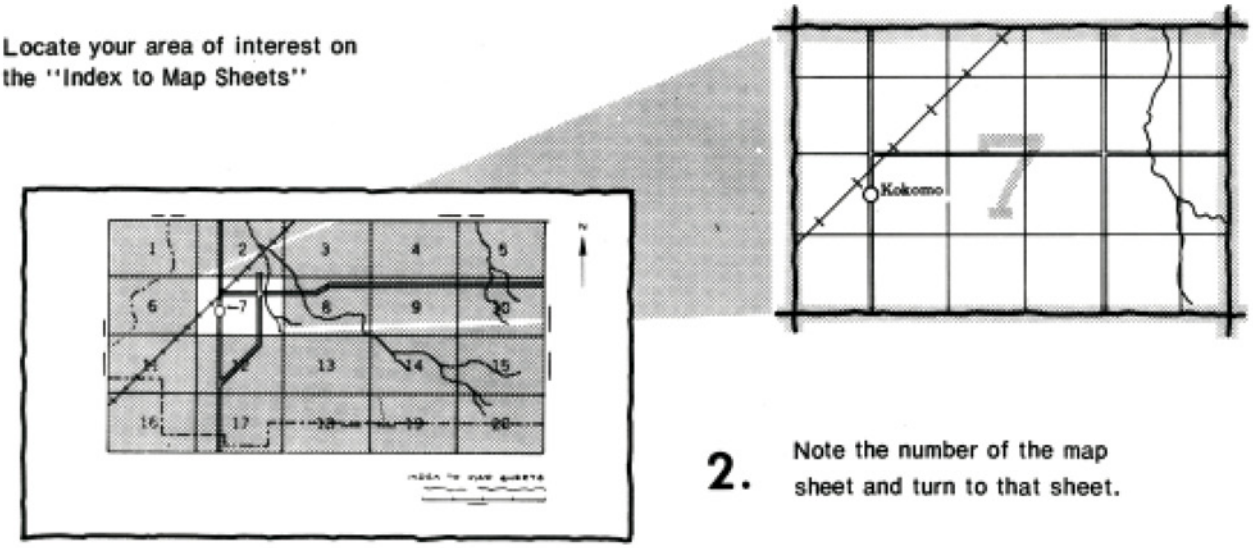
Soil survey of

BRISTOL COUNTY MASSACHUSETTS SOUTHERN PART

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

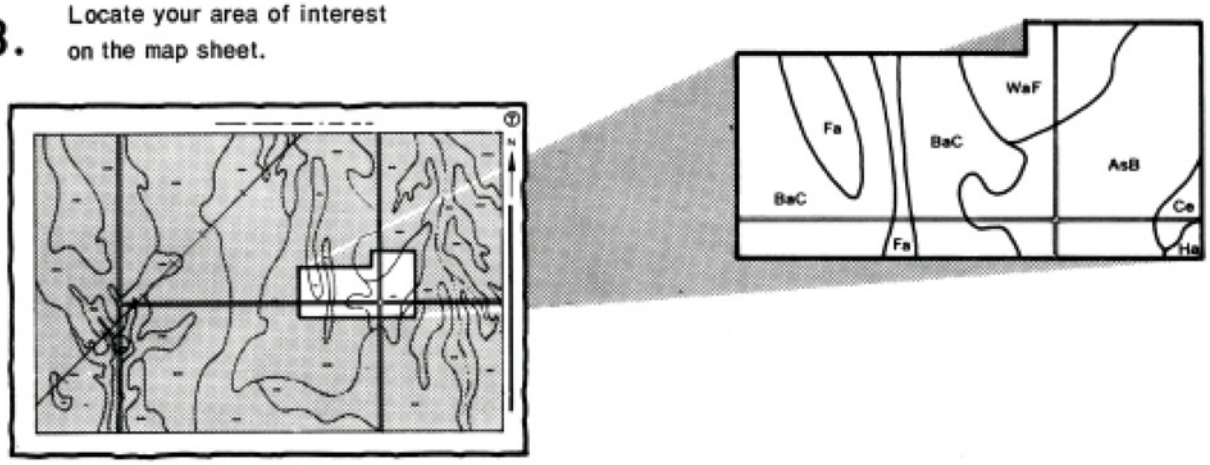
HOW TO USE

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

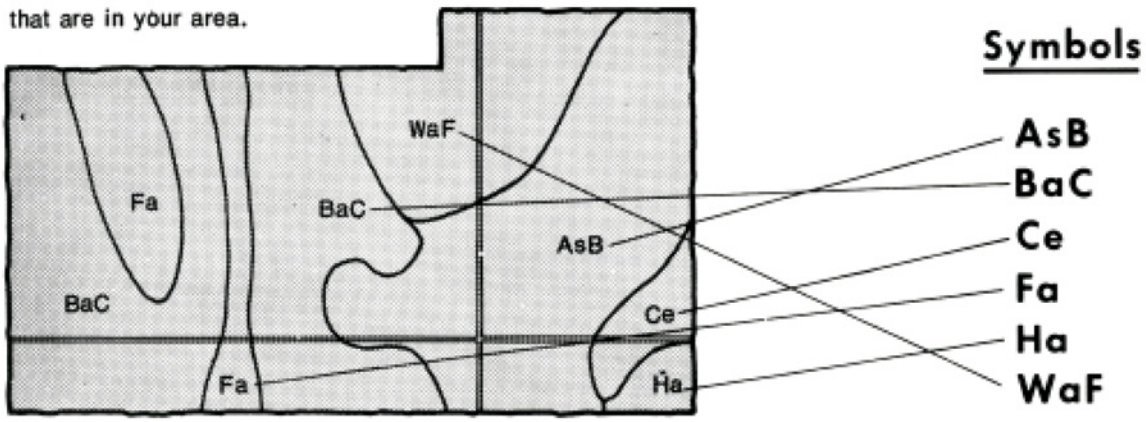


2. Note the number of the map sheet and turn to that sheet.

