in unlimed areas ranges from extremely acid through medium acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is loam, fine sandy loam, or very fine sandy loam.

The B21 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. The B22 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 or 6. The B horizon is loam, fine sandy loam, or very fine sandy loam. It has weak granular structure, or it is massive.

The IIC horizon has hue of 2.5Y or 5Y, value of 5 through 7, and chroma of 2 or 3. It typically is gravelly loamy sand but ranges from loamy fine sand to gravelly loamy coarse sand.

Chatfield series

The Chatfield series consists of moderately deep, well drained and somewhat excessively drained soils on uplands, hills, and ridges. The soils formed in a moderately deep mantle of glacial till derived mainly from granite and gneiss. Slopes range from 3 to 35 percent.

Chatfield soils are similar to Canton, Hollis, Montauk, Paxton, and Annisquam soils. The Chatfield soils are moderately deep to bedrock; the Canton, Montauk, Paxton, and Annisquam soils are deep, and the Hollis soils are shallow.

Typical pedon of Chatfield very fine sandy loam, in a wooded area of Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes, in the town of Middleton, 1,400 feet northeast of Liberty Street from a point 2,300 feet southeast of the Middleton-North Andover town line:

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) very fine sandy loam; weak medium granular structure; very friable; many fine roots; 5 percent stones, 5 percent gravel; very strongly acid; abrupt wavy boundary.

B21—1 to 6 inches; dark brown (7.5YR 4/4) very fine sandy loam; weak medium subangular blocky

structure; very friable; many fine and medium and few coarse roots; 5 percent cobblestones, 10 percent gravel; strongly acid; clear wavy boundary.

B22—6 to 17 inches; dark yellowish brown (10YR 4/4) gravelly very fine sandy loam; weak medium granular structure; friable; common fine and medium roots; 5 percent stones, 5 percent cobblestones, 20 percent gravel; very strongly acid; abrupt wavy boundary.

C—17 to 34 inches; light olive brown (2.5Y 5/4) gravelly very fine sandy loam; massive; firm; few fine roots; 5 percent stones, 25 percent gravel; strongly acid; abrupt wavy boundary.

R—34 inches; granitic bedrock.

The solum thickness ranges from 16 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. Stones make up 0 to 20 percent of the A horizon and 0 to 10 percent of the B and C horizons. Cobblestones make up 0 to 10 percent of the A horizon and 0 to 15 percent of the B and C horizons. The gravel content ranges from 5 to 10 percent in the A horizon, 5 to 20 percent in the B horizon, and 10 to 25 percent in the C horizon. Reaction ranges from very strongly acid to medium acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is loam, fine sandy loam, or very fine sandy loam.

The B horizon has hue of 7.5YR or 10YR in the upper part and 10YR or 2.5Y in the lower part, value of 4 or 5, and chroma of 4 or 6. It is very fine sandy loam, loam, or fine sandy loam or their gravelly analogs. It has fine or medium granular or subangular blocky structure and is friable or very friable.

The C horizon has hue of 2.5Y and value and chroma of 4 or 5. It is very fine sandy loam, loam, or fine sandy loam or their gravelly analogs. It has weak platy structure, or the horizon is massive. It is friable or firm.

The Chatfield soils in this survey area are a taxadjunct to the Chatfield series because the solum and the substratum are very fine sandy loam. This difference does not significantly affect the use and management of the soils.

Deerfield series

The Deerfield series consists of deep, moderately well drained soils on outwash plains. The soils formed in glacial outwash derived mainly from granite and gneiss. Slopes range from 0 to 8 percent.

The Deerfield soils are similar to Ninigret and Sudbury soils but have more sand in the solum than the Ninigret or Sudbury soils and have less gravel than the Sudbury soils.

Typical pedon of Deerfield loamy fine sand, in the town of Ipswich, in a wooded area 1,800 feet north-northeast of the junction of Mile Lane and Linebrook Road:

O1—1-1/2 inches to 0; decaying organic material.

Ap—0 to 6 inches; black (10YR 2/1) loamy fine sand; weak fine granular structure; very friable; common coarse and many fine and medium roots; very strongly acid; abrupt wavy boundary.

B21—6 to 10 inches; dark brown (7.5YR 3/2) loamy fine sand; weak medium granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

B22—10 to 24 inches; dark brown (10YR 3/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; very strongly acid; abrupt wavy boundary.

C1—24 to 34 inches; light brownish gray (2.5Y 6/2) loamy sand; common fine and medium distinct light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; massive; very friable; very strongly acid; abrupt wavy boundary.

C2—34 to 42 inches; brown (7.5YR 5/4) sand; common medium distinct red (2.5YR 4/6) and light brownish gray (10YR 6/2) mottles; massive; firm in place, loose disturbed; 2 percent fine gravel; very strongly acid; abrupt wavy boundary.

C3—42 to 60 inches; light yellowish brown (2.5Y 6/4) fine sand; few medium faint light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) mottles; massive; very friable; 1 percent fine gravel; very strongly acid.

The solum thickness ranges from 18 to 35 inches. The depth to mottling ranges from 15 to 40 inches. The content of coarse fragments is generally less than 5 percent throughout the soil. Some pedons have thin strata in the substratum that are up to 20 percent fine gravel. The reaction in unlimed areas is medium acid to very strongly acid.

The Ap horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. Some pedons have an A1 horizon. The A horizon ranges from fine sandy loam to sand. It has weak, very fine, fine, or medium granular structure.

The B horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 6. It ranges from fine sandy loam to sand above a depth of 10 inches and from loamy fine sand to coarse sand below a depth of 10 inches. It has very fine to medium granular structure or is single grain.

The C horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 1 through 4. It ranges from fine sand to coarse sand. The C horizon in some pedons does not have mottles.

Elmridge series

The Elmridge soils consist of deep, moderately well drained soils on glaciolacustrine and marine terraces.

The soils formed in loamy material over clayey lacustrine or marine sediments. Slopes range from 0 to 8 percent.

Elmridge soils formed in the same kind of material as poorly drained Shaker soils and are similar to Boxford and Ninigret soils. The Elmridge soils have more sand in the solum than the Boxford soils and have more clay in the substratum than the Ninigret soils.

Typical pedon of Elmridge fine sandy loam, 0 to 3 percent slopes, in the town of Ipswich, in a wooded area 200 feet southeast from a point on Sagamore Road 800 feet northeast from the Miles River Bridge:

O1—1 inch to 0; partially decomposed organic material.
Ap—0 to 8 inches; dark brown (10YR 3/3) fine sandy loam; brown (10YR 4/3) dry; weak fine granular structure; very friable; many fine medium and coarse roots; strongly acid; abrupt smooth boundary.
B21—8 to 19 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; 3 percent fine gravel; strongly acid; clear wavy boundary.
B22—19 to 23 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; 3 percent fine gravel; medium acid; clear wavy boundary.
IIB3—23 to 32 inches; olive (5Y 5/3) silty clay loam; few fine distinct gray (5Y 5/1) and brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; firm, slightly sticky; few fine roots; slightly acid; clear wavy boundary.
IIC—32 to 60 inches; olive (5Y 5/3) silty clay; many fine to coarse prominent light gray (5Y 6/1) and reddish brown (5YR 4/4) mottles; coarse prismatic structure parting to moderate thick platy; very firm, sticky; thin clay films in some pores and on some ped faces; discontinuous thin manganese stains on some ped faces; slightly acid.

The depth to the underlying fine textured material is 18 to 40 inches. The solum is 0 to 3 percent fine gravel. The soil ranges from strongly acid to slightly acid in the solum and from slightly acid to neutral in the IIC horizon.

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

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6. It is fine sandy loam or sandy loam. The lower part of the B horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 3 through 6. It is fine sandy loam, sandy loam, loam, or silty clay loam. The B horizon has weak or moderate, fine or medium, granular or subangular blocky structure. Consistence is friable or firm. Some pedons have thin layers of loamy fine sand or loamy sand.

The IIC horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 2 or 3. It is silty clay loam or silty clay. The structure mainly is moderate medium to thick platy within coarse prisms, or the horizon is massive. Some pedons have coarse prismatic structure. Consistence is firm or very firm. Thin films of clay, silt, or very fine sand are on ped faces in some pedons.

Fluvaquents

Fluvaquents consist of deep, very poorly drained and poorly drained soils on flood plains along rivers and streams. The soils formed in recently deposited loam over sandy alluvium deposited by stream overflow and are subject to frequent flooding. Slopes range from 0 to 3 percent.

Fluvaquents are similar to Scarboro and Swansea soils. The content of organic matter in Fluvaquents is variable but decreases with depth in the Scarboro soils. Fluvaquents have less organic matter in the surface layer than the Swansea soils.

Reference pedon of Fluvaquents mucky very fine sandy loam in an area of Fluvaquents, frequently flooded, in the town of Middleton, 200 feet southwest of southbound side of Interstate Route 95 bridge over the Ipswich River:

A1—0 to 12 inches; very dark gray (10YR 3/1) mucky very fine sandy loam; weak medium granular structure; friable; many fine and medium roots; medium acid; abrupt wavy boundary.
C1g—12 to 22 inches; gray (5Y 5/1) very fine sandy loam; few fine and medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; medium acid; abrupt wavy boundary.
C2g—22 to 42 inches; gray (5Y 5/1) silt loam; massive; friable; medium acid; abrupt wavy boundary.
C3g—42 to 60 inches; gray (5Y 5/1) stratified fine sand and medium sand; single grain; loose; medium acid.

The depth to sand or stratified sand and gravel ranges from 20 to 45 inches. The gravel content ranges from 0 to 15 percent in the solum and upper part of the substratum and up to 50 percent in individual layers of the lower part of the substratum. Reaction in unlimed areas is strongly acid to slightly acid to a depth of about 30 inches and medium acid to neutral below a depth of about 30 inches.

The A horizon has hue of 10YR or 2.5Y, value of 2 through 4, and chroma of 1 through 3. It ranges from silt loam to sandy loam or their mucky analogs. The horizon has weak or moderate granular structure or is massive. Consistence is friable or very friable.

The C horizon has hue of 10YR through 5Y, value of 3 through 6, and chroma of 0 through 3. In most pedons the upper part of the C horizon is mottled. The C horizon ranges from silt loam to sandy loam in the upper part and from loamy fine sand to coarse sand in the lower

part, including strata of gravel and organic material. The horizon is massive or single grain.

Freetown series

The Freetown series consists of deep, very poorly drained soils in depressions and on areas on uplands and outwash plains. The soils formed in highly decomposed organic material more than 51 inches thick. Slopes range from 0 to 1 percent.

Freetown soils are similar to Ipswich, Scarboro, Swansea, and Westbrook soils. The Freetown soils formed in decomposed organic material in freshwater, and the Ipswich and Westbrook soils formed in partially decomposed organic material in saltwater. The Freetown soils have more than 51 inches of organic material, but the Swansea soils are underlain by mineral soil material between depths of 16 and 51 inches. The Freetown soils formed in organic material, and the Scarboro soils formed in mineral material.

Typical pedon of Freetown muck, in the town of Wenham, in a wooded area 700 feet west of the outlet of Pleasant Pond:

Oa1—0 to 2 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); 60 percent fiber, 15 percent rubbed; moderate medium granular structure; very friable; many fine, medium, and coarse roots; mostly woody fiber; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa2—2 to 5 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); 40 percent fiber, 5 percent rubbed; moderate medium granular structure; very friable; common fine and medium roots; mostly woody fiber; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa3—5 to 15 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); 15 percent fiber, 2 percent rubbed; moderate medium subangular blocky structure; friable; few fine roots; woody and herbaceous fiber; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa4—15 to 30 inches; black (10YR 2/1) broken face and rubbed muck (sapric material); 5 percent fiber, 0 percent rubbed; weak thick platy structure; friable; less than 5 percent mineral; extremely acid; clear wavy boundary.

Oa5—30 to 40 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); 5 percent fiber, 0 percent rubbed; weak thick platy structure; friable; less than 5 percent mineral; extremely acid; gradual wavy boundary.

Oa6—40 to 60 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); 5 percent fiber, 0 percent rubbed; massive; friable; less than 5 percent mineral; extremely acid.

The organic material extends to a depth of 51 inches or more. Cumulatively, the layers of hemic material comprise less than 10 inches of the subsurface and bottom tiers, and fibric materials less than 5 inches. Woody fragments are in some part of the profile in most pedons and make up as much as 25 percent of some horizons. The fragments consist of twigs, branches, logs, or stumps and are 1 inch to more than 1 foot in diameter.

The surface tier is neutral or has hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 2. It is dominantly sapric material, but some pedons contain layers of hemic material. It has weak or moderate fine or medium granular or subangular blocky structure, or has moderate medium platy structure, or is massive.

The subsurface tier is neutral or has hue of 5YR to 10YR, value of 2 through 4, and chroma of 0 through 4. It is mottled in some pedons. It has granular, subangular blocky, or platy structure, or it is massive. Unrubbed organic material resembles herbaceous and woody plant tissue.

The bottom tier is neutral or has hue of 5YR through 10YR, value of 2 through 4, and chroma of 0 through 4. It typically is massive but in some pedons has platy or subangular blocky structure.

Hinckley series

The Hinckley series consists of deep, excessively drained soils on terraces, outwash plains, deltas, kames, and eskers. The soils formed in water-sorted glacial material derived mainly from granite and gneiss. Slopes range from 0 to 45 percent.

Hinckley soils and somewhat excessively drained Merrimac soils, moderately well drained Sudbury soils, and poorly drained Walpole soils formed in the same kind of material. The Hinckley soils are similar to Windsor soils but have more gravel.

Typical pedon of Hinckley gravelly fine sandy loam, 3 to 8 percent slopes, in a cultivated area in the town of Middleton, 1,700 feet northwest of the junction of East Street and Peabody Street (fig. 12):

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam; grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many fine and few medium roots; 30 percent gravel; medium acid; abrupt smooth boundary.

B2—8 to 17 inches; dark yellowish brown (10YR 4/4) gravelly loamy sand; weak fine granular structure; very friable; common fine roots; 30 percent gravel; strongly acid; clear wavy boundary.

IIC—17 to 60 inches; yellowish brown (10YR 5/4) coarsely stratified very gravelly sand and gravelly sand; single grain; loose; few fine roots; 5 percent cobblestones, 40 percent gravel; medium acid; abrupt wavy boundary.

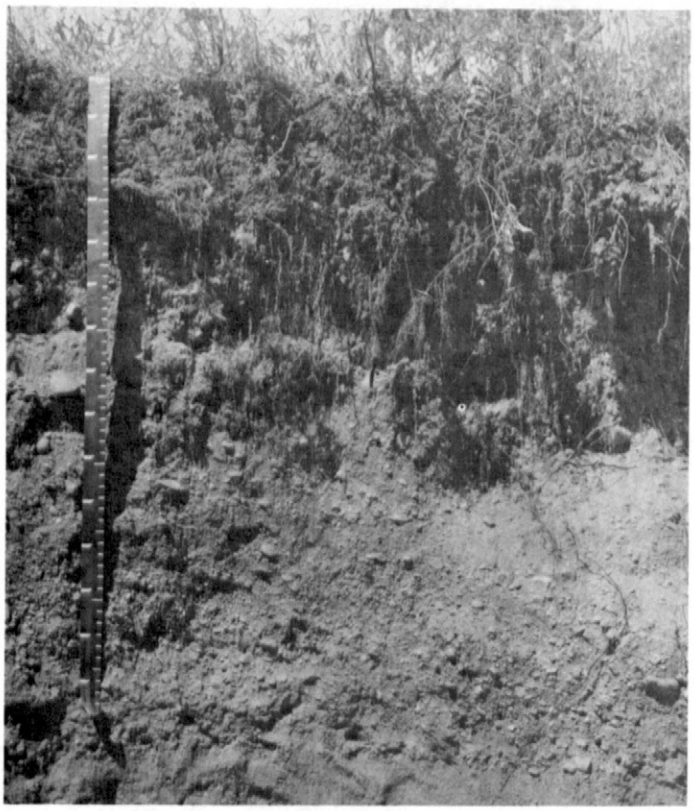


Figure 12.—Typical profile of Hinckley gravelly fine sandy loam, 3 to 8 percent slopes.

The solum thickness ranges from 13 to 24 inches. Gravel and cobblestones make up 10 to 50 percent of the solum and 35 to 70 percent of the substratum. Reaction in unlimed areas ranges from medium acid to very strongly acid.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Some pedons have an A1 horizon which has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A horizon ranges from fine sandy loam to loamy coarse sand or their gravelly analogs.

The B horizon has hue of 7.5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. The texture to a depth of 10 inches ranges from fine sandy loam to loamy coarse sand or their gravelly or cobbly analogs. Below a depth of 10 inches, it ranges from coarse sand to loamy fine sand or their gravelly, very gravelly, or cobbly analogs.

The IIC horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 2 through 6. It ranges from gravelly loamy fine sand to very cobbly coarse sand and is stratified.

Hollis series

The Hollis series consists of shallow, somewhat excessively drained soils on upland hills and ridges. The soils formed in a thin mantle of glacial till derived mainly from granite and gneiss. Slopes range from 3 to 35 percent.

Hollis soils are similar to Canton, Chatfield, Montauk, and Paxton soils. The Canton, Montauk, and Paxton soils are deep, and the Chatfield soils are moderately deep.

Typical pedon of Hollis fine sandy loam, in an area of Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes, in the city of Beverly, in a wooded area 150 feet east of the north end of Keller's Pond:

O2—2 inches to 0; black (10YR 2/1) decomposed organic material; weak fine granular structure; very friable; many cobblestones, stones, and boulders; extremely acid; abrupt smooth boundary.

A1—0 to 3 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; 10 to 15 percent angular gravel and cobblestones; very strongly acid; clear wavy boundary.

B2—3 to 18 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; many fine and medium roots in top 3 inches, common below; 10 to 15 percent angular gravel and cobblestones; very strongly acid; abrupt wavy boundary.

R—18 inches; granite bedrock.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. Gravel-size coarse fragments make up 5 to 25 percent of the solum. Some pedons have stones and boulders on the surface and in the solum. Reaction ranges from medium acid to very strongly acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 2 or 3. It is fine sandy loam, loam, or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6. It is fine sandy loam, loam, or sandy loam. Structure is weak granular or subangular blocky.

Ipswich series

The Ipswich series consists of deep, very poorly drained soils in tidal marshes subject to inundation by saltwater twice daily. The soils formed in thick organic deposits under saline conditions. Slopes range from 0 to 1 percent.

Ipswich soils are similar to Freetown, Swansea, and Westbrook soils. The Ipswich soils formed in partly decomposed herbaceous plants in saltwater; the

Freetown and Swansea soils formed in decomposed herbaceous and woody plants in freshwater. The Ipswich soils formed in a thicker layer of organic material than the Westbrook soils.

Typical pedon of Ipswich mucky peat, in an area of Ipswich and Westbrook mucky peats, in the town of Ipswich, 1,000 yards east of the bridge on Labor-in-Vain Road over Labor-in-Vain Creek:

Oe1—0 to 17 inches; very dark grayish brown (10YR 3/2) mucky peat (hemic material); 95 percent fiber, 50 percent rubbed; dense massive mat of decaying roots, stems, and leaves; friable, many fine and medium roots; moderate hydrogen sulfide odor; herbaceous fibers; 10 percent silt; medium acid in water; clear smooth boundary.

Oe2—17 to 42 inches; brown (10YR 4/3) broken face mucky peat (hemic material); very dark grayish brown (2.5Y 3/2) rubbed, very dark grayish brown (10YR 3/2) pressed; 80 percent fibers, 40 percent rubbed; massive; friable; common fine roots; moderate hydrogen sulfide odor; 15 percent silt and very fine sand; medium acid in water; abrupt smooth boundary.

Oa—42 to 60 inches; very dark grayish brown (2.5Y 3/2) muck (sapric material); 25 percent fiber, 15 percent rubbed; massive; friable; moderate hydrogen sulfide odor; 15 percent silt and very fine sand; medium acid in water.

The organic deposit is more than 51 inches thick. Thin layers of silt and very fine sand are in some pedons. Reaction is strongly acid to neutral.

Thg surface tier has hue of 10YR through 5Y, value of 2 through 4, and chroma of 1 through 3. The fiber content is 35 to 100 percent unrubbed and 20 to 75 percent rubbed. The mineral content is 5 to 50 percent.

The subsurface tier has hue of 10YR through 5Y, value of 2 through 4, and chroma of 1 through 3. The fiber content is 20 to 85 percent unrubbed and 20 to 40 percent rubbed. The mineral content is 5 to 50 percent.

The bottom tier is neutral or has hue of 10YR through 5Y, value of 2 through 4, and chroma of 0 through 3. The fiber content is 10 to 70 percent unrubbed and 5 to 40 percent rubbed. The mineral content is 5 to 50 percent.

Maybid series

The Maybid series consists of deep, very poorly drained soils on lowlands. The soils formed in water-deposited material of marine or lacustrine origin. Slopes range from 0 to 3 percent.

Maybid soils and moderately well drained Boxford soils and poorly drained Scitico soils formed in the same kind of material. Maybid soils are similar to Swansea and Whately Variant soils. The Maybid soils formed in silt and clay, while the Swansea soils formed in organic material underlain by sand. The Maybid soils have less sand in the solum than the Whately Variant soils.

Typical pedon of Maybid silt loam, in a wooded area in the town of Essex, 100 feet east of Belcher Street from a point 1,950 feet south of its junction with Choate Street:

O1—2 inches to 0; very dark grayish brown (10YR 3/2) decaying organic material and live roots.

A1—0 to 5 inches; very dark grayish brown (2.5Y 3/2) silt loam; moderate fine granular structure; friable; many fine roots in upper 2 inches, common fine roots in lower 3 inches; strongly acid; abrupt irregular boundary.

B2g—5 to 19 inches; olive gray (5Y 5/2) silty clay loam; common fine and medium prominent light gray (5Y 6/1) and dark yellowish brown (10YR 4/4) mottles; weak moderate and coarse subangular blocky structure; firm, slightly sticky; few fine roots to a depth of 18 inches in cracks; slightly acid; abrupt wavy boundary.

C1g—19 to 42 inches; greenish gray (5GY 5/1) silty clay; many fine and medium prominent yellowish red (5YR 5/6) mottles; weak thick platy structure parting to weak medium and coarse subangular blocky; very firm; slightly acid; clear wavy boundary.

C2g—42 to 60 inches; gray (5Y 5/1) silty clay; many fine and medium prominent brown (7.5YR 4/4) and yellowish brown (10YR 5/6) mottles and few fine distinct light gray (5Y 6/1) mottles; massive; very firm, sticky, plastic; coarsely varved; small patches of reddish black (10YR 2/1) manganese accumulations; neutral.

The thickness of the solum ranges from 18 to 30 inches. The content of coarse fragments is less than 1 percent throughout. Reaction is strongly acid to medium acid in the A horizon, medium acid to neutral in the B horizon, and slightly acid to neutral in the C horizon.

The A horizon is neutral or has hue of 10YR through 5Y, value of 2 or 3, and chroma of 0 through 2. It is silt loam or silty clay loam. Some pedons have an A2g horizon.