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

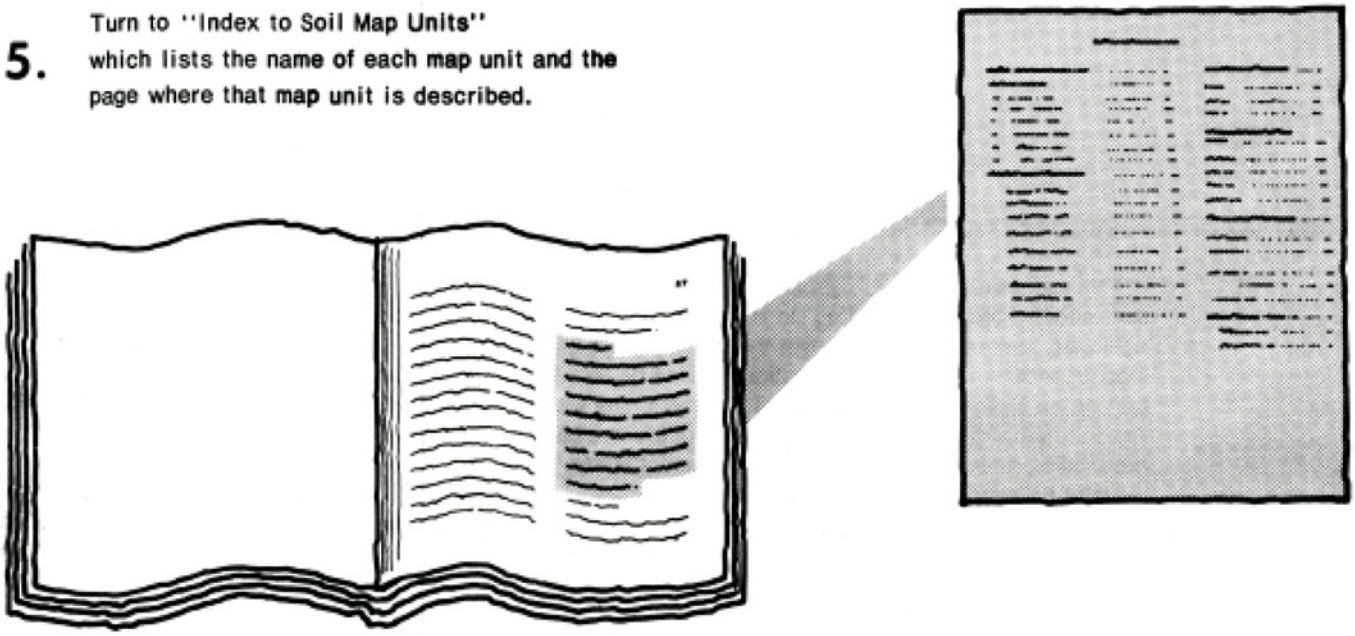


4. List the map unit symbols that are in your area.

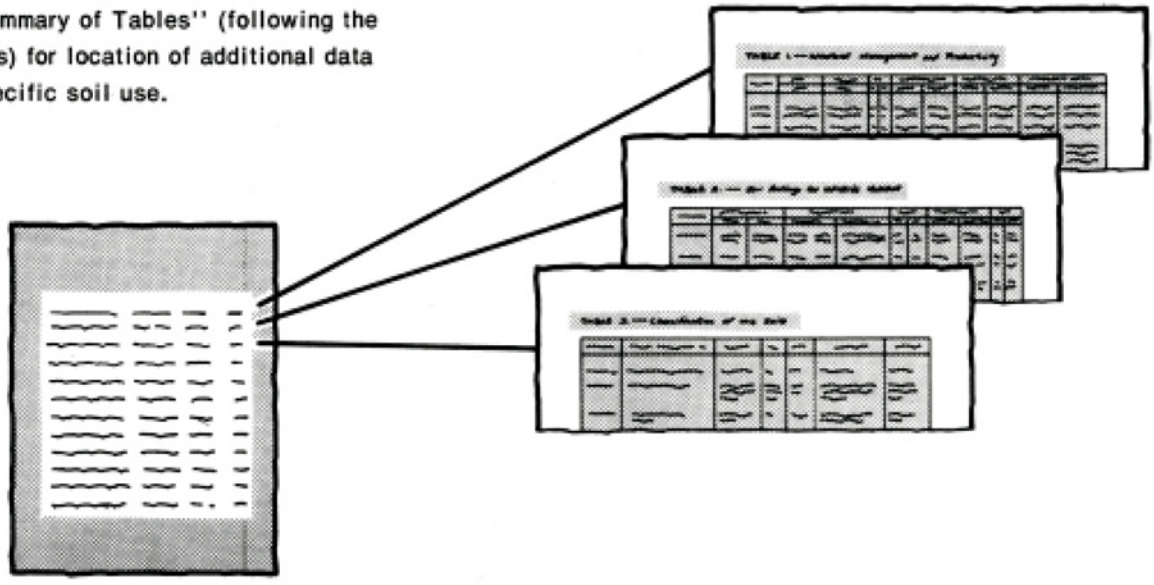


THIS SOIL SURVEY

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



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



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

This 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 performed in the period 1967-78. Soil names and descriptions were approved in 1979. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Soil Conservation Service and the Massachusetts Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Bristol Conservation District.

Cover: This area of Paxton fine sandy loam, 3 to 8 percent slopes, is used for silage corn.