The Bg horizon is neutral or has hue of 5Y or 5GY, value of 4 or 5, and chroma of 0 through 2. It has distinct or prominent high-chroma mottles. It is silty clay loam, silty clay, or clay. It has weak or moderate prismatic or subangular blocky structure, or it is massive.

The Cg horizon is neutral or has hue of 5Y, 5GY, 5G, or 5BG; value of 4 or 5; and chroma of 0 or 1. It is silty clay loam, silty clay, or clay.

Melrose series

The Melrose series consists of deep, well drained soils on glaciolacustrine, marine, or outwash plains and deltas. The soils formed in a thin mantle of loamy

outwash or lacustrine materials over clayey sediments. Slopes range from 0 to 8 percent.

Melrose soils formed in the same kind of material as moderately well drained Elmridge soils, poorly drained Shaker soils, and very poorly drained Whately Variant soils and are similar to Boxford, Merrimac, and Ninigret soils. The Melrose soils have more sand in the solum than the Boxford soils and do not have mottles in the lower part of the solum or in the substratum. The Melrose soils have more clay in the substratum than the Merrimac or Ninigret soils, have fewer coarse fragments throughout than the Merrimac soils, and do not have mottles in the lower part of the solum or in the substratum as do the Ninigret soils.

Typical pedon of Melrose fine sandy loam, 0 to 3 percent slopes, in a hayfield in the town of Ipswich, 100 feet north of Argilla Road from a point 650 feet west of its junction with Northgate Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

B21—9 to 26 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; few fine roots; medium acid; clear wavy boundary.

B22—26 to 30 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine granular structure; friable; medium acid; abrupt wavy boundary.

IIC1—30 to 36 inches; olive (5Y 5/3) silty clay loam; moderate fine and medium angular blocky structure; firm, slightly sticky; light olive gray (5Y 6/2) silt coatings on ped faces; medium acid; clear wavy boundary.

IIC2—36 to 60 inches; olive (5Y 4/3) silty clay; massive; very firm, sticky; slightly acid.

The depth to the underlying fine-textured material ranges from 18 to 40 inches. The solum is 0 to 3 percent coarse fragments. The solum ranges from strongly acid to medium acid, and the substratum ranges from strongly acid to neutral.

The A horizon has hue of 10YR and value and chroma of 2 through 4. It is fine sandy loam, very fine sandy loam, sandy loam, or loam. It has weak or moderate, fine or medium granular structure.

The B2 horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 3 through 6. It mainly is fine sandy loam, sandy loam, or coarse sandy loam. It has weak or moderate, fine or medium granular or weak very fine to medium subangular blocky structure. Thin horizons of loamy sand or loamy fine sand are above the lithologic discontinuity in some pedons.

The IIC horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 through 3. It mainly is silty clay loam, silty clay, or clay. There are a few silt and clay films on ped faces in some pedons. The IIC horizon is massive; or it has weak coarse prismatic, moderate fine or medium subangular or angular blocky, or weak to strong, medium to thick platy structure. It is firm or very firm.

The Melrose soils in this survey area are a taxadjunct to the Melrose series because they have a slightly higher soil temperature regime. This difference does not significantly affect the use and management of the soils.

Merrimac series

The Merrimac series consists of deep, somewhat excessively drained soils on outwash plains, terraces, kames, and eskers. The soils formed in glacial outwash material derived mainly from granite and gneiss. Slopes range from 0 to 25 percent.

The Merrimac soils formed in the same kind of material as moderately well drained Sudbury soils and poorly drained Walpole soils and are similar to Canton, Hinckley, and Windsor soils. The Merrimac soils formed in glacial outwash and are stratified; the Canton soils formed in glacial till and are not stratified. The Merrimac soils have fewer coarse fragments between depths of 10 and 40 inches than the Hinckley soils. The Merrimac soils have less sand in the solum than the Hinckley or Windsor soils and have more gravel throughout than the Windsor soils.

Typical pedon of Merrimac fine sandy loam, 0 to 3 percent slopes, in a cultivated field in the Town of Middleton, 2,200 feet northwest of the junction of East Street and Peabody Street:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) fine sandy loam; light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; common fine roots; 15 percent fine gravel; medium acid; abrupt smooth boundary.

B21—10 to 15 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; weak fine granular structure; very friable; 20 percent gravel; strongly acid; clear wavy boundary.

B22—15 to 22 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; weak medium granular structure; very friable; 30 percent gravel; strongly acid; abrupt wavy boundary.

IIC1—22 to 48 inches; yellowish brown (10YR 5/4) gravelly sand; single grain; loose; 40 percent gravel; medium acid; abrupt wavy boundary.

IIIC2—48 to 60 inches; yellowish brown (10YR 5/4) stratified sand, gravelly sand, and very gravelly sand; single grain; loose; 5 percent cobblestones, 0 to 50 percent gravel in individual strata; medium acid.

The solum thickness ranges from 18 to 30 inches. The upper part of the solum commonly is 5 to 20 percent gravel, and the lower part is 5 to 30 percent gravel. The substratum contains 25 to 55 percent gravel and 5 to 15

percent cobblestones. The total volume of rock fragments in the control section is less than 35 percent. Unless limed, the soil ranges from extremely acid to medium acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. Some pedons have an A1 horizon with hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. The A horizon is fine sandy loam, sandy loam, or very fine sandy loam.

The B horizon has hue of 7.5YR or 10YR in the upper part and 7.5YR to 2.5Y in the lower part, value of 3 through 6, and chroma of 3 through 8. The upper part of the B horizon is fine sandy loam, sandy loam, or very fine sandy loam. It has weak very fine to medium granular structure, or it is massive. The lower part of the B horizon is sandy loam, gravelly sandy loam, loamy sand, or gravelly loamy sand. Sandy loam does not extend below a depth of 27 inches, but a minimum of 5 inches of sandy loam overlies any B or IIC horizon that is loamy fine sand or coarser. The B subhorizon above the IIC horizon is single grain in many pedons.

The IIC horizon has hue of 10YR through 5Y and ranges widely in value and chroma. It is stratified sand, gravel, and cobblestones and has a weighted texture of gravelly sand or very gravelly sand.

Montauk series

The Montauk series consists of deep, well drained soils on upland till plains and moraines. The soils formed in sandy glacial till derived mainly from granitic materials.

Montauk soils and moderately well drained Scituate soils formed in the same kinds of material. Montauk soils are similar to Annisquam, Canton, and Paxton soils. The Montauk soils have fewer rock fragments throughout than the Annisquam soils, have a fragipan, which the Canton soils do not have, and have more sand in the substratum than the Paxton soils.

Typical pedon of Montauk fine sandy loam, in an area of Montauk very stony fine sandy loam, 3 to 8 percent slopes, in a wooded area in the town of Middleton, 300 feet southwest of Forest Street from a point 2,300 feet west of its junction with Main Street (fig. 13):

A1—0 to 4 inches; black (10YR 2/1) fine sandy loam; dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many fine, medium, and coarse roots; 5 percent gravel; strongly acid; abrupt smooth boundary.

B21—4 to 13 inches; brown (7.5YR 4/4) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; 5 percent stones, 5 percent cobblestones, 5 percent gravel; strongly acid; clear wavy boundary.

B22—13 to 25 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium granular structure; friable; common fine roots; 10 percent stones, 5 percent cobblestones, 5 percent gravel; strongly acid; abrupt wavy boundary.

IIC1—25 to 34 inches; olive brown (2.5Y 4/4) loamy sand; single grain; firm in place, loose disturbed; few fine roots; 10 percent stones, 5 percent cobblestones, 15 percent gravel; strongly acid; abrupt wavy boundary.

IIC2x—34 to 60 inches; olive (5Y 4/3) gravelly loamy sand; weak medium platy structure; very firm; 10 percent stones, 5 percent cobblestones, 20 percent gravel; medium acid.

Figure 13.—Typical profile of Montauk fine sandy loam in an area of Montauk very stony fine sandy loam, 3 to 8 percent slopes.

The depth to the fragipan ranges from 20 to 36 inches. Rock fragments make up 3 to 35 percent of the solum and 5 to 50 percent of the fragipan. The soil is extremely acid to medium acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 1 through 4. It is fine sandy loam, sandy loam, or loam. It has weak or moderate, fine or medium granular structure and friable or very friable consistence.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6. The lower part has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. The B horizon is fine sandy loam, sandy loam, or loam. It mainly has weak medium granular or subangular blocky structure but is massive in the lower part of some pedons.

The IIC1 horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 3 through 6. It is loamy sand or coarse sandy loam or their gravelly analogs. The IICx horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 6. The Cx horizon has weak, thin to thick platy structure, or it is massive. It is firm or very firm.

The Montauk soils in this survey area are a taxadjunct to the Montauk series because they have a horizon of friable loamy sand above the IICx horizon. This difference does not significantly affect the use and management of the soils.

Ninigret series

The Ninigret series consists of deep, moderately well drained soils on outwash plains and stream terraces. The soils formed in loamy outwash material over thick sandy glacial outwash derived mainly from granite and gneiss. Slopes range from 0 to 8 percent.

Ninigret soils are similar to Belgrade, Deerfield, and Sudbury soils. The Ninigret soils have more sand and less silt throughout than the Belgrade soils, have less sand in the solum than the Deerfield soils, and have less gravel in the solum than the Sudbury soils.

Typical pedon of Ninigret fine sandy loam, 0 to 3 percent slopes, in a field in the town of Middleton, 600 feet east-northeast of the junction of East Street and Locust Street:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

B21—9 to 15 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; common fine and few medium roots; 5 percent fine gravel; very dark grayish brown (10YR 3/2) Ap material in old root channels and worm holes; medium acid; gradual wavy boundary.

B22—15 to 22 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable; common fine roots; medium acid; abrupt wavy boundary.

B23—22 to 28 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common fine distinct light gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; weak fine granular structure; very friable; medium acid; abrupt wavy boundary.

B3—28 to 33 inches; light brownish gray (2.5Y 6/2) fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; medium acid; abrupt wavy boundary.

IIC1—33 to 40 inches; light brownish gray (2.5Y 6/2) loamy fine sand; few fine faint light gray (10YR 6/1) mottles; massive; very friable; medium acid; abrupt wavy boundary.

IIC2—40 to 60 inches; light olive brown (2.5Y 5/4) fine sand; common medium prominent light gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; single grain; loose; medium acid.

The thickness of the solum and the depth to the IIC horizon range from 18 to 34 inches. The gravel content is 0 to 10 percent gravel in the solum, 0 to 30 percent in the part of the C horizon above a depth of 40 inches, and 0 to 60 percent below a depth of 40 inches. The soil is very strongly acid to medium acid throughout.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 4. It is fine sandy loam or very fine sandy loam.

The B21 horizon has hue of 7.5YR or 10YR and value and chroma of 4 through 6. The B22, B23, and B3 horizons have hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 5. The B horizon at a depth of less than 24 inches is mottled. The B horizon mainly is fine sandy loam or very fine sandy loam. Some pedons have a layer of sandy loam or loamy fine sand less than 5 inches thick in the lower part. The B horizon has weak granular or subangular blocky structure or is massive.

The IIC horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 6. It ranges from loamy fine sand to sand or their gravelly analogs. It is massive or single grain and is very friable or loose.

Paxton series

The Paxton series consists of deep, well drained soils on uplands. The soils formed in glacial till derived mainly from granite and gneiss. Slopes range from 3 to 45 percent.

Paxton soils and poorly drained Ridgebury soils, very poorly drained Whitman soils, and moderately well drained Woodbridge soils formed in the same kind of material. Paxton soils are similar to Montauk soils but have less sand in the fragipan.

Typical pedon of Paxton fine sandy loam, 3 to 8 percent slopes, in the town of Middleton, in a field 2,000

feet east-northeast of the junction of Maple Street, East Street, and Gregory Street:

Ap—0 to 9 inches; very dark brown (10YR 2/2) fine sandy loam, grayish brown (2.5Y 5/2) dry; weak fine granular structure; friable; many fine roots; 10 percent gravel; slightly acid; abrupt smooth boundary.

B21—9 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; common fine roots; 5 percent gravel; slightly acid; clear wavy boundary.

B22—16 to 23 inches; olive brown (2.5Y 4/4) fine sandy loam; weak fine granular structure; friable; 5 percent cobblestones, 10 percent gravel; medium acid; abrupt smooth boundary.

Cx—23 to 60 inches; olive brown (2.5Y 4/4) fine sandy loam; moderate medium and thick platy structure; very firm and brittle; 5 percent stones, 5 percent cobblestones, 15 percent gravel; medium acid.

The thickness of the solum ranges from 15 to 38 inches and corresponds to the depth to the compact till. The rock fragment content ranges from 5 to 35 percent in the solum and 10 to 40 percent in the substratum. The reaction in unlimed areas is slightly acid to very strongly acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is fine sandy loam, loam, or their gravelly analogs.

The B21 horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. The B22 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 6. The B horizon is sandy loam, fine sandy loam, loam, or their gravelly analogs. It is granular or subangular blocky, or it is massive. It is friable or very friable.

The Cx horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 4. It is fine sandy loam, sandy loam, loam, or their gravelly analogs. It has weak or moderate, medium or thick platy structure, or it is massive. It is firm or very firm and brittle.

Pipestone series

The Pipestone series consists of deep, somewhat poorly drained soils on outwash plains, lake plains, and water-worked till plains. The soils formed in sandy outwash deposits. Slopes range from 0 to 3 percent.

Pipestone soils are similar to Walpole and Wareham soils. The Pipestone soils have a spodic horizon, which the Walpole and Wareham soils do not, and they have more sand in the solum than the Walpole soils.

Typical pedon of Pipestone loamy fine sand, in a wooded area in the town of Ipswich, 150 feet east of Locust Street from a point 1,800 feet north of its junction with Town Farm Road:

A1—0 to 9 inches; black (10YR 2/1) loamy fine sand; weak fine and medium granular structure; very friable; many fine and medium roots; very strongly acid; abrupt irregular boundary.

A2—9 to 14 inches; gray (10YR 5/1) loamy sand; few fine faint light gray (10YR 6/1) mottles; weak medium granular structure; very friable; commmon fine and medium roots; strongly acid; abrupt wavy boundary.

B21hir—14 to 16 inches; dark reddish brown (5YR 3/3) loamy sand; massive; firm; few fine roots; 20 percent dark red (2.5YR 3/6) ortstein; strongly acid; abrupt wavy boundary.

B22—16 to 28 inches; dark yellowish brown (10YR 4/4) loamy sand; few coarse distinct light gray (10YR 6/1) mottles; massive; very friable; few fine roots; medium acid; abrupt wavy boundary.

C1—28 to 43 inches; strong brown (7.5YR 5/6) sand; few coarse distinct grayish brown (10YR 5/2) and dark red (2.5YR 3/6) mottles; single grain; loose; medium acid; abrupt wavy boundary.

C2—43 to 60 inches; yellowish brown (10YR 5/4) fine sand; common medium prominent light gray (10YR 6/1) and dark red (2.5YR 3/6) mottles; single grain; loose; medium acid.

The solum thickness ranges from 20 to 40 inches. Some pedons are up to 10 percent fine gravel. The soil mainly is very strongly acid to neutral throughout. Some pedons have an extremely acid surface layer.

The A1 or Ap horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 1 or 2. It is loamy fine sandy, loamy sand, fine sand, or sand. The A2 horizon has hue of 10YR or 7.5YR, value of 5 through 7, and chroma of 1 through 3. It is loamy sand, fine sand, or sand.

The B21hir horizon has hue of 5YR through 10YR, value of 2 through 5, and chroma of 2 through 6. It is loamy sand, fine sand, or sand. In some pedons ortstein material comprises up to 30 percent of the B21hir horizon. The B21hir horizon has weak, fine to coarse granular or blocky structure, or it is single grain. The B22 horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. It is loamy sand, fine sand, or sand.

The C horizon has hue of 7.5YR through 10YR, value of 5 or 6, and chroma of 2 through 6. It is sand or fine sand.

Pollux series

The Pollux series consists of deep, well drained soils on glaciofluvial and glaciolacustrine plains and deltas. The soils formed in glacial outwash materials underlain by varved lacustrine sediments. Slopes range from 0 to 8 percent.

Pollux soils are similar to Elmridge, Melrose, and Ninigret soils. The Pollux soils have more silt and very fine sand and less clay in the substratum than the Elmridge or Melrose soils. The Pollux soils have more very fine sand and silt in the substratum than the Ninigret soils.

Typical pedon of Pollux fine sandy loam, 0 to 8 percent slopes, in the town of Essex, in a field 2,500 feet east-southeast of the junction of Apple Street and Western Avenue:

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

B21—10 to 20 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; few fine roots; 5 percent fine gravel; medium acid; clear wavy boundary.

B22—20 to 35 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable; 5 percent fine gravel; medium acid; abrupt wavy boundary.

IIC1—35 to 46 inches; olive (5Y 5/3) silt loam; many medium prominent gray (5Y 6/1) and strong brown (7.5YR 5/6) mottles; massive; firm; medium acid; clear wavy boundary.

IIC2—46 to 54 inches; light olive brown (2.5Y 5/4) very fine sandy loam; common fine and medium distinct gray (5Y 6/1) and brown (7.5YR 4/4) mottles; massive; firm; slightly acid; clear wavy boundary.

IIC3—54 to 60 inches; light olive brown (2.5Y 5/4) very fine sandy loam; few fine distinct brown (7.5YR 4/4) mottles; massive; firm; slightly acid.

The thickness of the solum and the depth to the lithologic discontinuity range from 25 to 40 inches. The coarse fragment content ranges from 0 to 10 percent throughout the solum. Reaction in unlimed areas ranges from very strongly acid to medium acid above a depth of 30 inches and very strongly acid to neutral below a depth of 30 inches.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 through 4. It ranges from sandy loam to very fine sandy loam.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6. The lower part has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 or 6. The B horizon ranges mainly from sandy loam to fine sandy loam. Some pedons have thin layers of sand in the lower part.

The IIC horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 4. It mainly is silt, silt loam, very fine sandy loam, or very fine sand. Some pedons have thin strata or varves, and some pedons have thin strata of clay. Some pedons do not have mottles in the IIC horizon.

Poquonock series

The Poquonock series consists of deep, well drained soils on uplands. The soils formed in sandy sediments over loamy glacial till derived mainly from granite and gneiss. Slopes range from 3 to 25 percent.

Poquonock soils are similar to Montauk, Paxton, and Windsor soils. The Poquonock soils have more sand and fewer coarse fragments in the solum than the Montauk or Paxton and less sand in the substratum than the Montauk soils. The Poquonock soils have a dense substratum; the Windsor soils do not.

Typical pedon of Poquonock loamy sand, in a wooded area of Poquonock very stony loamy sand, 3 to 8 percent slopes, in the town of Ipswich, 100 yards north of the water standpipe at the end of Edge Street:

O1—1 inch to 0; decomposed leaves and twigs.

Ap—0 to 7 inches; dark yellowish brown (10YR 3/4) loamy sand; weak fine granular structure; very friable; many fine and medium and few coarse roots; very strongly acid; clear smooth boundary.

B21—7 to 17 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary.

B22—17 to 24 inches; yellowish brown (10YR 5/4) loamy fine sand; massive; very friable; few fine roots; 10 percent fine gravel; strongly acid; abrupt smooth boundary.

IICx—24 to 60 inches; light olive brown (2.5Y 5/4) gravelly fine sandy loam; weak thin and medium platy structure; very firm, brittle; 5 percent stones, 5 percent cobblestones, 20 percent gravel; strongly acid.

The thickness of the solum and the depth to the substratum range from 22 to 38 inches. The content of coarse fragments ranges from 0 to 10 percent in the solum and from 10 to 30 percent in the IICx horizon. The soil is very strongly acid to medium acid throughout.

The A horizon has hue of 7.5YR or 10YR and value and chroma of 2 through 4. It is loamy sand, loamy fine sand, sandy loam, or fine sandy loam. It has weak fine or medium granular structure and friable or very friable consistence.

The B horizon has hue of 7.5YR through 2.5Y and value and chroma of 4 through 6. It is loamy sand, loamy fine sand, fine sand, or sand. The B21 horizon has weak granular structure, or it is massive. The B22 horizon is massive or single grain. Consistence is very friable or loose.

The IICx horizon has hue of 10YR through 5Y, value of 3 through 5, chroma of 1 through 4. It ranges from sandy loam to silt loam or their gravelly analogs. It has thin to thick platy structure, or it is massive.

Ridgebury series

The Ridgebury series consists of deep, poorly drained soils on uplands. The soils formed in loamy glacial till derived mainly from granite and gneiss. Slopes range from 0 to 8 percent.

Ridgebury soils and well drained Paxton soils, very poorly drained Whitman soils, and moderately well drained Woodbridge soils formed in the same kind of materials. Ridgebury soils are similar to Walpole soils but have less sand in the substratum and have a dense substratum which the Walpole soils do not have.

Typical pedon of Ridgebury fine sandy loam, in a wooded area of Ridgebury extremely stony fine sandy loam, 3 to 8 percent slopes, in the town of Essex, 3,100 feet south-southwest of the junction of Belcher Road and Choate Street:

Ap—0 to 9 inches; very dark brown (10YR 2/2) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; 5 percent stones, 10 percent gravel; strongly acid; abrupt wavy boundary.

B21—9 to 14 inches; olive (5Y 5/3) fine sandy loam; common fine distinct gray (5Y 5/1) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine roots; 5 percent cobblestones, 15 percent gravel; strongly acid; clear wavy boundary.

B22—14 to 20 inches; olive gray (5Y 5/2) gravelly sandy loam; common fine distinct dark brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; friable; few fine roots; 5 percent cobblestones, 20 percent gravel; strongly acid; clear wavy boundary.

Cx—20 to 60 inches; olive gray (5Y 5/2) gravelly sandy loam; common fine and medium distinct dark brown (7.5YR 4/4) mottles; massive; firm, brittle; 5 percent stones, 5 percent cobblestones, 20 percent gravel; strongly acid.

The thickness of the solum ranges from 10 to 30 inches. The content of stones in the soil ranges from 0 to 10 percent, of cobblestones from 0 to 10 percent, and of gravel from 5 to 30 percent. The soil in unlimed areas ranges from very strongly acid to medium acid throughout.

The A horizon is neutral or has hue of 10YR through 5Y, value of 2 or 3, and chroma of 0 through 2. It is fine sandy loam, sandy loam, or their gravelly analogs.

The B horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 0 through 3. Mottles are few or common, fine to coarse, and distinct or prominent. The B horizon is fine sandy loam, sandy loam, or their gravelly analogs. It is massive or has weak subangular blocky structure. It is very friable, friable, or firm.

The Cx horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 3. It has common or many, fine to coarse, distinct or prominent mottles. It ranges from coarse sandy loam to loam or their gravelly analogs. It is massive or has platy structure.

Scarboro series

The Scarboro series consists of deep, very poorly drained soils on outwash plains, deltas, and terraces. The soils formed in sandy glaciofluvial deposits. Slopes range from 0 to 3 percent.