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Issued October 1981

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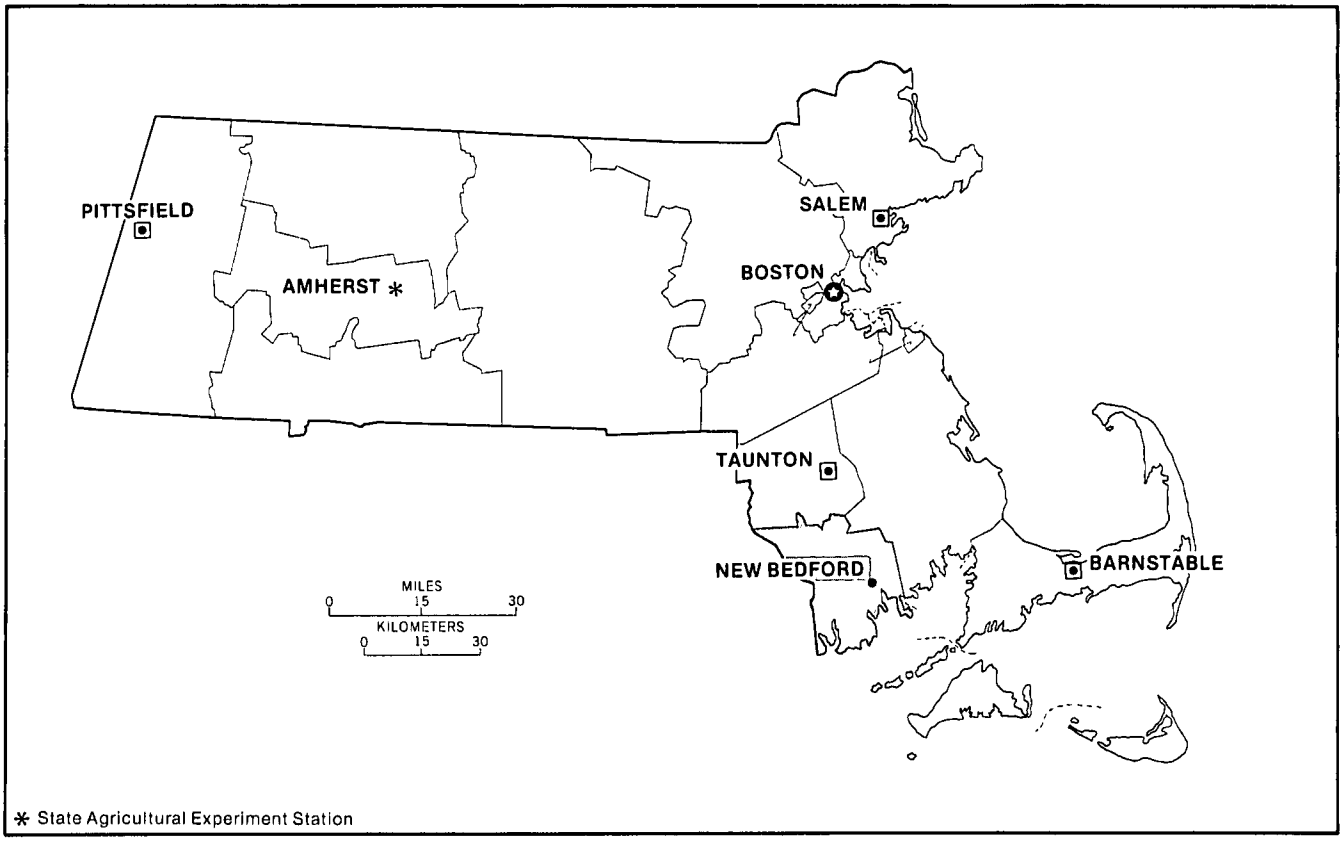
Preface

This soil survey contains information that can be used in land-planning programs in Bristol 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.



Location of Bristol County in Massachusetts.

soil survey of
Bristol County, Massachusetts, Southern Part

Communities of: Acushnet, Dartmouth, Fairhaven, Fall River, Freetown, New Bedford, Somerset, Swansea, and Westport

By Rino J. Roffinoli and Peter C. Fletcher, Soil Conservation Service

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

BRISTOL COUNTY is in the southeastern part of Massachusetts. The area covered by this survey is 166,040 acres, or about 260 square miles. The east and west branches of the Westport River provide most of the drainage of the survey area. The elevation of the area ranges from sea level to 384 feet above sea level at the top of Copicut Hill.