Scarboro soils and somewhat poorly drained Pipestone soils and poorly drained Wareham soils formed in the same kinds of material. Scarboro soils are similar to Fluvaquents and Swansea soils. The Scarboro soils are grayer below the surface layer than the Pipestone or Wareham soils. The content of organic matter in the Scarboro soils decreases with depth but is variable in the Fluvaquents. The Scarboro soils have a thinner organic layer on the surface than the Swansea soils.

Typical pedon of Scarboro mucky loamy fine sand, in the town of Ipswich, in a wooded area 1,600 feet southwest of the junction of Town Farm Road and Greens Point Road:

O1—3 inches to 0; black (10YR 2/1) mucky peat; weak fine and medium granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.

A1—0 to 8 inches; very dark brown (10YR 2/2) mucky loamy fine sand; weak fine and medium granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary.

A2g—8 to 13 inches; gray (10YR 5/1) loamy sand; few fine faint light gray (10YR 6/1) mottles; weak medium granular structure; very friable; common fine and medium roots; strongly acid; abrupt wavy boundary.

C1g—13 to 19 inches; grayish brown (2.5Y 5/2) loamy sand; single grain; loose; few fine roots; strongly acid; abrupt wavy boundary.

C2g—19 to 60 inches; coarsely stratified grayish brown (10YR 5/2) gravelly coarse sand, light yellowish brown (2.5Y 6/4) coarse sand, grayish brown (2.5Y 5/2) loamy sand, and gray (5Y 5/1) fine sand; single grain; loose; strongly acid.

The gravel content ranges from 0 to 10 percent in the A horizon, 0 to 20 percent in the part of the C horizon to a depth of 30 inches, and 0 to 50 percent in the part of the C horizon below a depth of 30 inches. The soil is very strongly acid to medium acid throughout.

The O horizon is mucky peat or muck.

The A1 horizon is neutral or has hue of 7.5YR through 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is loamy fine sand, loamy sand, sand, sandy loam, fine sandy loam, or their mucky analogs.

The A2 horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 or 2. It is loamy sand, loamy fine sand, fine sand, sand, sandy loam, or fine sandy loam.

The C horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 4. Mottles are none to many and fine to coarse. The C horizon is loamy fine sand, loamy sand, fine sand, sand, loamy coarse sand, coarse sand, or their gravelly analogs and is typically stratified. It is single grain or massive and very friable or loose.

Scitico series

The Scitico series consists of deep, poorly drained soils on lowlands on glaciolacustrine or marine terraces. The soils formed in marine or lacustrine sediments. Slopes range from 0 to 5 percent.

Scitico soils and moderately well drained Boxford soils and very poorly drained Maybid soils formed in the same kinds of material, and Scitico soils are similar to Shaker soils. The depth of the mottles is shallower in the Scitico soils than in the Boxford soils. The Scitico soils are browner in the subsoil than the Maybid soils and have more clay and less sand in the solum than the Shaker soils.

Typical pedon of Scitico silt loam, 0 to 5 percent slopes, in the town of Ipswich, 1/2 mile west of the junction of Fellows Road and Candlewood Road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; 2 percent gravel; medium acid; abrupt wavy boundary.

B21g—8 to 16 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; firm, slightly sticky, plastic; light gray (10YR 7/1) silt common on many vertical and some horizontal ped faces; common fine roots; 1 percent gravel; light olive gray (5Y 6/2) discontinuous fine sand strata 1/4 inch thick; medium acid; clear smooth boundary.

B22g—16 to 24 inches; gray (10YR 5/1) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate fine blocky structure; firm, sticky, plastic; some clay films; 2-millimeter silt coats on some vertical ped faces; few fine roots; common dark gray (10YR 4/1) linings in old root channels; medium acid; abrupt smooth boundary.

B23g—24 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6 and 5/4) mottles; moderate coarse subangular blocky structure; firm, sticky, plastic; dark gray (N 4/0) coatings in old root channels and on vertical ped faces; two 1/4 inch thick bands of fine sand in lower part of horizon; slightly acid; abrupt smooth boundary.

C1—42 to 57 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium distinct grayish brown (2.5Y 5/2) and gray (N 5/0) mottles; weak medium platy structure; firm, sticky, plastic; slightly acid; abrupt smooth boundary.

C2—57 to 70 inches; olive (5Y 5/4) silty clay; weak medium platy structure; firm, sticky, plastic; two 1/4 inch thick layers of dark yellowish brown (10YR 4/4) sand; slightly acid; abrupt smooth boundary.

The thickness of the solum ranges from 25 to 45 inches. The soil is typically free of rock fragments, but some pedons are up to 3 percent gravel. The upper part of the solum ranges from strongly acid to neutral. The lower part of the solum and the C horizon range from medium acid to neutral.

The Ap horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 1 or 2. It is silt loam, silty clay loam, or loam. It has weak or moderate, fine to coarse, granular or subangular blocky structure. It is friable or very friable.

The B horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 through 6; and chroma of 1 or 2. It ranges from silt loam to silty clay in the upper part and from silty clay loam to clay in the lower part. It mainly has subangular blocky, blocky, or platy structure and is friable or firm. Some pedons have prismatic structure.

The C horizon is neutral or has hue of 2.5Y or 5Y and value of 4 through 6. It has chroma of 0 through 2 above a depth of 30 inches and 0 through 4 below 30 inches. The C horizon is silty clay loam, silty clay, or clay. It has platy or prismatic structure, or it is massive and is firm or very firm. Some pedons are varved. Patchy or discontinuous manganese coatings are common in the B and C horizons of pedons from marine sediments and are less common or are not in pedons from lacustrine sediments.

Scituate series

The Scituate series consists of deep, moderately well drained soils on upland plains, hills, and ridges. The soils formed in stony and bouldery sandy glacial till derived mainly from granite and gneiss. Slopes range from 3 to 15 percent.

Scituate soils and well drained Annisquam and Montauk soils formed in the same kinds of material, and Scituate soils are similar to Woodbridge soils. The Scituate soils have mottles, and the Annisquam and Montauk soils are not mottled. The Scituate soils have more sand in the substratum than the Woodbridge soils.

Typical pedon of Scituate fine sandy loam, in an area of Scituate very stony fine sandy loam, 3 to 8 percent slopes, in the town of Danvers, in a field 400 feet south

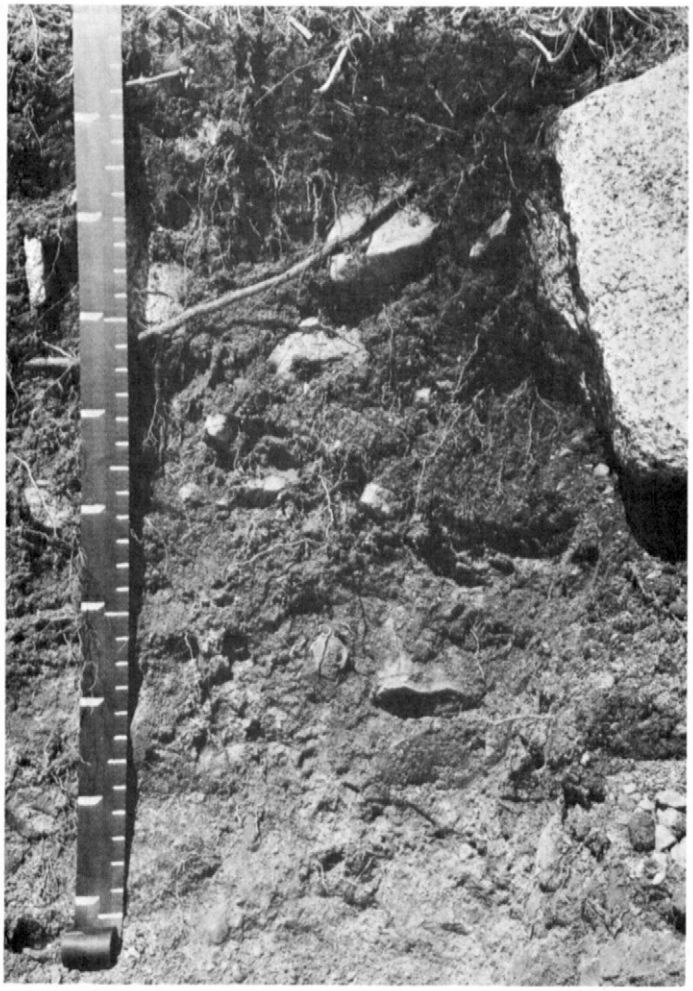


Figure 14.—Typical profile of Scituate fine sandy loam in an area of Scituate very stony fine sandy loam, 3 to 8 percent slopes.

of Green Street and 1,000 feet west of U.S. Route 1 (fig. 14):

Ap—0 to 9 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; 10 percent gravel; strongly acid; abrupt smooth boundary.

B21—9 to 21 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; very friable; common fine roots; 15 percent gravel; strongly acid; abrupt smooth boundary.

B22—21 to 30 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine granular structure; friable; 5 percent stones, 5 percent cobblestones, 15 percent gravel; strongly acid; abrupt wavy boundary.

B23—30 to 34 inches; light olive brown (2.5Y 5/4) gravelly fine sandy loam; common fine distinct gray (5Y 5/1) and brown (7.5YR 4/4) mottles; weak fine granular structure; friable; 5 percent stones, 5 percent cobblestones, 20 percent gravel; medium acid; abrupt wavy boundary.

IICx—34 to 60 inches; light olive brown (2.5Y 5/4) gravelly loamy sand; common medium distinct gray (5Y 5/1) and dark yellowish brown (10YR 4/4) mottles; weak thick platy structure; very firm; 5 percent stones, 5 percent cobblestones, 20 percent gravel; medium acid.

The solum is 18 to 34 inches thick. The gravel content ranges from 5 to 25 percent in the solum and 10 to 35 percent in the IIC horizon. The cobblestone content ranges from 0 to 5 percent of the B and IIC horizons. The boulder content ranges from 0 to 25 percent. The soil in unlimed areas ranges from extremely acid to slightly acid.

The Ap horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is fine sandy loam, sandy loam, or loam. It has weak or moderate, fine and medium granular structure and is friable or very friable.

The upper part of the B horizon has hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 4 or 6. The lower part of the B horizon has hue of 10YR through 5Y and value and chroma of 4 or 6 and is distinctly or prominently mottled. The B horizon is fine sandy loam, sandy loam, or loam. It has weak, fine or medium granular structure, or it is massive. It is friable or very friable.

The IICx horizon has hue 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. Mottles are common or many, medium or coarse, and distinct or prominent. The IICx horizon is loamy sand, loamy fine sand, loamy coarse sand, or their gravelly analogs. It has weak, thick or very thick platy structure, or it is massive. It is firm or very firm.

Shaker series

The Shaker series consists of deep, poorly drained soils on glaciolacustrine and marine terraces. The soils formed in a thin mantle of loamy material over clayey marine or lacustrine sediments. Slopes range from 0 to 8 percent.

Shaker soils and moderately well drained Elmridge soils, well drained Melrose soils, and very poorly drained Whately Variant soils formed in the same kinds of material. Shaker soils are similar to Scitico and Walpole soils but have more sand in the solum than the Scitico soils and have more clay in the substratum than the Walpole soils.

Typical pedon of Shaker fine sandy loam, 0 to 3 percent slopes, in a cultivated field in the town of Ipswich, 75 feet west of Town Farm Road, 1,100 feet south of its junction with Greens Point Road:

Ap—0 to 9 inches; very dark brown (10YR 2/2) fine sandy loam; weak fine and medium granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.
B21—9 to 19 inches; dark brown (10YR 4/3) fine sandy loam; few fine prominent grayish brown (10YR 5/2), dark reddish brown (2.5YR 3/4), and strong brown (7.5YR 5/6) mottles; weak fine and medium granular structure; very friable; few fine roots; medium acid; clear wavy boundary.
B22—19 to 31 inches; grayish brown (2.5Y 5/2) sandy loam; common medium distinct dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6) mottles; weak fine and medium granular structure; very friable; medium acid; abrupt wavy boundary.
IIC—31 to 60 inches; gray (5Y 5/1) silty clay; many medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6 and 5/8) mottles; massive; very firm, sticky; neutral.

Thickness of the solum is 18 to 40 inches. Coarse fragments make up 0 to 3 percent of the solum. The soil in unlimed areas ranges from strongly acid to medium acid in the solum and from medium acid to neutral in the substratum.

The A horizon has hue of 10YR or 7.5YR, value of 2 through 4, and chroma of 1 or 2. It is very fine sandy loam, fine sandy loam, or sandy loam. It has weak or moderate, fine or medium granular structure.

The upper part of the B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 2 or 3. It is fine sandy loam, sandy loam, or loam. The lower part of the B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. It mainly is fine sandy loam, sandy loam, loam, or silty clay loam. The B horizon has weak or moderate, fine or medium granular or angular or subangular blocky structure. Consistence is very friable, friable, or firm. Some pedons have thin layers of loamy sand above the IIC horizon.

The IIC horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 through 3. It is clay, silty clay, or silty clay loam. It is massive or has weak, medium or thick platy structure. Consistence is firm or very firm.

Sudbury series

The Sudbury series consists of deep, moderately well drained soils on outwash plains. The soils formed in water-sorted gravelly and sandy materials derived mainly from granite and gneiss. Slopes range from 0 to 8 percent.

Sudbury soils and somewhat excessively drained Merrimac soils and poorly drained Walpole soils formed in the same kinds of material. Sudbury soils are similar to Deerfield and Ninigret soils but have more gravel throughout than the Deerfield or Ninigret soils and have a finer textured solum than the Deerfield soils.

Typical pedon of Sudbury fine sandy loam, 0 to 3 percent slopes, in the city of Beverly, in a field 0.2 mile south of the junction of Essex Street and Cole Street and 150 feet south of the railroad tracks:

Ap—0 to 13 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; very friable; many fine grass roots; 5 percent gravel; medium acid; abrupt smooth boundary.
B2—13 to 19 inches; yellowish brown (10YR 5/6) sandy loam; fine and medium distinct dark reddish gray (5YR 4/2) mottles in the lower 3 inches; weak medium granular structure; very friable; common grass roots; 10 percent fine gravel; medium acid; abrupt wavy boundary.
IIB3—19 to 26 inches; yellowish brown (10YR 5/4) gravelly coarse sand; common coarse prominent reddish yellow (5YR 6/8) mottles and many fine prominent grayish brown (2.5Y 5/2) mottles; single grain; loose; few roots; yellowish red (5YR 4/8) coatings on some sand grains; 20 percent gravel; medium acid; abrupt wavy boundary.
IIC—26 to 60 inches; light olive brown (2.5Y 5/4) very gravelly coarse sand; common medium prominent strong brown (7.5YR 5/6) mottles; single grain; loose; many sand grains coated with strong brown (7.5YR 5/6); some slightly cemented sand grains and many pebbles and cobblestones coated with black (5YR 2/1); few roots; strata of sand and gravel consisting of 50 percent gravel and cobblestones; medium acid.

The thickness of the solum and the depth to stratified sand and gravel range from 18 to 30 inches. The depth to mottles ranges from 12 to 24 inches. The content of rock fragments, primarily gravel, in the solum ranges from 0 to 30 percent. The rock fragment content of the C horizon ranges from 25 to 75 percent and consists of 20 to 65 percent gravel and 5 to 25 percent cobblestones and stones. Reaction in unlimed areas ranges from extremely acid to medium acid throughout the soil.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. It is fine sandy loam, sandy loam, or very fine sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 8. The upper part of the B horizon is fine sandy loam or sandy loam, and the lower part ranges from sandy loam to coarse sand. The B horizon has granular or subangular blocky structure, or it is structureless.

The IIC horizon has hue of 10YR through 5Y, value of 5, and chroma of 2 through 4. The IIC horizon consists of stratified sand, gravel, and cobblestones and ranges from gravelly sand to very gravelly coarse sand.

Swansea series

The Swansea series consists of very poorly drained organic soils. The soils formed in 16 to 51 inches of highly decomposed organic material over sandy mineral material. Slopes range from 0 to 1 percent.

Swansea soils are similar to Freetown, Scarboro, and Westbrook soils and Fluvaquents. The Swansea soils are underlain by mineral material at a depth of 16 to 51 inches; the organic material is more than 51 inches thick in the Freetown soils and less than 16 inches thick in the Fluvaquents and Scarboro soils. The Freetown soils formed in decomposed organic material in freshwater, and the Westbrook soils formed in partially decomposed organic material in saltwater.

Typical pedon of Swansea mucky peat, in a wooded area in the town of Manchester, 2,300 feet northwest of the junction of School Street and Massachusetts Route 128:

Oe1—0 to 3 inches; black (5YR 2/1), broken face, rubbed and pressed mucky peat (hemic material); 95 percent fiber, 35 percent rubbed; weak medium granular structure; very friable; many fine, medium, and coarse roots; extremely acid; abrupt smooth boundary.

Oa1—3 to 12 inches; black (5YR 2/1), broken, rubbed and pressed muck (sapric material); 40 percent fiber, 15 percent rubbed; weak fine granular structure; very friable; many fine, medium, and coarse roots; less than 5 percent mineral; extremely acid; abrupt smooth boundary.

Oa2—12 to 22 inches; black (5YR 2/1), broken, rubbed and pressed muck (sapric material); 40 percent fiber, 15 percent rubbed; massive; friable; few fine roots; 5 percent mineral; extremely acid; abrupt wavy boundary.

IIC1—22 to 35 inches; dark gray (5Y 4/1) gravelly coarse sand; single grain; loose; 20 percent fine gravel; very strongly acid; abrupt wavy boundary.

IIC2—35 to 42 inches; dark gray (5Y 4/1) loamy fine sand; massive; friable; strongly acid; abrupt wavy boundary.

IIC3—42 to 60 inches; dark gray (5Y 4/1) sand; single grain; loose; strongly acid.

The depth to the IIC horizon is 16 to 51 inches. Woody fragments are in some part of the profile in many pedons and comprise up to 25 percent of some horizons.

The organic material is neutral or has hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 2.

The IIC horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 through 3. It is mottled in some pedons. It ranges from coarse sand to loamy sand and from extremely acid to strongly acid. The gravel content ranges from 0 to 40 percent.

Udipsamments

Udipsamments consist of deep, excessively drained to moderately well drained soils on coastal sand dunes. The soils formed in wind-deposited sand from nearby coastal beaches. Udipsamments are subject to deflation and deposition by the wind. Slopes range from 3 to 50 percent.

Udipsamments are similar to Deerfield and Windsor soils but do not have the mottles typical of the Deerfield soils and are grayer and have less silt and clay than the Deerfield or Windsor soils.

Reference profile of Udipsamments, rolling, on Castle Neck in the town of Ipswich, 1,600 feet east-southeast of the gate to the parking lot at Crane Beach:

A1—0 to 5 inches; grayish brown (10YR 5/2) fine sand, light brownish gray (10YR 6/2) dry; single grain; loose; many fine roots; medium acid; clear wavy boundary.

C—5 to 60 inches; light brownish gray (10YR 6/2) sand, light gray (10YR 7/2) dry; single grain; loose; common fine roots in upper 5 inches, few fine roots to a depth of 24 inches; darker bands 1/8 to 1/4 inch thick 1/4 inch to 2 inches apart; medium acid.

The thickness of the sandy material is 6 feet or more. The coarse fragment content in individual strata ranges from 0 to 25 percent. Reaction is strongly acid to slightly acid.

The A horizon is less than 8 inches thick.

The C horizon is typically sand, but some pedons have strata of fine sand.

Udorthents

Udorthents consist of areas from which soil has been excavated and areas where soil material has been deposited. These areas are on uplands and outwash plains. Slopes range from 0 to 45 percent.

Udorthents are associated with many different soils and with Urban land. Udorthents do not have a developed profile, which most other soils have, and have fewer buildings and paved areas than Urban land.

Reference pedon of Udorthents, smoothed, in the town of Danvers in the interchange area between U.S. Route 1 and Interstate Route 95, 3,800 feet north of the junction of U.S. Route 1 and Massachusetts Route 62:

A1—0 to 19 inches; very dark brown (10YR 2/2) loam; weak fine granular structure; very friable; many fine roots; 10 percent gravel; spots of black (10YR 2/1) soil material; medium acid; abrupt discontinuous boundary.

C1—19 to 26 inches; 70 percent dark grayish brown (2.5Y 4/2), 30 percent gray (2.5Y 6/0) loam; massive; firm, slightly sticky; few fine roots; 15

percent gravel; neutral; abrupt discontinuous boundary.
C2—26 to 37 inches; olive gray (5Y 5/2) loam; massive; firm, slightly sticky; 15 percent gravel; slightly acid; abrupt discontinuous boundary.
C3—37 to 60 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; massive; friable; 25 percent gravel; neutral.

The thickness of the material is 6 feet or more. Colors are variable, depending on those of the soils that were the source of material. Coarse fragments make up 0 to 50 percent of the soil. Reaction ranges from extremely acid to neutral throughout the soil.

The A horizon ranges from loamy very fine sand to silt loam. It has weak granular structure, or it is massive.

The C horizon mainly ranges from loamy very fine sand to sandy loam to loam. Some pedons have layers ranging from gravelly sand to clay. The C horizon is friable to very firm.

Walpole series

The Walpole series consists of deep, poorly drained soils on outwash plains and terraces. The soils formed in sandy and gravelly outwash material. Slopes range from 0 to 8 percent.

Walpole soils and well drained Merrimac soils, very poorly drained Scarboro soils, and moderately well drained Sudbury soils formed in the same kinds of material. Walpole soils are similar to Pipestone, Shaker, and Wareham soils. The Walpole soils are grayer than the Merrimac or Sudbury soils, have less organic matter in the surface layer than the Scarboro soils, and do not have a spodic horizon as do the Pipestone soils. They have more sand and less clay in the IIC horizon than the Shaker soils and have less sand in the solum than the Wareham soils.

Typical pedon of Walpole fine sandy loam, 0 to 3 percent slopes, in the town of Middleton, in a hayfield 800 feet northeast of the junction of East Street and Locust Street:

Ap—0 to 9 inches; very dark brown (10YR 2/2) fine sandy loam; many fine distinct dark reddish brown (5YR 3/3) mottles in old root channels; weak medium granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.
B21g—9 to 13 inches; grayish brown (2.5Y 5/2) fine sandy loam; few fine faint gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; weak medium granular structure; very friable; common fine roots; medium acid; abrupt wavy boundary.
B22g—13 to 22 inches; light olive gray (5Y 6/2) sandy loam; few fine distinct light olive brown (2.5Y 5/6) mottles; massive; very friable; few fine roots; medium acid; clear wavy boundary.
IIC—22 to 60 inches; olive (5Y 5/3) stratified sand, gravel, and gravelly sand; few fine and medium distinct light olive brown (2.5Y 5/6) mottles; massive; loose; 0 to 50 percent fine gravel in individual strata; medium acid.

The thickness of the solum ranges from 18 to 28 inches. Coarse fragments make up 0 to 25 percent of the solum and 0 to 50 percent of the IIC horizon. Reaction ranges from very strongly acid to medium acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam or sandy loam.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 3. It is fine sandy loam or sandy loam. It has weak granular or subangular blocky structure, or it is massive.

The IIC horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. It mainly is sand, gravelly sand, loamy sand, or gravelly loamy sand. Some pedons have thin strata ranging from fine sandy loam to gravel.

Wareham series

The Wareham series consists of deep, poorly drained soils on outwash plains. The soils formed in sandy glacial outwash. Slopes range from 0 to 5 percent.

Wareham soils and moderately well drained Deerfield soils, very poorly drained Scarboro soils, and excessively drained Windsor soils formed in the same kinds of material. Wareham soils are similar to Pipestone and Walpole soils. The Wareham soils are grayer than the Deerfield or Windsor soils, have less organic matter in the surface layer than the Scarboro soils, do not have the spodic horizon typical of the Pipestone soils, and have more sand in the solum than the Walpole soils.

Typical pedon of Wareham loamy sand, in the town of Ipswich, in a forested area 1,550 feet south of the junction of Linebrook Road and Mile Lane:

A1—0 to 10 inches; black (10YR 2/1) loamy sand; weak fine and medium granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; abrupt wavy boundary.
B2—10 to 16 inches; dark brown (10YR 4/3) loamy fine sand; common coarse distinct grayish brown (2.5Y 5/2) mottles; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.
C1—16 to 24 inches; grayish brown (2.5Y 5/2) loamy sand; few fine faint dark yellowish brown (10YR 3/4) mottles; massive; very friable; strongly acid; abrupt wavy boundary.
C2—24 to 32 inches; light brownish (2.5Y 6/2) sand; few fine distinct strong brown (7.5YR 5/6) mottles; single grain; loose; slightly acid; clear wavy boundary.

C3—32 to 60 inches; grayish brown (2.5Y 5/2) sand; common fine distinct light gray (N 6/0), pale olive (5Y 6/4), dark reddish brown (5YR 3/4), and yellowish red (5YR 4/6) mottles; single grain; loose; slightly acid.

The thickness of the solum ranges from 16 to 28 inches. The gravel content in the upper 36 inches ranges from 0 to 15 percent. Below 36 inches it ranges from 0 to 50 percent. Reaction in unlimed areas is very strongly acid or strongly acid in the solum and very strongly acid to slightly acid in the C horizon; the surface layer is slightly acid or neutral in some limed areas.

The A1 horizon is neutral or has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 through 2. It is loamy fine sand or loamy sand.

The B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 4 and is mottled. It is loamy fine sand, loamy sand, loamy coarse sand, fine sand, or sand.

The C horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 0 through 3 and is mottled. It mainly ranges from loamy sand to coarse sand. Some pedons have strata of fine gravel below a depth of 40 inches. The C horizon is massive or single grain in the upper part and single grain in the lower part. It is very friable or loose.

The Wareham soils in this survey area are a taxadjunct to the Wareham series because the reaction in the substratum is higher than that defined for the series. This difference does not significantly affect the use and management of the soils.

Westbrook series

The Westbrook series consists of deep, very poorly drained soils in tidal marshes subject to inundation by saltwater twice daily. The soils formed in organic deposits over loamy mineral materials. Slopes are less than 1 percent. Westbrook soils in this survey area are mapped only with Ipswich soils.

Westbrook soils are similar to Freetown, Ipswich, and Swansea soils. The Westbrook soils formed in saltwater, and the Freetown and Swansea soils formed in freshwater. The Westbrook soils formed in a thinner organic deposit than the Freetown or Ipswich soils.

Typical pedon of Westbrook mucky peat, in an area of Ipswich and Westbrook mucky peats, in the town of Ipswich, 700 feet north-northwest of the junction of Argilla Road and Northgate Road:

Oe1—0 to 18 inches; very dark brown (10YR 2/2) mucky peat; 80 percent fiber, 25 percent rubbed; massive dense mat of decaying roots, stems, and leaves; friable; many fine and medium roots; moderate hydrogen sulfide odor; mineral content 10 percent; strongly acid; clear smooth boundary.

Oe2—18 to 37 inches; black (10YR 2/1), broken face and rubbed mucky peat; very dark brown (10YR 2/2) pressed; 50 percent fiber, 20 percent rubbed; massive; friable; few fine roots; moderate hydrogen sulfide odor; mineral content 10 percent; strongly acid; clear wavy boundary.

IIC1g—37 to 60 inches; dark greenish gray (5BG 4/1) silty clay; few fine distinct olive brown (2.5Y 4/4) mottles; massive; very firm, very sticky, very plastic; neutral.

The thickness of the organic material ranges from 16 to 51 inches. Thin layers of silt and very fine sand are in some pedons. Reaction is strongly acid to neutral in the organic material and medium acid to neutral in the substratum.

The surface tier has hue of 10YR through 5Y, value of 2 through 4, and chroma of 1 or 2. The fiber content is 25 to 80 percent and 15 to 40 percent rubbed. The mineral content is 5 to 50 percent.

The subsurface and bottom tiers have hue of 10YR through 5Y, value of 2 through 4, and chroma of 1 through 3. The fiber content is 20 to 85 percent and 15 to 40 percent rubbed. The mineral content is 5 to 50 percent.

The IIC horizon is neutral or has hue of 2.5Y through 5BG, value of 3 through 5, and chroma of 0 through 2. It ranges from very fine sandy loam to silty clay. Herbaceous fibers and shell fragments are in some pedons.

Whately Variant

The Whately Variant consists of deep, very poorly drained soils on old glacial lakebeds. The soils formed in sandy glacial outwash material over clayey glacial lakebed sediments. Slopes range from 0 to 3 percent.

Whately Variant soils and moderately well drained Elmridge soils, poorly drained Shaker soils, and well drained Melrose soils formed in the same kinds of material. Whately Variant soils are similar to Maybid and Scarboro soils. The Whately Variant soils are grayer in the subsoil than the Elmridge, Shaker, or Melrose soils; have more sand and less clay in the solum than the Maybid soils; and have more clay in the substratum than the Scarboro soils.

Typical pedon of Whately Variant mucky fine sandy loam, in the town of Ipswich, at the edge of a cultivated field 325 feet southeast of Pine Swamp Road, 3,200 feet southwest of its junction with Linebrook Road:

Ap—0 to 10 inches; black (10YR 2/1) mucky fine sandy loam; weak fine granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.

B21—10 to 24 inches; grayish brown (2.5Y 5/2) loamy sand; few medium distinct light gray (10YR 6/1),

light olive brown (2.5Y 5/6), and yellowish brown (10YR 5/6) mottles; weak fine granular structure; very friable; few fine roots; medium acid; abrupt wavy boundary.

IIC1g—24 to 30 inches; greenish gray (5GY 5/1) silty clay; many medium prominent light olive brown (2.5Y 5/6) and dark brown (7.5YR 4/4) mottles in old root channels; massive; firm, sticky; slightly acid; gradual wavy boundary.

IIC2g—30 to 60 inches; greenish gray (5GY 5/1) clay; few fine faint light olive brown (2.5Y 5/4) mottles in upper 16 inches; massive; firm, very sticky; neutral.

The thickness of the solum is 18 to 40 inches. Reaction ranges from very strongly acid to slightly acid in the solum and from slightly acid to neutral in the IIC horizon.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is very fine sandy loam, fine sandy loam, or sandy loam or their mucky analogs.

The B horizon is neutral or has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 0 through 2. It mainly is loamy sand or loamy fine sand. Thin strata of sandy loam or fine or medium sand are in some pedons.

The IIC horizon is neutral or has hue of 2.5Y through 5BG, value of 4 through 6, and chroma of 0 through 2. It is silty clay loam, clay loam, silty clay, sandy clay, or clay. It is varved in some pedons. Mottles are few to many and faint to prominent.

Whitman series

The Whitman series consists of deep, very poorly drained soils on uplands. The soils formed in loamy glacial till derived mainly from granite and gneiss. Slopes range from 0 to 5 percent.

Whitman soils and well drained Paxton soils, poorly drained Ridgebury soils, and moderately well drained Woodbridge soils formed in the same kind of material. Whitman soils are similar to the Scarboro and Swansea soils. The Whitman soils have a grayer subsoil than the Paxton, Ridgebury, or Woodbridge soils; have less sand than the Scarboro soils; and formed in mineral material, while Swansea soils formed in organic material.

Typical pedon of Whitman loam, in an area of Whitman extremely stony loam, in the town of Essex, in a wooded area 1,600 feet east of the junction of Chebacco Road and Pond Street in Hamilton:

O1—3 inches to 0; black (5Y 2/2) partly decayed organic material.

A1—0 to 4 inches; very dark brown (10YR 2/2) loam; weak fine granular structure; very friable; many fine and medium roots; 3 percent stones, 5 percent gravel; very strongly acid; abrupt wavy boundary.

B2g—4 to 14 inches; dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; friable; common fine roots; 15 percent gravel; very strongly acid; clear wavy boundary.

C1x—14 to 22 inches; light brownish gray (2.5Y 6/2) fine sandy loam; weak thick platy structure; firm, brittle; 10 percent gravel; very strongly acid; abrupt wavy boundary.

C2x—22 to 60 inches; dark grayish brown (2.5Y 4/2) gravelly loamy sand; massive; firm; 10 percent stones, 20 percent gravel; very strongly acid.

The depth to the C horizon is 12 to 25 inches. The solum and underlying material contain 0 to 10 percent stones, 0 to 5 percent cobblestones, and 5 to 25 percent gravel. The reaction ranges from very strongly acid to slightly acid throughout.

The A horizon is neutral or has hue of 10YR, value of 2 or 3, and chroma of 0 through 2. It ranges from loamy to sandy loam.

The B horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 0 through 2. It ranges from sandy loam to loam. It is very friable or friable. Some pedons have few distinct or prominent mottles.

The C horizon is neutral of has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 0 through 2. It is fine sandy loam, sandy loam, loamy sand, or their gravelly analogs. It is massive, or it has thick platy structure. It is firm or very firm.

Windsor series

The Windsor series consists of deep, excessively drained soils on outwash plains and river and stream terraces. The soils formed in water-sorted sands. Slopes range from 0 to 25 percent.

Windsor soils and moderately well drained Deerfield soils, somewhat poorly drained Pipestone soils, and poorly drained Wareham soils formed in the same kind of material. Windsor soils are similar to Hinckley and Merrimac soils. The Windsor soils do not have mottles, and the Deerfield, Pipestone, and Wareham soils are mottled. The Windsor soils have less gravel than the Hinckley or Merrimac soils and are coarser textured in the solum than the Merrimac soils.

Typical pedon of Windsor loamy sand, 0 to 3 percent slopes, in a wooded area in the town of Ipswich, 1/4 mile south of the junction of Linebrook Road and Pine Swamp Road:

O1—1 inch to 0; partly decomposed leaves and twigs.

A1—0 to 2 inches; 50 percent very dark brown (10YR 2/2) and 50 percent dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable; many fine medium and coarse roots; very strongly acid; abrupt smooth boundary.

Ap—2 to 10 inches; dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable; many fine

medium and coarse roots; very strongly acid; abrupt wavy boundary.
B21—10 to 24 inches; yellowish brown (10YR 5/6) loamy sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear wavy boundary.
B22—24 to 30 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; few fine roots; strongly acid; abrupt wavy boundary.
C—30 to 60 inches; light olive brown (2.5Y 5/4) sand; single grain; loose; strongly acid.

The depth of the solum ranges from 20 to 32 inches. The coarse fragment content ranges from 0 to 10 percent in the solum and 0 to 15 percent in the C horizon. Thin strata of gravel or coarse sand are in some pedons. The reaction in unlimed areas is very strongly acid to medium acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. It is loamy sand or loamy fine sand.

The B21 horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. It is loamy sand or loamy fine sand. The B22 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 6. It ranges from loamy fine sand to sand. The B horizon has weak fine or medium granular structure or is single grain or massive. It is very friable or loose.

The C horizon has hue of 10YR or 5Y, value of 5 through 7, and chroma of 2 through 4. It is sand or fine sand.

Woodbridge series

The Woodbridge series consists of deep, moderately well drained soils on uplands. The soils formed in compact glacial till derived mainly from granite and gneiss. Slopes range from 3 to 25 percent.

Woodbridge soils and well drained Paxton soils, poorly drained Ridgebury soils, and very poorly drained Whitman soils formed in the same kinds of material. Woodbridge soils are similar to Scituate soils but have less sand in the substratum.

Typical pedon of Woodbridge fine sandy loam, 8 to 15 percent slopes, in the town of Essex on a hilltop 600 feet east-northeast of the junction of John Wise Road and Island Road:

Ap—0 to 6 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; 5 percent cobblestones, 5 percent gravel; strongly acid; abrupt smooth boundary.
B21—6 to 20 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium granular structure; friable; common fine roots; 5 percent cobblestones, 5 percent gravel; strongly acid; gradual wavy boundary.
B22—20 to 25 inches; yellowish brown (10YR 5/4) fine sandy loam; common fine distinct grayish brown (2.5Y 5/2) and strong brown (7.5YR 5/8) mottles; weak medium granular structure; friable; few fine roots; 5 percent cobblestones, 10 percent gravel; strongly acid; abrupt wavy boundary.
Cx—25 to 60 inches; light olive brown (2.5Y 5/4) gravelly fine sandy loam; common fine distinct grayish brown (2.5Y 5/2) and strong brown (7.5YR 5/8) mottles; weak medium platy structure; very firm, brittle; 5 percent cobblestones, 15 percent gravel; medium acid.

The depth to the substratum ranges from 20 to 38 inches. The depth to mottling ranges from 15 to 38 inches. Rock fragments make up 5 to 30 percent of the surface layer and subsoil and 10 to 40 percent of the substratum. Reaction ranges from very strongly acid to slightly acid in the substratum.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. It ranges from fine sandy loam to loam.

The B21 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. The B22 horizon has hue of 10YR or 2.5Y and value and chroma of 4 through 6 and is distinctly mottled. The B horizon is fine sandy loam, sandy loam, loam, or their gravelly analogs. The B horizon has weak granular or subangular blocky structure, or it is massive. Some pedons have an A'2 horizon.

The Cx horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 3 or 4. It is fine sandy loam, sandy loam, loam, or their gravelly analogs. It has weak, medium or thick platy structure, or it is massive. It is firm or very firm and brittle.

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glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	<2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). 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.

Conservation tillage. A system that retains protective amounts of residue mulch on the surface throughout the year using no-tillage, strip tillage, stubble mulching, and other types of noninversion tillage.

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.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

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.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

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.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They

have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

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 (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are 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. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The 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

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

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 (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

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.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B

horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single 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 layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by melt water streams, in a glacial lake or other body of still water in front of a glacier.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1967-78 at Peabody, Mass.]

Month	Temperature						Precipitation				
	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[1]	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	33.8	16.9	25.4	60	-9	20	3.76	1.59	5.58	6	13.9
February	36.0	18.1	27.1	60	-6	7	3.80	1.82	5.51	6	16.3
March	44.8	27.1	36.0	71	5	49	4.17	2.64	5.55	7	10.6
April	57.4	36.3	46.9	86	20	232	3.63	2.33	4.80	7	1.3
May	66.7	46.0	56.3	89	32	505	4.31	2.80	5.68	8	.0
June	76.6	56.0	66.3	95	41	789	4.04	1.42	6.21	7	.0
July	82.1	61.9	72.0	96	48	992	3.21	1.71	4.52	6	.0
August	80.6	60.1	70.4	96	44	942	3.70	2.05	5.15	6	.0
September	72.1	52.0	62.1	92	34	663	3.70	1.36	5.63	6	.0
October	61.4	42.2	51.8	81	23	366	3.52	2.07	4.81	6	.0
November	48.8	33.3	41.1	71	13	109	5.03	2.05	7.55	8	1.9
December	38.2	22.3	30.2	62	-1	12	6.13	4.19	7.91	9	13.6
Yearly:											
Average	58.2	39.4	48.8	---	---	---	---	---	---	---	---
Extreme	---	---	---	98	-10	---	---	---	---	---	---
Total	---	---	---	---	---	4,686	49.00	42.78	55.00	82	57.6

[1]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

[Data were recorded in the period 1967-78 at Peabody, Mass.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 16	April 23	May 7
2 years in 10 later than--	April 13	April 20	May 4
5 years in 10 later than--	April 7	April 15	April 26
First freezing temperature in fall:			
1 year in 10 earlier than--	October 28	October 16	September 30
2 years in 10 earlier than--	October 21	October 19	October 6
5 years in 10 earlier than--	November 10	October 26	October 17

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1967-78 at Peabody, Mass.]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	191	178	148
8 years in 10	199	183	157
5 years in 10	216	193	173
2 years in 10	232	203	189
1 year in 10	241	208	198

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AnB	Annisquam extremely bouldery fine sandy loam, 3 to 8 percent slopes	440	0.3
AnC	Annisquam extremely bouldery fine sandy loam, 8 to 15 percent slopes	865	0.6
AnD	Annisquam extremely bouldery fine sandy loam, 15 to 35 percent slopes	1,215	0.9
Ba	Beaches	935	0.7
BeB	Belgrade very fine sandy loam, 0 to 8 percent slopes	190	0.1
BuA	Boxford silt loam, 0 to 3 percent slopes	380	0.3
BuB	Boxford silt loam, 3 to 8 percent slopes	1,635	1.2
BuC	Boxford silt loam, 8 to 15 percent slopes	335	0.2
BxB	Boxford-Urban land complex, gently sloping	175	0.1
CaB	Canton fine sandy loam, 3 to 8 percent slopes	595	0.4
CaC	Canton fine sandy loam, 8 to 20 percent slopes	265	0.2
CbB	Canton very stony fine sandy loam, 3 to 8 percent slopes	1,615	1.2
CbC	Canton very stony fine sandy loam, 8 to 15 percent slopes	2,010	1.5
CbD	Canton very stony fine sandy loam, 15 to 25 percent slopes	1,155	0.8
CcB	Canton extremely stony fine sandy loam, 3 to 8 percent slopes	370	0.3
CcC	Canton extremely stony fine sandy loam, 8 to 15 percent slopes	535	0.4
CcD	Canton extremely stony fine sandy loam, 15 to 25 percent slopes	1,150	0.8
CcE	Canton extremely stony fine sandy loam, 25 to 35 percent slopes	310	0.2
ChC	Canton-Urban land complex, sloping	560	0.4
CrC	Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes	10,555	7.6
CrD	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	18,035	13.1
De	Deerfield loamy fine sand	870	0.6
Du	Dumps	605	0.4
ElA	Elmridge fine sandy loam, 0 to 3 percent slopes	220	0.2
ElB	Elmridge fine sandy loam, 3 to 8 percent slopes	530	0.4
FP	Fluvaquents, frequently flooded	625	0.5
Fm	Freetown muck	6,815	4.9
Fp	Freetown muck, ponded	1,190	0.9
HfA	Hinckley gravelly fine sandy loam, 0 to 3 percent slopes	480	0.4
HfB	Hinckley gravelly fine sandy loam, 3 to 8 percent slopes	1,945	1.4
HfC	Hinckley gravelly fine sandy loam, 8 to 15 percent slopes	1,490	1.1
HfD	Hinckley gravelly fine sandy loam, 15 to 25 percent slopes	725	0.5
HfE	Hinckley gravelly fine sandy loam, 25 to 45 percent slopes	560	0.4
HuC	Hollis-Urban land-Rock outcrop complex, sloping	2,740	2.0
Iw	Ipswich and Westbrook mucky peats	7,735	5.6
Ma	Maybid silt loam	1,020	0.7
MeA	Melrose fine sandy loam, 0 to 3 percent slopes	85	0.1
MeB	Melrose fine sandy loam, 3 to 8 percent slopes	115	0.1
MmA	Merrimac fine sandy loam, 0 to 3 percent slopes	1,680	1.2
MmB	Merrimac fine sandy loam, 3 to 8 percent slopes	3,445	2.5
MmC	Merrimac fine sandy loam, 8 to 15 percent slopes	980	0.7
MmD	Merrimac fine sandy loam, 15 to 25 percent slopes	405	0.3
MnB	Merrimac-Urban land complex, gently sloping	5,220	3.8
MoB	Montauk fine sandy loam, 3 to 8 percent slopes	315	0.2
MoC	Montauk fine sandy loam, 8 to 15 percent slopes	180	0.1
MsB	Montauk very stony fine sandy loam, 3 to 8 percent slopes	985	0.7
MsC	Montauk very stony fine sandy loam, 8 to 15 percent slopes	650	0.5
MsD	Montauk very stony fine sandy loam, 15 to 25 percent slopes	95	0.1
MxC	Montauk extremely stony fine sandy loam, 8 to 15 percent slopes	105	0.1
MxD	Montauk extremely stony fine sandy loam, 15 to 25 percent slopes	195	0.1
NnA	Ninigret fine sandy loam, 0 to 3 percent slopes	105	0.1
NnB	Ninigret fine sandy loam, 3 to 8 percent slopes	120	0.1
PaB	Paxton fine sandy loam, 3 to 8 percent slopes	875	0.6
PaC	Paxton fine sandy loam, 8 to 15 percent slopes	430	0.3
PaD	Paxton fine sandy loam, 15 to 25 percent slopes	365	0.3
PbB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	910	0.7
PbC	Paxton very stony fine sandy loam, 8 to 15 percent slopes	815	0.6
PbD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	1,190	0.9
PcE	Paxton and Montauk extremely stony fine sandy loams, 25 to 45 percent slopes	375	0.3
PdC	Paxton-Urban land complex, sloping	3,420	2.5
Pe	Pipestone loamy fine sand	390	0.3
Pg	Pits, sand and gravel	760	0.6
PlB	Pollux fine sandy loam, 0 to 8 percent slopes	110	0.1
PoB	Poquonock very stony loamy sand, 3 to 8 percent slopes	150	0.1
PoC	Poquonock very stony loamy sand, 8 to 15 percent slopes	265	0.2
PoD	Poquonock very stony loamy sand, 15 to 25 percent slopes	195	0.1
Qu	Quarries	380	0.3
RdA	Ridgebury fine sandy loam, 0 to 6 percent slopes	185	0.1
RlA	Ridgebury extremely stony fine sandy loam, 0 to 3 percent slopes	155	0.1
RlB	Ridgebury extremely stony fine sandy loam, 3 to 8 percent slopes	1,075	0.8
Rx	Rock outcrop-Hollis complex	1,860	1.4
Sb	Scarboro mucky loamy fine sand	1,565	1.1

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
ScA	Scitico silt loam, 0 to 5 percent slopes	1,820	1.3
SgB	Scituate fine sandy loam, 3 to 8 percent slopes	330	0.2
ShB	Scituate very stony fine sandy loam, 3 to 8 percent slopes	1,035	0.8
ShC	Scituate very stony fine sandy loam, 8 to 15 percent slopes	100	0.1
SmB	Scituate extremely stony fine sandy loam, 3 to 8 percent slopes	195	0.1
SoB	Scituate extremely bouldery fine sandy loam, 3 to 8 percent slopes	415	0.3
SoC	Scituate extremely bouldery fine sandy loam, 8 to 15 percent slopes	135	0.1
SpA	Shaker fine sandy loam, 0 to 3 percent slopes	465	0.3
SpB	Shaker fine sandy loam, 3 to 8 percent slopes	170	0.1
SrA	Sudbury fine sandy loam, 0 to 3 percent slopes	1,715	1.2
SrB	Sudbury fine sandy loam, 3 to 8 percent slopes	1,035	0.8
Ss	Swansea mucky peat	1,160	0.8
UAC	Udipsamments, rolling	1,470	1.1
UD	Udorthents, smoothed	4,060	2.9
Ur	Urban land	12,515	9.0
WaA	Walpole fine sandy loam, 0 to 3 percent slopes	805	0.6
WaB	Walpole fine sandy loam, 3 to 8 percent slopes	135	0.1
We	Wareham loamy sand	635	0.5
Wf	Whately Variant mucky fine sandy loam	280	0.2
Wh	Whitman extremely stony loam	1,510	1.1
WnA	Windsor loamy sand, 0 to 3 percent slopes	270	0.2
WnB	Windsor loamy sand, 3 to 8 percent slopes	625	0.5
WnC	Windsor loamy sand, 8 to 15 percent slopes	185	0.1
WnD	Windsor loamy sand, 15 to 25 percent slopes	135	0.1
WrB	Woodbridge fine sandy loam, 3 to 8 percent slopes	290	0.2
WrC	Woodbridge fine sandy loam, 8 to 15 percent slopes	100	0.1
WsB	Woodbridge very stony fine sandy loam, 3 to 8 percent slopes	1,405	1.0
WsC	Woodbridge very stony fine sandy loam, 8 to 15 percent slopes	325	0.2
WsD	Woodbridge very stony fine sandy loam, 15 to 25 percent slopes	155	0.1
W	Water	3,500	2.5
	Total	138,000	100.0

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 that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn silage	Grass-legume hay	Grass-clover
	Ton	Ton	AUM*
AnB, AnC, AnD---- Annisquam	---	---	---
Ba**. Beaches			
BeB---- Belgrade	24	4.0	7.6
BuA---- Boxford	22	3.0	5.7
BuB---- Boxford	22	3.5	6.6
BuC---- Boxford	20	3.5	6.6
BxB---- Boxford-Urban land	---	---	---
CaB---- Canton	22	4.5	8.5
CaC---- Canton	20	4.0	7.6
CbB, CbC, CbD---- Canton	---	---	---
CcB, CcC, CcD, CcE---- Canton	---	---	---
ChC---- Canton-Urban land	---	---	---
CrC---- Chatfield-Hollis-Rock outcrop	---	---	---
CrD---- Chatfield-Hollis-Rock outcrop	---	---	---
De---- Deerfield	16	3.0	5.7
Du**. Dumps			
ElA---- Elmridge	22	4.0	7.6
ElB---- Elmridge	22	4.0	7.6
FF. Fluvaquents			
Fm, Fp---- Freetown	---	---	---
HfA, HfB---- Hinckley	12	2.0	3.8

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn silage	Grass-legume hay	Grass-clover
	Ton	Ton	AUM*
HfC---------- Hinckley	---	---	2.5
HfD---------- Hinckley	---	---	2.0
HfE---------- Hinckley	---	---	---
HuC**---------- Hollis-Urban land-Rock outcrop	---	---	---
Iw---------- Ipswich and Westbrook	---	---	---
Ma---------- Maybid	---	---	---
MeA---------- Melrose	24	4.0	7.6
MeB---------- Melrose	24	4.0	7.6
MmA, MmB---------- Merrimac	18	3	5.7
MmC---------- Merrimac	16	3	5.7
MmD---------- Merrimac	14	2.5	4.7
MnB---------- Merrimac-Urban land	---	---	---
MoB---------- Montauk	22	3.5	6.6
MoC---------- Montauk	20	3.5	6.6
MsB, MsC, MsD---------- Montauk	---	---	---
MxC, MxD---------- Montauk	---	---	---
NnA, NnB---------- Ninigret	22	3.5	6.6
PaB---------- Paxton	24	4.0	7.6
PaC---------- Paxton	22	4.0	7.6
PaD---------- Paxton	20	3.5	6.6
PbB, PbC, PbD---------- Paxton	---	---	---
PcE---------- Paxton and Montauk	---	---	---

Sae footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn silage	Grass-legume hay	Grass-clover
	Ton	Ton	AUM*
PdC---------- Paxton-Urban land	---	---	---
Pe---------- Pipestone	12	3.0	5.7
Pg**. Pits			
PlB---------- Pollux	24	4.0	7.6
PoB, PoC, PoD---------- Poquonock	---	---	---
Qu**. Quarries			
RdA---------- Ridgebury	16	3.5	6.6
RlA, RlB---------- Ridgebury	---	---	---
Rx**---------- Rock outcrop-Hollis	---	---	---
Sb---------- Scarbork	---	---	---
ScA---------- Scitico	20	3.5	6.6
SgB---------- Scituate	24	3.5	6.6
ShB, ShC---------- Scituate	---	---	---
SmB, SoB, SkC---------- Scituate	---	---	---
SpA, SpB---------- Shaker	18	3.5	6.6
SrA---------- Sudbury	18	4.0	7.6
SrB---------- Sudbury	18	4.0	7.6
Ss---------- Swansea	---	---	---
UAC**. Udipsamments			
UD**. Udorthents			
Ur**. Urban land			
WaA, WaB---------- Walpole	18	3.0	5.7
We---------- Wareham	16	2.5	4.7

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn silage	Grass-legume hay	Grass-clover
	Ton	Ton	AUM*
Wf---------- Whately Variant	---	---	---
Wh---------- Whitman	---	---	---
WnA, WnB---------- Windsor	14	2.5	4.7
WnC---------- Windsor	12	2.5	4.7
WnD---------- Windsor	---	2.0	3.8
WrB---------- Woodbridge	24	4.0	7.6
WrC---------- Woodbridge	22	4.0	7.6
WsB, WsC, WsD---------- Woodbridge	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	85	---	---	---	---
II	13,685	3,835	4,725	5,125	---
III	8,240	2,290	2,630	3,320	---
IV	5,290	770	2,845	1,675	---
V	9,820	---	9,820	---	---
VI	15,560	---	1,190	13,915	---
VII	39,385	---	1,190	38,195	---
VIII	11,065	---	7,735	3,330	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AnB, AnC, AnD---- Annisquam	4x	Slight	Severe	Slight	Slight	Northern red oak----	55	Norway spruce, white spruce, eastern white pine, European larch.
						Sugar maple----------	50	
						Eastern white pine--	50	
BeB---------- Belgrade	3o	Slight	Slight	Slight	Slight	Eastern white pine--	75	Eastern white pine, red pine, European larch, white spruce.
						White spruce--------	65	
						Northern red oak----	62	
BuA, BuB---------- Boxford	4o	Slight	Slight	Slight	Slight	Eastern white pine--	65	Eastern white pine, white spruce.
						Northern red oak----	55	
BuC---------- Boxford	4r	Moderate	Moderate	Slight	Slight	Eastern white pine--	65	Eastern white pine, white spruce.
						Northern red oak----	55	
BxB*: Boxford----------	4o	Slight	Slight	Slight	Slight	Eastern white pine--	65	Eastern white pine, white spruce.
						Northern red oak----	55	
Urban land.								
CaB, CaC, CbB, CbC- Canton	5o	Slight	Slight	Slight	Slight	Eastern white pine--	58	Eastern white pine, white spruce.
						Northern red oak----	52	
CbD---------- Canton	5r	Slight	Moderate	Slight	Slight	Eastern white pine--	58	Eastern white pine, white spruce.
						Northern red oak----	52	
CcB, CcC, CcD, CcE- Canton	5x	Slight	Moderate	Slight	Slight	Eastern white pine--	58	Eastern white pine, white spruce.
						Northern red oak----	52	
ChC*: Canton----------	5o	Slight	Slight	Slight	Slight	Eastern white pine--	58	Eastern white pine, white spruce.
						Northern red oak----	52	
Urban land.								
CrC*, CrD*: Chatfield---------	3x	Slight	Moderate	Slight	Slight	Sugar maple----------	65	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	70	
						White ash-----------	75	
Hollis----------	5x	Slight	Moderate	Severe	Moderate	Northern red oak----	47	Eastern white pine.
						Eastern white pine--	55	
						Sugar maple----------	56	
Rock outcrop.								
De---------- Deerfield	4s	Slight	Slight	Moderate	Slight	Eastern white pine--	65	Eastern white pine, red pine, European larch.
						Northern red oak----	55	
ElA, ElB---------- Elmridge	3o	Slight	Slight	Slight	Slight	Eastern white pine--	75	Eastern white pine, European larch, white spruce.
						Northern red oak----	70	
						Shagbark hickory----	60	
Fm---------- Freetown	5w	Slight	Severe	Severe	Severe	Red maple-----------	50	White spruce, eastern hemlock, balsam fir.
						Atlantic white-cedar	60	
						Eastern hemlock-----	55	
						Green ash-----------	35	
						American elm--------	55	
						Red spruce----------	50	
						Balsam fir----------	45	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
HfA, HfB, HfC---- Hinckley	5s	Slight	Slight	Severe	Slight	Northern red oak----	49	Eastern white pine, red pine, European larch.
						Eastern white pine--	60	
						Red pine----------	58	
						Sugar maple--------	57	
HfD, HfE---------- Hinckley	5s	Slight	Moderate	Severe	Slight	Northern red oak----	49	Eastern white pine, red pine, European larch.
						Eastern white pine--	60	
						Red pine----------	58	
						Sugar maple--------	57	
HuC*:								
Hollis----------	5d	Slight	Slight	Severe	Moderate	Northern red oak----	47	Eastern white pine.
						Eastern white pine--	55	
						Sugar maple--------	56	
Urban land.								
Rock outcrop.								
Ma---------- Maybid	5w	Slight	Severe	Severe	Severe	Red maple----------	55	
MeA, MeB---------- Melrose	4o	Slight	Slight	Slight	Slight	Eastern white pine--	69	Eastern white pine, red pine, white spruce.
						Red pine----------	59	
						Sugar maple--------	55	
MmA, MmB, MmC------ Merrimac	4s	Slight	Slight	Moderate	Slight	Northern red oak----	51	Eastern white pine, red pine.
						Eastern white pine--	64	
						Sugar maple--------	58	
MmD---------- Merrimac	4s	Slight	Moderate	Moderate	Slight	Northern red oak----	51	Eastern white pine, red pine.
						Eastern white pine--	64	
						Sugar maple--------	58	
MnB*:								
Merrimac----------	4s	Slight	Slight	Moderate	Slight	Northern red oak----	51	Eastern white pine, red pine.
						Eastern white pine--	64	
						Sugar maple--------	58	
Urban land.								
MoB, MoC---------- Montauk	3o	Slight	Slight	Slight	Slight	Sugar maple--------	65	Norway spruce, white spruce, European larch.
						Northern red oak----	70	
						Red pine----------	75	
						Eastern white pine--	75	
MsB, MsC---------- Montauk	3o	Slight	Slight	Slight	Slight	Sugar maple--------	65	Norway spruce, white spruce, red pine.
						Northern red oak----	70	
						Red pine----------	75	
MsD---------- Montauk	3r	Slight	Moderate	Slight	Slight	Sugar maple--------	65	Norway spruce, white spruce, red pine.
						Northern red oak----	70	
						Red pine----------	75	
MxC---------- Montauk	3x	Slight	Moderate	Slight	Slight	Eastern white pine--	75	Eastern white pine, European larch.
MxD---------- Montauk	3x	Slight	Moderate	Slight	Slight	Eastern white pine--	75	Eastern white pine, European larch.
NnA, NnB---------- Ninigret	3o	Slight	Slight	Slight	Slight	Red pine----------	71	Eastern white pine, white spruce.
						Eastern white pine--	75	
						Red maple----------	60	
						Northern red oak----	65	
						Sugar maple--------	55	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
PaB, PaC---------- Paxton	3o	Slight	Slight	Slight	Slight	Northern red oak----	65	Red pine, eastern white pine, Norway spruce, European larch.
						Red pine----------	67	
						Eastern white pine--	66	
						Sugar maple---------	75	
PaD---------- Paxton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	65	Red pine, eastern white pine, Norway spruce, European larch.
						Red pine----------	67	
						Eastern white pine--	66	
						Sugar maple---------	75	
PbB, PbC---------- Paxton	3o	Slight	Slight	Slight	Slight	Northern red oak----	65	Red pine, eastern white pine, Norway spruce, European larch.
						Red pine----------	67	
						Eastern white pine--	66	
						Sugar maple---------	75	
PbD---------- Paxton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	65	Red pine, eastern white pine, Norway spruce, European larch.
						Red pine----------	67	
						Eastern white pine--	66	
						Sugar maple---------	75	
PcE*:								
Paxton----------	3x	Slight	Moderate	Slight	Slight	Northern red oak----	65	Red pine, eastern white pine, Norway spruce, European larch.
						Red pine----------	67	
						Eastern white pine--	66	
						Sugar maple---------	75	
Montauk----------	3x	Slight	Moderate	Slight	Slight	Eastern white pine--	75	Eastern white pine, European larch.
PdC*:								
Paxton----------	3o	Slight	Slight	Slight	Slight	Northern red oak----	65	Red pine, eastern white pine, Norway spruce, European larch.
						Red pine----------	67	
						Eastern white pine--	66	
						Sugar maple---------	75	
Urban land.								
Pe---------- Pipestone	3s	Slight	Slight	Moderate	Slight	Northern red oak----	70	Eastern white pine, European larch, red pine.
						Eastern white pine--	65	
PlB---------- Pollux	4k	Slight	Slight	Slight	Slight	Eastern white pine--	70	Eastern white pine, white spruce, red pine, European larch.
						Northern red oak----	65	
						Sugar maple---------	60	
PoB, PoC---------- Poquonock	4s	Slight	Slight	Severe	Slight	Eastern white pine--	60	Eastern white pine, European larch, eastern white pine, European larch.
						Northern red oak----	60	
						Shagbark hickory----	---	
PoD---------- Poquonock	4s	Slight	Moderate	Severe	Slight	Eastern white pine--	60	Eastern white pine, European larch, eastern white pine, European larch.
						Northern red oak----	60	
						Shagbark hickory----	---	
RdA, RlA, RlB------ Ridgebury	4w	Slight	Severe	Severe	Severe	Northern red oak----	57	Eastern white pine, white spruce.
						Red spruce----------	47	
						Eastern white pine--	63	
						Sugar maple---------	52	
Rx*:								
Rock outcrop.								
Hollis----------	5x	Slight	Moderate	Severe	Moderate	Northern red oak----	47	Eastern white pine.
						Eastern white pine--	55	
						Sugar maple---------	56	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
Sb---------- Scarboro	5w	Slight	Severe	Severe	Severe	Eastern white pine-- Red maple---------- Atlantic white-cedar	55 55 45	Northern white-cedar.
ScA---------- Scitico	5w	Slight	Severe	Severe	Severe	Eastern white pine-- Red maple---------- White ash----------	--- --- ---	Eastern white pine, white spruce.
SgB, ShB, ShC------ Scituate	4o	Slight	Slight	Slight	Slight	Northern red oak---- Eastern white pine-- Sugar maple--------- Red pine----------	61 65 55 70	Eastern white pine, red pine, white spruce, European larch.
SmB---------- Scituate	4x	Slight	Moderate	Slight	Slight	Northern red oak---- Eastern white pine-- Sugar maple--------- Red pine----------	61 65 55 70	Eastern white pine, red pine, white spruce, European larch.
SoB, SoC---------- Scituate	4x	Slight	Severe	Slight	Slight	Northern red oak---- Eastern white pine-- Sugar maple--------- Red pine----------	61 65 55 70	Eastern white pine, red pine, white spruce, European larch.
SpA, SpB---------- Shaker	5w	Slight	Severe	Severe	Severe	Eastern white pine-- Red maple---------- Sugar maple---------	57 55 55	Eastern white pine, white spruce.
SrA, SrB---------- Sudbury	4o	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak---- Red spruce---------- Red pine----------	60 45 47 60	Eastern white pine, red pine, European larch, white spruce, Norway spruce.
Ss---------- Swansea	4w	Slight	Severe	Severe	Severe	Red maple---------- Atlantic white-cedar Eastern hemlock----- Green ash---------- American elm-------- Red spruce---------- Balsam fir----------	50 60 55 35 55 50 45	White spruce, eastern hemlock, balsam fir.
WaA, WaB---------- Walpole	4w	Slight	Severe	Severe	Severe	Eastern white pine-- Red maple---------- White ash---------- Eastern hemlock-----	68 75 61 14	Eastern white pine, white spruce, northern white-cedar, Norway spruce.
We---------- Wareham	4w	Slight	Severe	Severe	Severe	Eastern white pine-- Red maple---------- Red spruce----------	65 65 45	Eastern white pine.
Wf---------- Whately Variant	5w	Slight	Severe	Severe	Severe	Red maple----------	50	Northern white-cedar.
Wh---------- Whitman	5x	Slight	Severe	Severe	Severe	Eastern white pine-- Red spruce---------- Red maple----------	56 44 55	
WnA, WnB, WnC------ Windsor	5s	Slight	Slight	Severe	Slight	Eastern white pine-- Northern red oak---- Red pine---------- Sugar maple---------	57 52 61 55	Eastern white pine, red pine.
WnD---------- Windsor	5s	Slight	Moderate	Severe	Slight	Eastern white pine-- Northern red oak---- Red pine---------- Sugar maple---------	57 52 61 55	Eastern white pine, red pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
WrB, WrC---------- Woodbridge	3o	Slight	Slight	Slight	Slight	Eastern white pine--	67	Eastern white pine, European larch.
						Northern red oak----	72	
						Red pine----------	65	
						Red spruce----------	50	
						Sugar maple---------	65	
WsB, WsC---------- Woodbridge	3o	Slight	Slight	Slight	Slight	Eastern white pine--	67	Eastern white pine, red pine, European larch.
						Northern red oak----	72	
						Red pine----------	65	
						Red spruce----------	50	
						Sugar maple---------	65	
WsD---------- Woodbridge	3r	Slight	Moderate	Slight	Slight	Eastern white pine--	67	Eastern white pine, red pine, European larch.
						Northern red oak----	72	
						Red pine----------	65	
						Red spruce----------	50	
						Sugar maple---------	65	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AnB---- Annisquam	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
AnC---- Annisquam	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: large stones.
AnD---- Annisquam	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: large stones, slope.
Ba*. Beaches					
BeB---- Belgrade	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: erodes easily.	Moderate: wetness.
BuA, BuB---- Boxford	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
BuC---- Boxford	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.
BxB*: Boxford----	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Urban land.					
CaB---- Canton	Slight----	Slight----	Moderate: slope, small stones.	Slight----	Slight.
CaC---- Canton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----	Moderate: slope.
CbB---- Canton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----	Moderate: large stones.
CbC---- Canton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight----	Moderate: large stones, slope.
CbD---- Canton	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
CcB---- Canton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----	Moderate: large stones.
CcC---- Canton	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Slight----	Moderate: large stones, slope.
CcD---- Canton	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CcE---------- Canton	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
ChC*: Canton----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
Urban land.					
CrC*: Chatfield----------	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: small stones, large stones, slope.
Hollis----------	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Slight----------	Severe: thin layer.
Rock outcrop.					
CrD*: Chatfield----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Hollis----------	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.	Severe: slope, thin layer.
Rock outcrop.					
De---------- Deerfield	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight----------	Moderate: wetness.
Du*. Dumps					
ElA---------- Elmridge	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
ElB---------- Elmridge	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
FF. Fluvaquents					
Fm---------- Freetown	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Fp---------- Freetown	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
HfA, HfB---------- Hinckley	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight----------	Severe: small stones, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HfC Hinckley	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones, droughty.
HfD Hinckley	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, droughty, slope.
HfE Hinckley	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, droughty, slope.
HuC*: Hollis	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, depth to rock.	Slight	Severe: thin layer.
Urban land.					
Rock outcrop.					
Iw*: Ipswich	Severe: ponding, flooding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: ponding, flooding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess salt, excess sulfur.
Westbrook	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess salt, excess sulfur, ponding.
Ma Maybid	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
MeA, MeB Melrose	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
MmA Merrimac	Slight	Slight	Moderate: small stones.	Slight	Slight.
MmB Merrimac	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MmC Merrimac	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MmD Merrimac	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MnB*: Merrimac	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Urban land.					
MoB Montauk	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MoC---------- Montauk	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
MsB---------- Montauk	Moderate: large stones, percs slowly.	Moderate: large stones.	Severe: large stones, small stones.	Slight----------	Moderate: small stones, large stones.
MsC---------- Montauk	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: small stones, large stones, slope.
MsD---------- Montauk	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
MxC---------- Montauk	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: small stones, large stones, slope.
MxD---------- Montauk	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
NnA---------- Ninigret	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
NnB---------- Ninigret	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
PaB---------- Paxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly, small stones.	Slight----------	Slight.
PaC---------- Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
PaD---------- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PbB---------- Paxton	Moderate: percs slowly, large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
PbC---------- Paxton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight----------	Moderate: slope, large stones.
PbD---------- Paxton	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
PcE*:					
Paxton----------	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
Montauk----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PdC*:					
Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
Urban land.					
Pe Pipestone	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pg*. Pits					
PlB Pollux	Slight	Slight	Moderate: slope.	Slight	Slight.
PoB Poquonock	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight	Moderate: large stones.
PoC Poquonock	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight	Moderate: large stones, slope.
PoD Poquonock	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
Qu*. Quarries					
RdA Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
RlA, RlB Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, large stones, small stones.	Severe: wetness.	Severe: wetness.
Rx*:					
Rock outcrop.					
Hollis	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.	Severe: slope, thin layer.
Sb Scarboro	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
ScA Scitico	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
SgB Scituate	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
ShB Scituate	Moderate: large stones, wetness.	Moderate: large stones, wetness.	Severe: large stones, small stones.	Moderate: wetness.	Moderate: small stones, large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ShC---------- Scituate	Moderate: slope, large stones, wetness.	Moderate: slope, large stones, wetness.	Severe: slope, large stones, small stones.	Moderate: wetness.	Moderate: slope, small stones, large stones.
SmB---------- Scituate	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: wetness.	Moderate: small stones, large stones.
SoB---------- Scituate	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: large stones, wetness.	Severe: large stones.
SoC---------- Scituate	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, wetness.	Severe: large stones.
SpA, SpB---------- Shaker	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
SrA---------- Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, small stones.	Slight----------	Slight.
SrB---------- Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, small stones.	Slight----------	Slight.
Ss---------- Swansea	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
UAC. Udipsamments					
UD. Udorthents					
Ur*. Urban land					
WaA, WaB---------- Walpole	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
We---------- Wareham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wf---------- Whately Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wh---------- Whitman	Severe: large stones, ponding.	Severe: large stones, ponding.	Severe: ponding, large stones.	Severe: ponding.	Severe: large stones, ponding.
WnA---------- Windsor	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty.
WnB---------- Windsor	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
WnC---------- Windsor	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WnD---------- Windsor	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WrB---------- Woodbridge	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: slope, percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
WrC---------- Woodbridge	Moderate: slope, percs slowly, wetness.	Moderate: slope, percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.
WsB---------- Woodbridge	Moderate: wetness, large stones.	Moderate: wetness, large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, wetness.
WsC---------- Woodbridge	Moderate: slope, wetness, large stones.	Moderate: slope, wetness, large stones.	Severe: slope, large stones.	Moderate: wetness.	Moderate: slope, large stones, wetness.
WsD---------- Woodbridge	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Moderate: slope, wetness.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AnB---- Annisquam	Very poor.	Very poor.	Fair	Poor	Poor	---	Poor	Very poor.	Poor	Poor	Very poor.
AnC, AnD---- Annisquam	Very poor.	Very poor.	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
Ba*. Beaches											
BeB---- Belgrade	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
BuA---- Boxford	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
BuB---- Boxford	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
BuC---- Boxford	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
BxB*: Boxford----	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Urban land.											
CaB---- Canton	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
CaC---- Canton	Fair	Good	Good	Good	Gko	---	Very poor.	Very poor.	Good	Good	Very poor.
CbB---- Canton	Very poor.	Poor	Good	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
CbC, CbD---- Canton	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
CcB---- Canton	Very poor.	Very poor.	Good	Good	Good	---	Poor	Very poor.	Poor	Fair	Very poor.
CcC, CcD, CcE---- Canton	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
ChC*: Canton----	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.											
CrC*, CrD*: Chatfield----	Very poor.	Very poor.	Good	Fair	Fair	---	Very poor.	Very poor.	Very poor.	Fair	Very poor.
Hollis----	Very poor.	Very poor.	Fair	Poor	Poor	---	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.											
De---- Deerfield	Poor	Fair	Fair	Poor	Poor	---	Poor	Poor	Fair	Poor	Poor

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Du*. Dumps											
ElA---- Elmridge	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
ElB---- Elmridge	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
FF. Fluvaquents											
Fm---- Freetown	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good
Fp---- Freetown	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good
HfA, HfB, HfC, HfD- Hinckley	Poor	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
HfE---- Hinckley	Very poor.	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
HuC*: Hollis----	Very poor.	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
Urban land.											
Rock outcrop.											
Iw*: Ipswich----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good
Westbrook----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good
Ma---- Maybid	Very poor.	Poor	Poor	Poor	Poor	---	Good	Fair	Poor	Poor	Fair
MeA---- Melrose	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
MeB---- Melrose	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
MmA, MmB, MmC---- Merrimac	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
MmD---- Merrimac	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
MnB*: Merrimac----	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
Urban land.											
MoB---- Montauk	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
MoC---- Montauk	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MsB---- Montauk	Very poor.	Poor	Good	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
MsC, MsD---- Montauk	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
MxC, MxD---- Montauk	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
NnA---- Ninigret	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
NnB---- Ninigret	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
PaB---- Paxton	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
PaC---- Paxton	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
PaD---- Paxton	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
PbB---- Paxton	Very poor.	Poor	Good	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
PbC, PbD---- Paxton	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
PcE*:											
Paxton----	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Montauk----	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
PdC*:											
Paxton----	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.											
Pe---- Pipestone	Fair	Poor	Fair	Poor	Poor	---	Poor	Fair	Poor	Poor	Poor
Pg*. Pits											
PlB---- Pollux	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
PoB---- Poquonock	Very poor.	Poor	Good	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
PoC, PoD---- Poquonock	Very poor.	Poor	Good	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Qu*. Quarries											
RdA---- Ridgebury	Poor	Poor	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair
RlA---- Ridgebury	Very poor.	Poor	Fair	Fair	Fair	---	Good	Good	Poor	Fair	Good

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Shrubs	Wetland plants	Shallow water areas	Open-land wild-life	Wood-land wild-life	Wetland wild-life
RlB---------- Ridgebury	Very poor.	Poor	Fair	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
Rx*: Rock outcrop.											
Hollis----------	Very poor.	Very poor.	Fair	Poor	Poor	---	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Sb---------- Scarboro	Very poor.	Poor	Poor	Poor	Poor	---	Good	Fair	Poor	Poor	Fair
ScA---------- Scitico	Poor	Fair	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair
SgB---------- Scituate	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
ShB---------- Scituate	Very poor.	Poor	Good	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
ShC---------- Scituate	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
SmB---------- Scituate	Very poor.	Very poor.	Good	Good	Good	---	Poor	Very poor.	Poor	Fair	Very poor.
SoB---------- Scituate	Very poor.	Very poor.	Good	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
SoC---------- Scituate	Very poor.	Very poor.	Good	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
SpA---------- Shaker	Poor	Fair	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair
SpB---------- Shaker	Poor	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.
SrA---------- Sudbury	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
SrB---------- Sudbury	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Ss---------- Swansea	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good
UAC. Udipsamments											
UD. Udorthents											
Ur*. Urban land											
WaA---------- Walpole	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good
WaB---------- Walpole	Poor	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.
We---------- Wareham	Poor	Fair	Fair	Poor	Poor	---	Fair	Fair	Fair	Poor	Fair

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Wf---------- Whately Variant	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good
Wh---------- Whitman	Very poor.	Very poor.	Poor	Poor	Poor	---	Good	Fair	Very poor.	Poor	Fair
WnA, WnB, WnC, WnD- Windsor	Poor	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
WrB---------- Woodbridge	Fair	Good	Good	Good	Fair	---	Poor	Very poor.	Good	Good	Very poor.
WrC---------- Woodbridge	Fair	Good	Good	Good	Fair	---	Very poor.	Very poor.	Good	Good	Very poor.
WsB---------- Woodbridge	Very poor.	Poor	Good	Good	Fair	---	Poor	Very poor.	Poor	Good	Very poor.
WsC, WsD---------- Woodbridge	Very poor.	Poor	Good	Good	Fair	---	Very poor.	Very poor.	Poor	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnB---------- Annisquam	Severe: large stones.	Severe: large stones.	Severe: wetness, large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
AnC---------- Annisquam	Severe: large stones.	Severe: large stones.	Severe: wetness, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
AnD---------- Annisquam	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, wetness, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
Ba*. Beaches						
BcB---------- Belgrade	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
BuA, BuB---------- Boxford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
BuC---------- Boxford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
BxB*: Boxford----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Urban land.						
CaB---------- Canton	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
CaC---------- Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
CbB---------- Canton	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: large stones.
CbC---------- Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
CbD---------- Canton	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CcB---------- Canton	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: large stones.
CcC---------- Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
CcD, CcE---------- Canton	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ChC*: Canton----------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dsellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ChC*: Urban land.						
CrC*: Chatfield	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: small stones, large stones, slope.
Hollis	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
CrD*: Chatfield	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hollis	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, thin layer.
Rock outcrop.						
De Deerfield	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.
Du*. Dumps						
ElA Elmridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength, frost action.	Moderate: wetness.
ElB Elmridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength, frost action.	Moderate: wetness.
FF. Fluvaquents						
Fm Freetown	Severe: wetness, excess humus.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, excess humus.
Fp Freetown	Severe: ponding, excess humus.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength, frost action.	Severe: ponding, excess humus.
HfA Hinckley	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: small stones, droughty.
HfB Hinckley	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, droughty.
HfC Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
HfD, HfE Hinckley	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HuC*:						
Hollis	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: thin layer.
Urban land.						
Rock outcrop.						
Iw*:						
Ipswich	Severe: ponding, excess humus.	Severe: ponding, flooding, low strength.	Severe: ponding, flooding, low strength.	Severe: ponding, flooding, low strength.	Severe: ponding, low strength, flooding.	Severe: ponding, excess salt, excess sulfur.
Westbrook	Severe: excess humus, ponding, flooding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding, low strength.	Severe: excess salt, excess sulfur, ponding.
Ma Maybid	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, low strength, frost action.	Severe: ponding.
MeA Melrose	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
MeB Melrose	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
MmA Merrimac	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
MmB Merrimac	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Slight.
MmC Merrimac	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
MmD Merrimac	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MnB*:						
Merrimac	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land.						
MoB Montauk	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Slight.
MoC Montauk	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope.
MsB Montauk	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones, large stones.
MsC Montauk	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: small stones, large stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MsD---------- Montauk	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MxC---------- Montauk	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: small stones, large stones, slope.
MxD---------- Montauk	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
NnA---------- Ninigret	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.
NnB---------- Ninigret	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: wetness.
PaB---------- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Slight.
PaC---------- Paxton	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope.
PaD---------- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PbB---------- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: large stones.
PbC---------- Paxton	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope, large stones.
PbD---------- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcE*:						
Paxton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Montauk----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PdC*:						
Paxton----------	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope.
Urban land.						
Pe---------- Pipestone	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pg*. Pits						
PlB---------- Pollux	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength, frost action.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PoB---------- Poquonock	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: large stones.
PoC---------- Poquonock	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope.	Moderate: large stones, slope.
PoD---------- Poquonock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Qu*. Quarries						
RdA, RlA, RlB----- Ridgebury	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Rx*: Rock outcrop.						
Hollis----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, thin layer.
Sb---------- Scarboro	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
ScA---------- Scitico	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
SgB---------- Scituate	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: frost action, wetness.	Moderate: wetness.
ShB---------- Scituate	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: frost action, wetness.	Moderate: small stones, large stones.
ShC---------- Scituate	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope, small stones, large stones.
SmB---------- Scituate	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: frost action, wetness.	Moderate: small stones, large stones.
SoB---------- Scituate	Severe: large stones, wetness.	Severe: large stones.	Severe: wetness, large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
SoC---------- Scituate	Severe: large stones, wetness.	Severe: large stones.	Severe: wetness, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
SpA, SpB---------- Shaker	Severe too clayey, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
SrA---------- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SrB---------- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: wetness, frost action.	Slight.
Ss---------- Swansea	Severe: wetness, excess humus, cutbanks cave.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, excess humus.
UAC. Udipsamments						
UD. Udorthents						
Ur*. Urban land						
WaA, WaB---------- Walpole	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
We---------- Wareham	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wf---------- Whately Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Wh---------- Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, ponding.	Severe: large stones, ponding.
WnA---------- Windsor	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
WnB---------- Windsor	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
WnC---------- Windsor	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
WnD---------- Windsor	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WrB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: wetness.
WrC---------- Woodbridge	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: slope, wetness.
WsB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: large stones, wetness.
WsC---------- Woodbridge	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: slope, large stones, wetness.
WsD---------- Woodbridge	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope, frost action.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AnB Annisquam	Severe: percs slowly.	Severe: large stones.	Severe: large stones.	Severe: seepage.	Poor: seepage, large stones.
AnC Annisquam	Severe: percs slowly.	Severe: slope, large stones.	Severe: large stones.	Severe: seepage.	Poor: seepage, large stones.
AnD Annisquam	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: seepage, slope.	Poor: seepage, large stones, slope.
Ba*. Beaches					
BcB Belgrade	Severe: wetness, percs slowly.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Fair: wetness.
BuA Boxford	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
BuB Boxford	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
BuC Boxford	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
BxB*: Boxford	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
Urban land.					
CaB Canton	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CaC Canton	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CbB Canton	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CbC Canton	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CbD Canton	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
CcB Canton	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CcC---------- Canton	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CcD, CcE---------- Canton	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
ChC*: Canton----------	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
Urban land.					
CrC*: Chatfield----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Hollis----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Rock outcrop.					
CrD*: Chatfield----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Hollis----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, thin layer, slope.
Rock outcrop.					
De---------- Deerfield	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
Du*. Dumps					
ElA---------- Elmridge	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
ElB---------- Elmridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
FF. Fluvaquents					
Fm---------- Freetown	Severe: wetness.	Severe: wetness, excess humus, seepage.	Severe: wetness, excess humus, seepage.	Severe: wetness, seepage.	Poor: excess humus, wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Fp Freetown	Severe: ponding.	Severe: ponding, excess humus, seepage.	Severe: ponding, excess humus, seepage.	Severe: ponding, seepage.	Poor: ponding, excess humus.
HfA, HfB Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HfC Hinckley	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HfD, HfE Hinckley	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, too sandy, seepage.
HuC*: Hollis	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Urban land.					
Rock outcrop.					
Iw*: Ipswich	Severe: ponding, flooding.	Severe: seepage, flooding, excess humus.	Severe: ponding, flooding, seepage.	Severe: ponding, flooding, seepage.	Poor: excess humus, ponding, excess salt.
Westbrook	Severe: flooding, ponding.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding.	Poor: hard to pack, ponding, excess humus.
Ma Maybid	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: ponding, too clayey.
MeA, MeB Melrose	Severe: percs slowly.	Severe: seepage.	Severe: too clayey.	Severe: seepage.	Poor: too clayey, hard to pack.
MmA, MmB Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MmC Merrimac	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MmD Merrimac	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MnB*: Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Urban land.					
MoB Montauk	Severe: percs slowly.	Moderate: slope.	Slight	Severe: seepage.	Poor: seepage.
MoC Montauk	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Severe: seepage.	Poor: seepage.
MsB Montauk	Severe: percs slowly.	Moderate: slope.	Slight	Severe: seepage.	Poor: seepage.
MsC Montauk	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Severe: seepage.	Poor: seepage.
MsD Montauk	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope, seepage.	Poor: seepage, slope.
MxC Montauk	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Severe: seepage.	Poor: seepage.
MxD Montauk	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope, seepage.	Poor: seepage, slope.
NnA, NnB Ninigret	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
PaB Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PaC Laxtkn	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
PaD Paxton	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PbB Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PbC Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
PbD Paxton	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PcE*: Paxton	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PcE*: Montauk	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope, seepage.	Poor: seepage, slope.
PdC*: Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
Urban land.					
Pe Pipestone	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: too sandy, seepage, wetness.
Pc*. Pits					
PlB Pollux	Severe: percs slowly.	Severe: seepage.	Slight	Severe: seepage.	Good.
PoB Poquonock	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PoC Poquonock	Severe: percs slowly.	Severe: slope.	Moderate: slope, wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PoD Poquonock	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Qu*. Quarries					
RdA, RlA Ridgebury	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
RlB Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Rx*: Rock outcrop.					
Hollis	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, thin layer, slope.
Sb Scarboro	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
ScA Scitico	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SgB, ShB---------- Scituate	Severe: percs slowly, wetness.	Severe: seepage.	Severe: wetness.	Severe: seepage.	Fair: small stones, wetness.
ShC---------- Scituate	Severe: percs slowly, wetness.	Severe: slope, seepage.	Severe: wetness.	Severe: seepage.	Fair: small stones, wetness.
SmB---------- Scituate	Severe: percs slowly, wetness.	Severe: seepage.	Severe: wetness.	Severe: seepage.	Fair: small stones, wetness.
SoB---------- Scituate	Severe: percs slowly, wetness.	Severe: seepage, large stones.	Severe: wetness, large stones.	Severe: seepage.	Poor: large stones.
SoC---------- Scituate	Severe: percs slowly, wetness.	Severe: seepage, slope, wetness.	Severe: wetness, large stones.	Severe: seepage.	Poor: large stones.
SpA---------- Shaker	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness, seepage.	Poor: too clayey, wetness, hard to pack.
SpB---------- Shaker	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness, seepage.	Poor: too clayey, wetness, hard to pack.
SrA, SrB---------- Sudbury	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
Ss---------- Swansea	Severe: wetness, poor filter.	Severe: wetness, excess humus, seepage.	Severe: wetness, too sandy, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus, seepage.
UAC. Udipsamments					
UD. Udorthents					
Ur*. Urban land					
WaA, WaB---------- Walpole	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
We---------- Wareham	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
Wf---------- Whately Variant	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
Wh---------- Whitman	Severe: percs slowly, ponding.	Slight----------	Severe: ponding.	Severe: ponding.	Poor: ponding.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WnA, WnB---------- Windsor	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Poor: too sandy, seepage.	Poor: too sandy, seepage.
WnC---------- Windsor	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Poor: too sandy, seepage.	Poor: too sandy, seepage.
WnD---------- Windsor	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Poor: slope, too sandy, seepage.	Poor: slope, too sandy, seepage.
WrB---------- Woodbridge	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WrC---------- Woodbridge	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Fair: slope, small stones, wetness.
WsB---------- Woodbridge	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Fair: small stones.	Fair: small stones.
WsC---------- Woodbridge	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Fair: slope, small stones.	Fair: slope, small stones.
WsD---------- Woodbridge	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AnB, AnC Annisquam	Fair: large stones, wetness.	Probable	Probable	Poor: large stones, area reclaim.
AnD Annisquam	Fair: large stones, wetness, slope.	Probable	Probable	Poor: large stones, area reclaim, slope.
Ba*. Beaches				
BeB Belgrade	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
BuA, BuB, BuC Boxford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BxB*: Boxford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
CaB, CaC Canton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
CbB, CbC Canton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CbD Canton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CcB, CcC Canton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CcD Canton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CcE Canton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
ChC*: Canton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Urban land.				
CrC*: Chatfield	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CrC*:				
Hollis	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim.
Rock outcrop.				
CrD*:				
Chatfield	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Hollis	Poor: area reclaim, thin layer, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, slope.
Rock outcrop.				
De Deerfield	Fair: wetness.	Probable	Improbable: excess fines.	Poor: too sandy, thin layer.
Du*. Dumps				
ElA, ElB Elmridge	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
FF. Fluvaquents				
Fm, Fp Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
HfA, HfB, HfC Hinckley	Good	Probable	Probable	Poor: too sandy, area reclaim, small stones.
HfD Hinckley	Fair: slope.	Probable	Probable	Poor: slope, too sandy, small stones.
HfE Hinckley	Poor: slope.	Probable	Probable	Poor: slope, too sandy, small stones.
HuC*:				
Hollis	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim.
Urban land.				
Rock outcrop.				
Iw*:				
Ipswich	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess salt, excess humus.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Iw*: Westbrook	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, excess salt, wetness.
Ma Maybid	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
MeA, MeB Melrose	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
MmA, MmB, MmC Merrimac	Good	Probable	Probable	Poor: small stones, area reclaim.
MmD Merrimac	Fair: slope.	Probable	Probable	Poor: slope, small stones, area reclaim.
MnB*: Merrimac	Good	Probable	Probable	Poor: small stones, area reclaim.
Urban land.				
MoB, MoC, MsB, MsC Montauk	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
MsD Montauk	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
MxC Montauk	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
MxD Montauk	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
NnA, NnB Ninigret	Fair: wetness.	Probable	Probable	Poor: area reclaim.
PaB Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
PaC Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, area reclaim.
PaD Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PbB, PbC Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
PbD Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PcE*:				
Paxton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
Montauk	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
PdC*:				
Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, area reclaim.
Urban land.				
Pe Pipestone	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Pg*. Lits				
PlB Pollux	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
PoB, PoC Poquonock	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too sandy, large stones.
PoD Poquonock	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Qu*. Quarries				
RdA, RlA, RlB Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
Rx*:				
Rock outcrop.				
Hollis	Poor: area reclaim, thin layer, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, slope.
Sb Scarboro	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, ponding.
ScA Scitico	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.
SgB Scituate	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
ShB, ShC, SmB Scituate	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
SoB, SoC Scituate	Fair: large stones, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SpA, SpB---------- Shaker	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
SrA, SrB---------- Sudbury	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, too sandy, area reclaim.
Ss---------- Swansea	Poor: wetness.	Probable----------	Improbable: excess fines.	Poor: wetness, excess humus.
UAC. Udipsamments				
UD. Udorthents				
Ur*. Urban land				
WaA, WaB---------- Walpole	Poor: wetness.	Probable----------	Probable----------	Poor: wetness, small stones.
We---------- Wareham	Poor: wetness.	Probable----------	Probable----------	Poor: wetness, too sandy, area raclaim.
Wf---------- Whately Variant	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Wh---------- Whitman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, large stones, area reclaim.
WnA, WnB, WnC---------- Windsor	Good----------	Probable----------	Improbable: excess fines.	Poor: too sandy.
WnD---------- Windsor	Fair: slope.	Probable----------	Improbable: excess fines.	Poor: slope, too sandy.
WrB---------- Woodbridge	Poor: frost action.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
WrC---------- Woodbridge	Poor: frost action.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, area reclaim.
WsB, WsC---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
WsD---------- Woodbridge	Poor: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Grassed waterways
AnB---- Annisquam	Severe: seepage.	Severe: seepage, large stones.	Severe: no water.	Deep to water----	Large stones, droughty.
AnC, AnD---- Annisquam	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water----	Large stones, slope, droughty.
Ba*. Beaches					
BeB---- Belgrade	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave, slow refill.	Percs slowly, frost action.	Erodes easily, percs slowly.
BuA---- Boxford	Slight----	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, erodes easily, percs slowly.
BuB---- Boxford	Moderate: slope.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, erodes easily, percs slowly.
BuC---- Boxford	Severe: slope.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, slope, erodes easily.
BxB*: Boxford----	Moderate: slope.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, erodes easily, percs slowly.
Urban land.					
CaB---- Canton	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water----	Favorable.
CaC---- Canton	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water----	Slope.
CbB---- Canton	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water----	Large stones.
CbC, CbD---- Canton	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water----	Large stones, slope.
CcB---- Canton	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water----	Large stones.
CcC, CcD, CcE---- Canton	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water----	Large stones, slope.
ChC*: Canton----	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water----	Slope.
Urban land.					

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Grassed waterways
CrC*:					
Chatfield	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, depth to rock.
Hollis	Severe: depth to rock.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.
Rock outcrop.					
CrD*:					
Chatfield	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, depth to rock.
Hollis	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.
Rock outcrop.					
Dc Deerfield	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Droughty.
Du*. Dumps					
ElA Elmridge	Slight	Moderate: piping, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, percs slowly.
ElB Elmridge	Moderate: slope.	Moderate: piping, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, percs slowly.
Ff. Fluvaquents					
Fm Freetown	Severe: seepage.	Severe: excess humus, wetness.	Slight	Frost action	Wetness.
Fp Freetown	Severe: seepage.	Severe: excess humus, ponding.	Slight	Frost action, ponding.	Wetness.
HfA, HfB Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, droughty.
HfC, HfD, HfE Hinckley	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, droughty, slope.
HuC*:					
Hollis	Severe: depth to rock.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.
Urban land.					
Rock outcrop.					

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Grassed waterways
Iw*:					
Ipswich	Severe: seepage.	Severe: excess humus, ponding, excess salt.	Severe: salty water.	Flooding, excess salt, ponding.	Excess salt, wetness.
Westbrook	Moderate: seepage.	Severe: excess humus, ponding, excess salt.	Severe: salty water.	Ponding, flooding, subsides.	Wetness, excess salt.
Ma Maybid	Slight	Severe: ponding.	Severe: slow refill.	Percs slowly, ponding, frost action.	Wetness, percs slowly, erodes easily.
MeA, MeB Melrose	Severe: seepage.	Moderate: hard to pack.	Severe: no water.	Deep to water	Erodes easily, percs slowly.
MmA, MmB Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Favorable.
MmC, MmD Merrimac	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope.
MnB*:					
Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Favorable.
Urban land.					
MoB Montauk	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Rooting depth, percs slowly.
MoC Montauk	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.
MsB Montauk	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Rooting depth, percs slowly.
MsC, MsD, MxC, MxD Montauk	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.
NnA Ninigret	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Favorable.
NnB Ninigret	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Favorable.
PaB Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth.
PaC, PaD Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly, rooting depth.
PbB Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Rooting depth, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Grassed waterways
PbC, PbD---------- Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water----	Slope, rooting depth, percs slowly.
PcE*:					
Paxton----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water----	Slope, rooting depth, percs slowly.
Montauk----------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water----	Slope, rooting depth, percs slowly.
PdC*:					
Paxton----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water----	Slope, percs slowly, rooting depth.
Urban land.					
Pe---------- Pipestone	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave----	Droughty, wetness.
Pg*. Pits					
PlB---------- Pollux	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water----	Erodes easily, percs slowly.
PoB---------- Poquonock	Moderate: slope.	Moderate: piping.	Severe: no water.	Deep to water----	Rooting depth, percs slowly.
PoC, PoD---------- Poquonock	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water----	Slope, rooting depth, percs slowly.
Qu*. Quarries					
RdA---------- Ridgebury	Slight----------	Severe: wetness, piping.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.
RlA---------- Ridgebury	Slight----------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.
RlB---------- Ridgebury	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, percs slowly, rooting depth.
Rx*: Rock outcrop.					
Hollis----------	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water----	Slope, depth to rock.
Sb---------- Scarboro	Severe: seepage.	Severe: seepage, ponding.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Wetness, droughty.
ScA---------- Scitico	Slight----------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Grassed waterways
SgB, ShB---------- Scituate	Severe: seepage.	Moderate: piping.	Severe: no water.	Percs slowly, slope.	Rooting depth, percs slowly.
ShC---------- Scituate	Severe: seepage, slope.	Moderate: piping.	Severe: no water.	Percs slowly, slope.	Slope, rooting depth, percs slowly.
SmB---------- Scituate	Severe: seepage.	Moderate: piping.	Severe: no water.	Percs slowly, slope.	Rooting depth, percs slowly.
SoB---------- Scituate	Severe: seepage.	Severe: large stones, wetness.	Severe: no water.	Percs slowly, large stones, slope.	Large stones, rooting depth, percs slowly.
SoC---------- Scituate	Severe: seepage, slope.	Severe: large stones, wetness.	Severe: no water.	Percs slowly, large stones, slope.	Large stones, slope, rooting depth.
SpA---------- Shaker	Slight----------	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.
SpB---------- Shaker	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, erodes easily.
SrA---------- Sudbury	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave----	Favorable.
SrB---------- Sudbury	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Favorable.
Ss---------- Swansea	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Wetness.
UAC. Udipsamments					
UD. Udorthents					
Ur*. Urban land					
WaA---------- Walpole	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness.
WaB---------- Walpole	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Slope, frost action, cutbanks cave.	Wetness.
We---------- Wareham	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave----	Wetness, droughty.
Wf---------- Whately Variant	Slight----------	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.
Wh---------- Whitman	Slight----------	Severe: piping, ponding.	Severe: no water.	Percs slowly, frost action.	Large stones, wetness, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Grassed waterways
WnA---------- Windsor	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Cutbanks cave----	Droughty.
WnB---------- Windsor	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Slope, cutbanks cave.	Droughty.
WnC, WnD---------- Windsor	Severe: slope, seepage.	Severe: seepage, piping.	Severe: no water.	Slope, cutbanks cave.	Slope, droughty.
WrB---------- Woodbridge	Moderate: slope.	Moderate: piping, wetness.	Severe: no water.	Slope, percs slowly, frost action.	Percs slowly, rooting depth.
WrC---------- Woodbridge	Severe: slope.	Moderate: piping, wetness.	Severe: no water.	Slope, percs slowly, frost action.	Slope, percs slowly, rooting depth.
WsB---------- Wkodbridce	Moderate: slope.	Moderate: piping, wetness.	Severe: no water.	Percs slowly, slope.	Percs slowly, rooting depth.
WsC, WsD---------- Woodbridge	Severe: slope.	Moderate: piping, wetness.	Severe: no water.	Percs slowly, slope.	Slope, percs slowly, rooting depth.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AnB, AnC, AnD---- Annisquam	0-4	Extremely bouldery fine sandy loam.	SM, ML	A-2, A-4	30-50	80-90	75-90	45-85	25-60	---	NP
	4-28	Gravelly fine sandy loam, gravelly sandy loam.	SM, SW-SM, GW, GW-GM	A-1, A-2, A-4	15-50	40-80	20-70	10-60	5-40	---	NP
	28-60	Gravelly loamy sand, gravelly loamy coarse sand.	SM, SW-SM, GW, GW-GM	A-1, A-2	15-50	35-80	15-70	10-50	5-20	---	NP
Ba*. Beaches											
BeB---------- Belgrade	0-9	Very fine sandy loam.	ML	A-4	0	100	95-100	90-100	60-95	<35	NP-8
	9-42	Silt loam, very fine sandy loam, loamy very fine sand.	ML	A-4	0	100	95-100	85-100	50-90	<35	NP-8
	42-60	Silt loam, loamy very fine sand, sand and gravel.	ML, SM	A-1, A-2, A-4	0	75-100	55-100	35-100	15-90	<35	NP-8
BuA, BuB, BuC---- Boxford	0-9	Silt loam--------	ML	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	35-50	5-15
	9-17	Silt loam, silty clay loam.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	30-45	5-18
	17-44	Silty clay loam, silty clay.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	30-45	5-18
	44-60	Silty clay loam, silty clay, clay.	CL, ML	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	80-95	30-45	8-18
BxB*: Boxford----------	0-9	Silt loam--------	ML	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	35-50	5-15
	9-17	Silt loam, silty clay loam.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	30-45	5-18
	17-44	Silty clay loam, silty clay.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	30-45	5-18
	44-60	Silty clay loam, silty clay, clay.	CL, ML	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	80-95	30-45	8-18
Urban land.											
CaB, CaC---------- Canton	0-7	Fine sandy loam	SM, ML	A-2, A-4	0-5	85-95	75-90	55-85	30-60	<30	NP-8
	7-28	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<30	NP-8
	28-60	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CbB, CbC, CbD----- Canton	0-4	Very stony fine sandy loam.	SM, ML	A-2, A-4	5-15	80-95	70-90	50-85	30-60	<30	NP-8
	4-28	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<30	NP-8
	28-60	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
CcB, CcC, CcD, CcE----- Canton	0-4	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	10-30	70-95	60-90	40-85	25-60	<30	NP-8
	4-28	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<30	NP-8
	28-60	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
ChC*: Canton----------	0-4	Fine sandy loam	SM, ML	A-2, A-4	0-5	85-95	75-90	55-85	30-60	<30	NP-8
	4-28	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<30	NP-8
	28-60	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
Urban land.											
CrC*, CrD*: Chatfield-------	0-5	Extremely stony fine sandy loam.	SM, GM, GM-GC, SM-SC	A-4, A-2, A-1	5-25	55-80	50-75	30-65	15-50	10-20	1-6
	5-34	Loam, gravelly loam, gravelly sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-5	60-95	55-90	35-80	15-65	10-20	1-6
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hollis----------	0-3	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	10-25	75-100	65-95	40-85	25-70	<20	NP-3
	3-18	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	75-95	65-95	40-80	20-65	---	NP
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
De--------------- Deerfield	0-6	Loamy fine sand	SP-SM, SM	A-1, A-2, A-3, A-4	0	95-100	80-100	40-75	5-40	---	NP
	6-24	Loamy sand, sand, coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	80-100	40-75	5-30	---	NP
	24-60	Sand, fine sand, coarse sand.	SP, SM	A-1, A-2, A-3	0	95-100	65-100	30-75	3-30	---	NP
Du*. Dumps											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ElA, ElB---------	0-8	Fine sandy loam	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
Elmridge	8-23	Fine sandy loam, sandy loam, loam.	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
	23-60	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	90-100	75-95	25-50	5-25
FF.											
Fluvaquents											
Fm---------------	0-5	Sapric material	Pt	A-8	---	---	---	---	---	---	NP
Freetown	5-60	Sapric material, hemic material.	Pt	A-8	---	---	---	---	---	---	NP
Fp---------------	0-60	Sapric material	Pt	A-8	---	---	---	---	---	---	NP
Freetown											
HfA, HfB, HfC, HfD, HfE--------	0-8	Gravelly fine sandy loam.	SM, SP-SM	A-1, A-2, A-3, A-4	0-10	60-95	40-75	20-70	2-40	---	NP
Hinckley	8-17	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	---	NP
	17-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	5-30	20-65	20-50	10-40	0-20	---	NP
HuC*:											
Hollis----------	0-3	Very stony fine sandy loam.	SM, ML	A-2, A-4	5-15	75-100	65-95	40-85	25-70	<20	NP-3
	3-18	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	75-95	65-95	40-80	20-65	---	NP
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
Rock outcrop.											
Iw*:											
Ipswich---------	0-17	Fibric material	Pt	A-8	0	---	---	---	---	---	NP
	17-42	Hemic material---	Pt	A-8	0	---	---	---	---	---	NP
	42-60	Sapric material, hemic material.	Pt	A-8	0	---	---	---	---	---	NP
Westbrook-------	0-37	Hemic material---	Pt	A-8	0	---	---	---	---	---	NP
	37-60	Silt loam, very fine sandy loam.	ML, CL-ML, OL	A-4	0	95-100	95-100	95-100	85-100	<25	NP-5
Ma---------------	0-5	Silt loam--------	ML, CL, CH	A-4, A-6, A-7	0	100	100	90-100	75-95	30-52	4-26
Maybid	5-19	Silty clay, silty clay loam, clay.	CL, CH	A-6, A-7	0	100	100	95-100	85-95	30-52	10-26
	19-60	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	95-100	85-95	30-52	10-26
MeA, MeB---------	0-9	Fine sandy loam	SM, ML	A-2, A-4	0	100	95-100	55-85	30-55	<30	NP-9
Melrose	9-30	Fine sandy loam, sandy loam, coarse sandy loam.	SM	A-2, A-4	0	100	95-100	55-85	25-50	<30	NP-9
	30-60	Silty clay loam, clay loam, clay.	CL, CH	A-7, A-6	0	100	100	95-100	90-100	30-55	11-30

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MmA, MmB, MmC, MmD---------- Merrimac	0-10	Fine sandy loam	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	---	NP
	10-15	Sandy loam-------	SM	A-2	0	75-95	70-90	40-60	20-35	---	NP
	15-22	Gravelly loamy sand, sandy loam, gravelly sandy loam.	SP, SM, SP-SM	A-1, A-2, A-3	0	65-95	55-90	30-60	0-35	---	NP
	22-60	Stratified sand to very gravelly coarse sand.	GP, SP, SP-SM, GP-GM	A-1	5-25	40-65	30-60	15-40	0-10	---	NP
MnB*: Merrimac--------	0-10	Fine sandy loam	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	---	NP
	10-15	Sandy loam-------	SM	A-2	0	75-95	70-90	40-60	20-35	---	NP
	15-22	Gravelly loamy sand, sandy loam, gravelly sandy loam.	SP, SM, SP-SM	A-1, A-2, A-3	0	65-95	55-90	30-60	0-35	---	NP
	22-60	Stratified sand to very gravelly coarse sand.	GP, SP, SP-SM, GP-GM	A-1	5-25	40-65	30-60	15-40	0-10	---	NP
Urban land.											
MoB, MoC---------- Montauk	0-8	Fine sandy loam--	ML, SM	A-4, A-2, A-1	0	80-100	75-95	45-95	20-85	<20	NP-4
	8-25	Fine sandy loam, gravelly sandy loam, silt loam.	SM, ML	A-2, A-4, A-1	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	25-60	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-2, A-1, A-4, A-3	0-5	60-100	55-95	20-80	10-50	<15	NP-2
MsB, MsC, MsD---- Montauk	0-4	Very stony fine sandy loam.	SM, ML	A-1, A-2, A-4	5-10	65-80	60-35	30-75	15-70	<20	NP-4
	4-25	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	25-60	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GL-G	A-1, A-2, A-0, A-3	0-5	60-100	55-95	20-80	10-50	<15	NP-2
MxC, MxD--------- Montauk	0-4	Extremely stony fine sandy loam.	SM, ML, GM	A-2, A-4, A-1	5-25	65-80	60-75	30-75	15-70	<20	NP-4
	4-25	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	25-60	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4, A-3	0-5	60-100	55-95	20-80	10-50	<15	NP-2
NnA, NnB--------- Ninigret	0-9	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	70-95	40-65	<25	NP-3
	9-33	Fine sandy loam, sandy loam, very fine sandy loam.	SM	A-2, A-4	0	95-100	90-100	65-85	20-50	<25	NP-3
	33-60	Loamy sand, sand, gravelly sand.	SP, SM, GP	A-1, A-2, A-3	0-20	45-100	30-90	25-65	0-30	---	NP
PaB, PaC, PaD---- Paxton	0-9	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	80-95	75-90	60-85	30-65	<30	NP-18
	9-23	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-18
	23-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-18

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PbB, PbC, PbD---- Paxton	0-4	Very stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	80-95	75-90	60-85	30-65	<30	NP-18
	4-23	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	70-90	65-90	50-85	25-65	<30	NP-18
	23-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-18
PcE*:											
Paxton----------	0-4	Extremely stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	10-25	80-90	70-85	60-80	30-65	<30	NP-18
	4-23	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-0	5-20	70-90	65-90	50-85	25-65	<30	NP-18
	23-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	>30	NP-18
Montauk---------	0-2	Extremely stony fine sandy loam.	SM, ML, GM	A-2, A-4, A-1	5-25	65-80	60-75	30-75	15-70	<20	NP-4
	2-22	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	22-60	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4, A-3	0-5	60-100	55-95	20-80	10-50	<15	NP-2
PdC*:											
Paxton----------	0-9	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	80-95	75-90	60-85	30-65	<30	NP-18
	9-23	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-18
	23-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-18
Urban land.											
Pe---------- Pipestone	0-9	Loamy fine sand	SP, SM, SP-SM	A-2-4, A-3	0	95-100	90-100	60-80	0-20	---	NP
	9-28	Sand, loamy sand, fine sand.	SP-SM, SP, SM	A-2-4, A-3	0	95-100	90-100	60-80	0-15	---	NP
	28-60	Sand, fine sand	SP-SM, SP	A-3, A-2-4	0	95-100	90-100	50-80	0-10	---	NP
Pg*. Pits											
PlB----------	0-10	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	85-100	55-95	30-75	<25	NP-18
Pollux	10-35	Sandy loam, fine sandy loam.	SM, ML	A-2, A-4	0	90-100	85-100	55-95	25-65	<25	NP-18
	35-60	Stratified silt loam to very fine sand.	ML, SM	A-4, A-2	0	100	100	65-100	25-90	<25	NP-18
PoB, PoC, PoD---- Poquonock	0-7	Very stony loamy sand.	SM	A-2	5-15	90-100	85-100	50-85	20-30	---	NP
	7-24	Loamy fine sand, loamy sand, sand.	SM	A-2	0-5	90-100	60-85	50-85	10-30	---	NP
	24-60	Gravelly loam, gravelly sandy loam, fine sandy loam.	SM, ML	A-2, A-4	5-15	85-90	70-85	45-75	25-70	<30	NP-4
Qu*. Quarries											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RdA---------- Ridgebury	0-9	Fine sandy loam	SM, ML	A-1, A-2, A-4	0-5	80-100	75-90	40-90	20-70	---	NP
	9-20	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	20-60	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
RlA, RlB---------- Ridgebury	0-9	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	5-20	70-100	60-90	45-85	25-65	---	NP
	9-20	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	20-60	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
Rx*: Rock outcrop.											
Hollis----------	0-2	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	10-25	75-100	65-95	40-85	25-70	<20	NP-3
	2-15	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	75-95	65-95	40-80	20-65	---	NP
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sb----------	3-0	Mucky peat-------	Pt	A-8	---	---	---	---	---	---	---
Scarboro	0-8	Mucky loamy fine sand.	SM, SP-SM	A-1, A-2, A-3, A-4	0	95-100	85-100	45-85	5-50	---	NP
	8-13	Loamy sand, fine sand, sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	85-100	45-80	5-35	---	NP
	13-19	Loamy sand, sand, coarse sand.	SM, SP-SM, SP	A-1, A-2, A-3	0	95-100	70-100	30-80	2-35	---	NP
	19-60	Stratified loamy fine sand to gravelly coarse sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	70-100	35-100	15-80	0-35	---	NP
ScA---------- Scitico	0-8	Silt loam--------	ML, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	70-95	25-60	5-25
	8-42	Silt loam, silty clay loam, silty clay.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	75-100	25-50	5-25
	42-60	Silty clay loam, silty clay, clay.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-50	5-25
SgB---------- Scituate	0-9	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	80-95	70-90	40-85	20-65	<20	NP-4
	9-38	Fine sandy loam, sandy loam, loam.	SM, ML	A-2, A-4, A-1	0-15	70-95	60-90	35-85	20-65	<20	NP-4
	38-60	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-10	65-85	50-75	30-65	12-30	<15	NP-2

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ShB, ShC--------- Scituate	0-5	Very stony fine sandy loam.	SM, ML	A-2, A-4, A-1	10-20	70-90	60-85	35-80	20-65	<20	NP-4
	5-38	Fine sandy loam, loam, sandy loam.	SM, ML	A-2, A-4, A-1	0-15	70-95	60-90	35-85	20-65	<20	NP-4
	38-60	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-10	65-85	50-75	30-25	12-30	<15	NP-2
SmB-------------- Scituate	0-5	Extremely stony fine sandy loam.	SM, ML	A-2, A-4, A-1	15-35	60-90	55-85	35-80	20-65	<20	NP-4
	5-38	Fine sandy loam, loam, sandy loam.	SM, ML	A-2, A-4, A-1	0-15	70-95	60-90	35-85	20-65	<20	NP-4
	38-60	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-10	65-85	50-75	30-65	12-30	<15	NP-2
SoB, SoC--------- Scituate	0-5	Extremely bouldery fine sandy loam.	SM, ML	A-1, A-2, A-4	30-50	60-95	45-90	30-85	15-70	<20	NP-4
	5-38	Fine sandy loam, loam, sandy loam.	SM, ML	A-1, A-2, A-4	0-15	70-95	60-90	35-85	20-65	<20	NP-4
	38-60	Gravelly loamy sand, loamy coarse sand, loamy fine sand.	SM	A-1, A-2	0-10	55-85	50-75	30-65	12-30	<15	NP-2
SpA, SpB--------- Shaker	0-9	Fine sandy loam	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
	9-31	Fine sandy loam, sandy loam, loam.	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
	31-60	Silty clay, silty clay loam, clay.	CL	A-6, A-7	0	100	95-100	90-100	75-95	25-50	5-25
SrA, SrB--------- Sudbury	0-13	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	85-100	70-100	40-90	20-55	---	NP
	13-19	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0-5	85-100	60-100	40-80	20-50	---	NP
	19-26	Gravelly coarse sand, loamy sand, sandy loam.	SM, SP-SM	A-1, A-2, A-3	0-5	70-100	60-100	30-70	5-35	---	NP
	26-60	Stratified sand and gravel.	SP, SP-SM, GP, GP-GM	A-1	10-40	35-70	25-65	15-45	0-10	---	NP
Ss--------------- Swansea	0-3	Hemic material---	Pt	A-8	---	---	---	---	---	---	NP
	3-22	Sapric material, hemic material.	Pt	A-8	---	---	---	---	---	---	NP
	22-60	Sand, loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	55-100	45-100	30-70	5-30	---	NP
UAC. Udipsamments											
UD. Udorthents											
Ur*. Urban land											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WaA, WaB--------- Walpole	0-9	Fine sandy loam	SM	A-2, A-4	0-5	90-100	85-100	70-100	30-50	<25	NP-3
	9-22	Fine sandy loam, sandy loam, gravelly sandy loam.	SM	A-2, A-4	0-5	85-100	60-100	40-95	25-50	---	NP
	22-60	Gravelly loamy sand, gravelly sand, sand.	SP, SM, GP, GP-GM	A-1, A-2, A-3	0-20	55-100	50-100	25-90	0-25	---	NP
We--------------- Wareham	0-10	Loamy sand--------	SM, SP-SM	A-1, A-2	0	85-100	75-100	40-85	10-35	---	NP
	10-16	Loamy coarse sand, loamy fine sand, sand.	SM, SP-SM	A-1, A-2, A-3	0	85-100	75-100	35-85	5-35	---	NP
	16-24	Loamy coarse sand, loamy sand, coarse sand.	SM, SP-SM, SP	A-1, A-2, A-3	0	85-100	75-100	25-75	0-30	---	NP
	24-60	Coarse sand, loamy sand, very gravelly sand.	SP, SM, GM, GP	A-1, A-2, A-3	0-3	50-100	25-100	10-75	0-30	---	NP
Wf--------------- Whately Variant	0-10	Mucky fine sandy loam.	ML, SM	A-2, A-4	0	100	100	60-85	30-55	<20	NP-4
	10-24	Loamy sand, loamy fine sand.	SM	A-2	0	100	100	50-75	15-35	---	NP
	24-60	Silty clay, clay, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	75-95	28-50	12-30
Wh--------------- Whitman	0-4	Extremely stony loam.	ML, SM, CL-ML	A-1, A-2, A-4	10-40	65-80	60-75	35-70	20-65	<35	NP-10
	4-14	Sandy loam, gravelly fine sandy loam, gravelly silt loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	<35	NP-10
	14-22	Sandy loam, gravelly fine sandy loam, loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	<32	NP-8
	22-60	Loamy sand, gravelly loamy sand, gravelly sandy loam.	SM	A-1, A-2	0-10	65-95	60-90	30-65	15-35	---	NP
WnA, WnB, WnC, WnD---------- Windsor	0-10	Loamy sand--------	SM	A-2, A-1	0	95-100	85-100	35-85	20-35	---	NP
	10-30	Loamy sand, loamy fine sand, sand.	SW-SM, SM, SP-SM	A-2, A-1	0	95-100	85-100	45-95	10-30	---	NP
	30-60	Sand, fine sand	SP-SM, SM	A-2, A-3, A-1	0	90-100	75-100	40-95	5-20	---	NP
WrB, WrC--------- Woodbridge	0-6	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	85-95	70-90	60-85	30-65	<30	NP-10
	6-25	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	75-90	65-90	50-85	25-65	<30	NP-10
	25-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
WsB, WsC, WsD---- Woodbridge	0-4	Very stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	85-95	70-90	60-85	30-65	<30	NP-10
	4-25	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	75-95	65-90	50-85	25-60	<30	NP-10
	25-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-90	50-75	25-60	<30	NP-10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. 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	T
	In	In/hr	In/in	pH			
AnB, AnC, AnD----	0-4	2.0-6.0	0.11-0.17	3.6-6.0	Low----------	0.17	3
Annisquam	4-28	2.0-6.0	0.03-0.11	3.6-6.0	Low----------	0.24	
	28-60	0.2-0.6	0.01-0.08	3.6-6.0	Low----------	0.24	
Ba*.							
Beaches							
BeB----------	0-9	0.6-2.0	0.18-0.25	4.5-7.3	Low----------	0.49	3
Belgrade	9-42	0.6-2.0	0.16-0.20	4.5-7.3	Low----------	0.64	
	42-60	0.06-6.0	0.06-0.20	5.1-7.3	Low----------	0.64	
BuA, BuB, BuC----	0-9	0.2-0.6	0.16-0.24	4.5-6.5	Low----------	0.32	3
Boxford	9-17	0.06-0.2	0.15-0.22	4.5-6.5	Low----------	0.49	
	17-44	<0.2	0.13-0.15	5.1-7.3	Moderate-------	0.49	
	44-60	<0.2	0.11-0.15	5.1-7.3	Moderate-------	0.49	
BxB*:							
Boxford---------	0-9	0.2-0.6	0.16-0.24	4.5-6.5	Low----------	0.32	3
	9-17	0.06-0.2	0.15-0.22	4.5-6.5	Low----------	0.49	
	17-44	<0.2	0.13-0.15	5.1-7.3	Moderate-------	0.49	
	44-60	<0.2	0.11-0.15	5.1-7.3	Moderate-------	0.49	
Urban land.							
CaB, CaC---------	0-7	2.0-6.0	0.11-0.19	3.6-6.0	Low----------	0.24	3
Canton	7-28	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28	
	28-60	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17	
CbB, CbC, CbD----	0-4	2.0-6.0	0.13-0.20	3.6-6.0	Low----------	0.20	3
Canton	4-28	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28	
	28-60	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17	
CcB, CcC, CcD,							
CcE----------	0-4	2.0-6.0	0.13-0.17	3.6-6.0	Low----------	0.20	3
Canton	4-28	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28	
	28-60	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17	
ChC*:							
Canton----------	0-4	2.0-6.0	0.11-0.19	3.6-6.0	Low----------	0.24	3
	4-28	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28	
	28-60	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17	
Urban land.							
CrC*, CrD*:							
Chatfield-------	0-5	0.6-6.0	0.08-0.14	4.5-6.0	Low----------	0.20	3
	5-34	0.6-6.0	0.08-0.15	4.5-6.0	Low----------	0.20	
	34	---	---	---	----------	----	
Hollis----------	0-3	0.6-6.0	0.10-0.21	4.5-6.0	Low----------	0.17	2
	3-18	0.6-6.0	0.06-0.18	4.5-6.0	Low----------	0.32	
	18	---	---	---	----------	----	
Rock outcrop.							
De----------	0-6	6.0-20	0.07-0.13	4.5-6.5	Low----------	0.17	5
Deerfield	6-24	6.0-20	0.01-0.13	4.5-6.5	Low----------	0.17	
	24-60	>6.0	0.01-0.08	4.5-6.5	Low----------	0.17	
DU*.							
Dumps							

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE 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			
E1A, E1B--------- Elmridge	0-8 8-23 23-60	2.0-6.0 2.0-6.0 <0.2	0.14-0.24 0.13-0.22 0.12-0.18	4.5-6.5 4.5-6.5 5.6-7.8	Low---------- Low---------- Low----------	0.24 0.24 0.49	3
FF. Fluvaquents							
Fm---------- Freetown	0-5 5-60	0.6-6.0 0.6-6.0	0.35-0.45 0.35-0.45	3.6-4.4 3.6-4.4	Low---------- Low----------	---- ----	---
Fp---------- Freetown	0-60	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---
HfA, HfB, HfC, HfD, HfE-------- Hinckley	0-8 8-17 17-60	6.0-20 6.0-20 >20	0.03-0.18 0.01-0.10 0.01-0.06	3.6-6.0 3.6-6.0 3.6-6.0	Low---------- Low---------- Low----------	0.17 0.17 0.10	3
HuC*: Hollis---------- Urban land. Rock outcrop.	0-3 3-18 18	0.6-6.0 0.6-6.0 ---	0.10-0.21 0.06-0.18 ---	4.5-6.0 4.5-6.0 ---	Low---------- Low---------- ----------	0.17 0.32 ----	2
Iw*: Ipswich--------- Westbrook------- 	0-17 13-42 42-20 0-37 37-60	0.6-20 0.6-20 0.2-20 0.6-20 0.6-2.0	0.18-0.31 0.18-0.35 0.18-0.31 0.18-0.36 0.10-0.26	5.1-7.8 5.1-3.8 1.1-7.8 4.5-7.3 5.6-7.3	Low---------- Low---------- Low---------- Low---------- Low----------	---- ---- ---- ---- 0.64	---
Ma---------- Maybid	0-5 5-19 19-60	0.2-0.6 <0.2 <0.2	0.12-0.30 0.09-0.17 0.09-0.18	5.1-6.0 5.6-7.3 6.1-7.3	Low---------- Moderate------- Moderate-------	0.32 0.43 0.49	5
MeA, MeB--------- Melrose	0-9 9-30 30-60	2.0-6.0 2.0-6.0 <0.2	0.11-0.20 0.10-0.16 0.12-0.16	5.1-6.0 5.1-6.0 5.1-7.3	Low---------- Low---------- Moderate-------	0.28 0.32 0.49	3
MmA, MmB, MmC, MmD---------- Merrimac	0-10 10-15 15-22 22-60	2.0-6.0 2.0-6.0 2.0-20 6.0-20	0.14-0.19 0.14-0.17 0.03-0.12 0.01-0.06	3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0	Low---------- Low---------- Low---------- Low----------	0.24 0.24 0.17 0.10	3
MnB*: Merrimac-------- Urban land.	0-10 10-15 15-22 22-60	2.0-6.0 2.0-6.0 2.0-20 6.0-20	0.14-0.19 0.14-0.17 0.03-0.12 0.01-0.06	3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0	Low---------- Low---------- Low---------- Low----------	0.24 0.24 0.17 0.10	3
MoB, MoC--------- Montauk	0-8 8-25 25-60	0.6-6.0 0.6-6.0 0.06-0.6	0.16-0.20 0.10-0.16 0.02-0.08	3.6-6.0 3.6-6.0 3.6-6.0	Low---------- Low---------- Low----------	0.32 0.24 0.24	3
MsB, MsC, MsD---- Montauk	0-4 4-25 25-60	0.6-6.0 0.6-6.0 0.06-0.6	0.11-0.15 0.10-0.16 0.02-0.16	3.6-6.0 3.6-6.0 3.6-6.0	Low---------- Low---------- Low----------	0.17 0.24 0.24	3
MxC, MxD--------- Montauk	0-4 4-25 25-60	0.6-6.0 0.6-6.0 0.06-0.6	0.11-0.15 0.10-0.16 0.02-0.16	3.6-6.0 3.6-6.0 3.6-6.0	Low---------- Low---------- Low----------	0.17 0.24 0.24	3

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE 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			
NnA, NnB	0-9	2.0-6.0	0.13-0.25	4.5-6.0	Low	0.28	3
Ninigret	9-33	2.0-6.0	0.06-0.18	4.5-6.0	Low	0.32	
	33-60	6.0-20	0.01-0.13	4.5-6.0	Low	0.10	
PaB, PaC, PaD	0-9	0.6-2.0	0.08-0.23	4.5-6.5	Low	0.24	3
Paxton	9-23	0.6-2.0	0.06-0.20	4.5-6.5	Low	0.32	
	23-60	0.2	0.01-0.12	4.5-2.5	Low	0.20	
PbB, PbC, PbD	0-4	0.6-6.0	0.08-0.23	4.5-6.5	Low	0.20	3
Paxton	4-23	0.6-6.0	0.06-0.20	4.5-6.5	Low	0.32	
	23-60	<0.2	0.05-0.12	4.5-6.5	Low	0.24	
PcE*:							
Paxton	0-4	0.6-6.0	0.05-0.15	4.5-6.5	Low	0.20	3
	4-23	0.6-6.0	0.06-0.20	4.5-6.5	Low	0.32	
	23-60	<0.2	0.05-0.12	4.5-6.5	Low	0.24	
Montauk	0-2	0.6-6.0	0.11-0.15	3.6-6.0	Low	0.17	3
	2-22	0.6-6.0	0.10-0.16	3.6-6.0	Low	0.24	
	22-60	0.06-0.6	0.02-0.16	3.6-6.0	Low	0.24	
PdC*:							
Paxton	0-9	0.6-2.0	0.08-0.23	4.5-6.5	Low	0.24	3
	9-23	0.6-2.0	0.06-0.20	4.5-6.5	Low	0.32	
	23-60	<0.2	0.05-0.12	4.5-6.5	Low	0.24	
Urban land.							
Pe	0-9	6.0-20	0.07-0.10	4.5-7.3	Low	0.17	5
Pipestone	9-28	6.0-20	0.06-0.09	4.5-7.3	Low	0.17	
	28-60	>20	0.05-0.07	5.1-7.3	Low	0.17	
Pg*.							
Pits							
PlB	0-10	2.0-6.0	0.11-0.16	4.5-7.3	Low	0.28	3
Pollux	10-35	2.0-6.0	0.12-0.15	4.5-6.0	Low	0.28	
	35-60	0.06-0.6	0.16-0.21	4.5-7.3	Low	0.64	
PoB, PoC, PoD	0-7	6.0-20	0.07-0.18	4.5-6.0	Low	0.17	3
Poquonock	7-24	>6.0	0.06-0.14	4.5-6.0	Low	0.17	
	24-60	<0.2	0.08-0.12	4.5-6.0	Low	0.24	
Qu*.							
Quarries							
RdA	0-9	0.6-6.0	0.06-0.24	4.5-6.0	Low	0.24	3
Ridgebury	9-20	0.6-6.0	0.04-0.20	4.5-6.0	Low	0.32	
	20-60	<0.2	0.01-0.05	4.5-6.0	Low	0.24	
RlA, RlB	0-9	0.6-2.0	0.02-0.24	4.1-6.0	Low	0.20	3
Ridgebury	9-20	0.6-6.0	0.04-0.20	4.5-6.0	Low	0.32	
	20-60	<0.2	0.01-0.05	4.5-6.0	Low	0.24	
Rx*:							
Rock outcrop.							
Hollis	0-2	0.2-6.0	0.10-0.21	0.1-2.0	Low	0.17	2
	2-15	0.6-2.0	0.02-0.18	0.1-2.0	Low	0.32	
	11	---	---	---	---	----	
Sb	3-0	6.0-20	0.20-0.45	4.5-6.0	Low	----	5
Scarboro	0-8	>6.0	0.05-0.20	4.5-6.0	Low	0.17	
	8-13	>6.0	0.04-0.13	4.5-6.0	Low	0.17	
	13-19	>6.0	0.02-0.13	4.5-6.0	Low	0.10	
	19-60	>6.0	0.01-0.13	4.5-6.0	Low	0.10	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE 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			
ScA----------	0-8	0.2-2.0	0.14-0.30	5.1-7.3	Low----------	0.49	3
Scitico	8-42	<0.2	0.11-0.21	5.1-7.3	Moderate-------	0.43	
	42-60	<0.2	0.09-0.21	5.6-7.3	Moderate-------	0.28	
SgB----------	0-9	2.0-6.0	0.11-0.21	3.6-6.0	Low----------	0.24	3
Scituate	9-38	2.0-6.0	0.09-0.16	3.6-6.0	Low----------	0.24	
	38-60	0.06-0.2	0.01-0.07	3.6-6.0	Low----------	0.24	
ShB, ShC----------	0-5	2.0-6.0	0.09-0.18	3.6-6.0	Low----------	0.17	3
Scituate	5-38	2.0-6.0	0.09-0.16	3.6-6.0	Low----------	0.24	
	38-60	0.06-0.2	0.01-0.07	3.6-6.0	Low----------	0.24	
SmB----------	0-5	2.0-6.0	0.08-0.15	3.6-6.0	Low----------	0.17	3
Scituate	5-38	2.0-6.0	0.09-0.16	3.6-6.0	Low----------	0.24	
	38-60	0.06-0.2	0.01-0.07	3.6-6.0	Low----------	0.24	
SoB, SoC----------	0-5	2.0-6.0	0.07-0.19	3.6-6.0	Low----------	0.17	3
Scituate	5-38	2.0-6.0	0.09-0.16	3.6-6.0	Low----------	0.24	
	38-60	0.06-0.2	0.01-0.07	3.6-6.0	Low----------	0.24	
SpA, SpB----------	0-9	2.0-6.0	0.14-0.24	5.1-6.5	Low----------	0.24	3
Shaker	9-31	2.0-6.0	0.13-0.22	5.1-6.5	Low----------	0.24	
	31-60	<0.2	0.12-0.18	5.6-7.3	Low----------	0.49	
SrA, SrB----------	0-13	2.0-6.0	0.10-0.25	3.6-6.0	Low----------	0.24	3
Sudbury	13-19	2.0-6.0	0.07-0.18	3.6-6.0	Low----------	0.24	
	19-26	2.0-20	0.01-0.15	3.6-6.0	Low----------	0.17	
	26-60	6.0-20	0.01-0.06	3.6-6.0	Low----------	0.10	
Ss----------	0-3	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---
Swansea	3-22	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	
	22-60	>20	0.01-0.08	3.6-5.5	Low----------	0.10	
UAC.							
Udipsamments							
UD.							
Udorthents							
Ur*.							
Urban land							
WaA, WaB----------	0-9	2.0-6.0	0.10-0.23	4.5-6.0	Low----------	0.20	3
Walpole	9-22	2.0-6.0	0.07-0.18	4.5-6.0	Low----------	0.24	
	22-60	>6.0	0.01-0.13	4.5-6.0	Low----------	0.10	
We----------	0-10	6.0-20	0.06-0.15	3.6-5.5	Low----------	0.17	5
Wareham	10-16	6.0-20	0.03-0.13	3.6-5.5	Low----------	0.17	
	16-24	6.0-20	0.01-0.13	3.6-5.5	Low----------	0.17	
	24-60	6.0-20	0.01-0.10	3.6-6.5	Low----------	0.10	
Wf----------	0-10	0.6-6.0	0.15-0.20	4.5-6.5	Low----------	0.24	3
Whately Variant	10-24	2.0-6.0	0.08-0.10	4.5-6.5	Low----------	0.17	
	24-60	<0.2	0.10-0.15	6.6-7.3	Moderate-------	0.24	
Wh----------	0-4	0.6-6.0	0.12-0.26	4.5-6.5	Low----------	0.20	3
Whitman	4-14	0.6-6.0	0.10-0.17	4.5-6.5	Low----------	0.32	
	14-22	<0.2	0.03-0.04	4.5-6.5	Low----------	0.24	
	22-60	<0.2	0.02-0.03	4.5-6.5	Low----------	0.24	
WnA, WnB, WnC, WnD----------	0-10	>6.0	0.08-0.12	4.5-6.0	Low----------	0.17	5
Windsor	10-30	>6.0	0.02-0.12	4.5-6.0	Low----------	0.17	
	30-60	>6.0	0.01-0.08	4.5-6.5	Low----------	0.10	
WrB, WrC----------	0-6	0.6-2.0	0.08-0.23	4.5-6.0	Low----------	0.24	3
Woodbridge	6-25	0.6-2.0	0.06-0.20	4.5-6.0	Low----------	0.32	
	25-60	<0.2	0.05-0.12	4.5-6.5	Low----------	0.24	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE 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			
WsB, WsC, WsD---- Woodbridge	0-4	0.6-2.0	0.08-0.23	4.5-6.0	Low----------	0.20	3
	4-25	0.6-2.0	0.06-0.20	4.5-6.0	Low----------	0.32	
	25-60	<0.2	0.05-0.12	4.5-6.5	Low----------	0.24	

See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
AnB, AnC, AnD----- Annisquam	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	Moderate	Low------	High.
Ba*. Beaches										
BeB---------- Belgrade	B	None--------	---	---	1.5-3.5	Apparent	Nov-Apr	High-----	Moderate	Moderate.
BuA, BuB, BuC----- Boxford	C	None--------	---	---	1.0-3.0	Apparent	Nov-Apr	High-----	High-----	Moderate.
BxB*: Boxford----------	C	None--------	---	---	1.0-3.0	Apparent	Nov-Apr	High-----	High-----	Moderate.
Urban land.										
CaB, CaC, CbB, CbC, CbD, CcB, CcC, CcD, CcE---- Canton	B	None--------	---	---	>6.0	---	---	Low------	Low------	High.
ChC*: Canton----------	B	None--------	---	---	>6.0	---	---	Low------	Low------	High.
Urban land.										
CrC*, CrD*: Chatfield--------	B	None--------	---	---	>6.0	---	---	Moderate	Low------	Moderate.
Hollis----------	C/D	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
Rock outcrop.										
De---------- Deerfield	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	Low------	High.
Du*. Dumps										
ElA, ElB---------- Elmridge	C	None--------	---	---	1.5-3.0	Perched	Nov-May	High-----	Moderate	Moderate.
FF. Fluvaquents										
Fm---------- Freetown	D	None--------	---	---	0-1.0	Apparent	Jan-Dec	High-----	High-----	High.
Fp---------- Freetown	D	None--------	---	---	+3-0	Apparent	Jan-Dec	High-----	High-----	High.
HfA, HfB, HfC, HfD, HfE--------- Hinckley	A	None--------	---	---	>6.0	---	---	Low------	Low------	High.
HuC*: Hollis----------	C/D	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
Urban land.										
Rock outcrop.										

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
Iw*:										
Ipswich	D	Frequent	Very brief	Jan-Dec	+1-0	Apparent	Jan-Dec	---	High	High.
Westbrook	D	Frequent	Very brief	Jan-Dec	+1-0	Apparent	Jan-Dec	---	High	High.
Ma Maybid	D	None	---	---	+1-0.5	Apparent	Oct-Aug	High	High	Moderate.
MeA, MeB Melrose	C	None	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
MmA, MmB, MmC, MmD Merrimac	A	None	---	---	>6.0	---	---	Low	Low	High.
MnB*:										
Merrimac	A	None	---	---	>6.0	---	---	Low	Low	High.
Urban land.										
MoB, MoC, MsB, MsC, MsD, MxC, MxD Montauk	C	None	---	---	2.0-2.5	Perched	Feb-May	Moderate	Low	High.
NnA, NnB Ninigret	B	None	---	---	1.5-3.0	Apparent	Nov-Apr	Moderate	Low	High.
PaB, PaC, PaD, PbB, PbC, PbD Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Mar	Moderate	Low	Moderate.
PcE*:										
Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Mar	Moderate	Low	Moderate.
Montauk	C	None	---	---	2.0-2.5	Perched	Feb-May	Moderate	Low	High.
PdC*:										
Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Mar	Moderate	Low	Moderate.
Urban land.										
Pe Pipestone	A	None	---	---	0.5-1.5	Apparent	Oct-Jun	Moderate	Low	Moderate.
Pg*. Pits										
PlB Pollux	C	None	---	---	>6.0	---	---	Moderate	Low	High.
PoB, PoC, PoD Poquonock	C	None	---	---	1.5-3.0	Perched	Feb-Mar	Low	Low	High.
Qu*. Quarries										
RdA, RlA, RlB Ridgebury	C	None	---	---	0-1.5	Perched	Nov-May	High	High	High.
Rx*:										
Rock outcrop.										
Hollis	C/D	None	---	---	>6.0	---	---	Moderate	Low	High.
Sb Scarboro	D	None	---	---	+1-1.0	Apparent	Jan-Dec	High	High	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
ScA---------- Scitico	C	None--------	---	---	0-1.0	Perched	Nov-May	High-----	High-----	Moderate.
SgB, ShB, ShC, SmB, SoB, SoC---- Scituate	C	None--------	---	---	1.5-3.0	Perched	Nov-May	Moderate	Low------	High.
SpA, SpB---------- Shaker	C	None--------	---	---	0-1.5	Perched	Nov-May	High-----	Moderate	Moderate.
SrA, SrB---------- Sudbury	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	Low------	High.
Ss---------- Swansea	D	None--------	---	---	0-1.0	Apparent	Jan-Dec	High-----	High-----	High.
UAC. Udipsamments										
UD. Udorthents										
Ur*. Urban land										
WaA, WaB---------- Walpole	C	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	Low------	High.
We---------- Wareham	C	None--------	---	---	0-1.5	Apparent	Sep-Jun	Moderate	Moderate	High.
Wf---------- Whately Variant	D	None--------	---	---	0-1.0	Apparent	Nov-Jun	High-----	High-----	High.
Wh---------- Whitman	D	None--------	---	---	+1-0.1	Perched	Sep-Jun	High-----	High-----	High.
WnA, WnB, WnC, WnD---------- Windsor	A	None--------	---	---	>6.0	---	---	Low------	Low------	High.
WrB, WrC, WsB, WsC, WsD---------- Woodbridge	C	None--------	---	---	1.5-3.0	Perched	Nov-May	High-----	Low------	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Annisquam	Loamy-skeletal, mixed, mesic Typic Fragiochrepts
Belgrade	Coarse-silty, mixed, mesic Aquic Dystric Eutrochrepts
Boxford	Fine, mixed, mesic Aquic Dystric Eutrochrepts
Canton	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
*Chatfield	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Deerfield	Mixed, mesic Aquic Udipsamments
Elmridge	Coarse-loamy over clayey, mixed, mesic Aquic Dystric Eutrochrepts
Fluvaquents	Fluvaquents
Freetown	Dysic, mesic Typic Medisaprists
Hinckley	Sandy-skeletal, mixed, mesic Typic Udorthents
Hollis	Loamy, mixed, mesic Lithic Dystrochrepts
Ipswich	Euic, mesic Typic Sulfihemists
Maybid	Fine, illitic, nonacid, mesic Typic Humaquepts
*Melrose	Coarse-loamy over clayey, mixed, frigid Typic Dystrochrepts
Merrimac	Sandy, mixed, mesic Typic Dystrochrepts
*Montauk	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Ninigret	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Dystrochrepts
Paxton	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Pipestone	Sandy, mixed, mesic Entic Haplaquods
Pollux	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Poquonock	Sandy, mixed, mesic Typic Fragiochrepts
Ridgebury	Coarse-loamy, mixed, mesic Aeric Fragiaquepts
Scarboro	Sandy, mixed, mesic Histic Humaquepts
Scitico	Fine, mixed, nonacid, mesic Typic Haplaquepts
Scituate	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Shaker	Coarse-loamy over clayey, mixed, nonacid, mesic Aeric Haplaquepts
Sudbury	Sandy, mixed, mesic Aquic Dystrochrepts
Swansea	Sandy or sandy-skeletal, mixed, dysic, mesic Terric Medisaprists
Udipsamments	Udipsamments
Udorthents	Udorthents
Walpole	Sandy, mixed, mesic Aeric Haplaquepts
*Wareham	Mixed, mesic Humaqueptic Psammaquents
Westbrook	Euic, mesic Typic Sulfihemists
Whately Variant	Sandy over clayey, mixed, nonacid, mesic Typic Humaquepts
Whitman	Coarse-loamy, mixed, mesic Humic Fragiaquepts
Windsor	Mixed, mesic Typic Udipsamments
Woodbridge	Coarse-loamy, mixed, mesic Typic Fragiochrepts

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