Settlement of the area began shortly after 1620, and the major enterprises at the time were farming and fishing and whaling. The early farmers produced fruit and vegetables and raised livestock. Farm production has been decreasing since about 1860, however, because of the demands of urban and industrial growth. The main farm enterprise is dairy farming, and some farms also raise hogs and poultry. The main crops are silage corn and sweet corn, hay, truck crops, ornamental nursery stock, and cranberries. The major mineral resources are sand and gravel for construction purposes.

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 Fall River, Massachusetts, in the period 1951 to 1973. 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 31 degrees F, and the average daily minimum temperature is 23 degrees. The lowest temperature on record, which occurred at Fall River on January 15, 1957, is —11 degrees. In summer the average temperature is 70 degrees, and the average daily maximum temperature is 80 degrees. The highest recorded temperature, which occurred at Fall River on June 26, 1952, is 98 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 42 inches. Of this, 21 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 16 inches. The heaviest 1-day rainfall during the period of record was 5.53 inches at Fall River on August 10, 1954. Thunderstorms occur on about 20 days each year, and most occur in summer.

Average seasonal snowfall is 36 inches. The greatest snow depth at any one time during the period of record was 26 inches. On an average of 18 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 80 percent. The sun shines 60 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in March.

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 "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, 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 association on the general soil map is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in 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 association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

soil descriptions

1. Paxton-Woodbridge-Whitman association

Nearly level to moderately steep soils that are well drained, moderately well drained, and very poorly drained; on glaciated uplands

This association consists of upland hills and ridges dissected by many small drainageways. Stones and boulders cover more than 3 percent of the surface of many areas.

The association makes up about 71 percent of the survey area. The association is about 25 percent Paxton soils, 15 percent Woodbridge soils, 10 percent Whitman soils, and 50 percent minor soils (fig. 1).

The Paxton soils are on hills and ridges. They are nearly level to moderately steep. The soils are well drained and have a very firm substratum at a depth of about 22 inches that restricts the movement of water and the development of roots.

The Woodbridge soils are nearly level and gently sloping. They are moderately well drained and have a very firm substratum at a depth of about 27 inches that restricts the movement of water and the development of roots.

The Whitman soils are nearly level. They are in depressions and low-lying areas adjacent to waterways. The soils are very poorly drained and have a very firm substratum at a depth of about 15 inches that restricts the movement of water. Root development also is restricted by the very firm substratum and by a seasonal high water table.

The minor soils in this unit include the Freetown, Merrimac, and Ridgebury soils. The Freetown soils are very poorly drained and consist of organic material. The Merrimac soils are somewhat excessively drained and have a gravelly and sandy substratum. The Ridgebury soils are poorly drained and have a very firm substratum.

Most of this association is in woodland. Large areas in the southern part have been cleared and are used for dairy farming, and some large areas are used for housing developments and other types of community development.

The main limitations for farming in this association are stones on the surface and a seasonal high water table. Overgrazing and grazing when the soils are wet are major concerns of pasture management. Except for the Whitman soils, most of the association is suitable for trees.

Slope, slow permeability, and wetness are the main limitations of the soils as a site for septic tank absorption fields and sanitary landfills or as a building site.

2. Hinckley-Freetown-Scarboro association

Nearly level to steep, excessively drained and very poorly drained soils; on outwash plains

This association consists of sandy and gravelly soils and organic soils. Slopes range from 0 to 25 percent.

The association makes up about 10 percent of the survey area. The association is about 35 percent Hinckley soils, 10 percent Freetown soils, 5 percent Scarboro soils, and 50 percent minor soils (fig. 2).

The Hinckley soils are excessively drained and very permeable and have a gravelly and sandy substratum. The soils are nearly level to steep and are droughty in most years.

The Freetown soils are very poorly drained and consist of organic deposits more than 51 inches thick. The soils are nearly level or depressional.

The Scarboro soils are very poorly drained and have a sandy subsoil and substratum. They are nearly level or depressional.

The minor soils include the Merrimac, Windsor, and Deerfield soils. The Merrimac soils are somewhat excessively drained and have a loose, gravelly

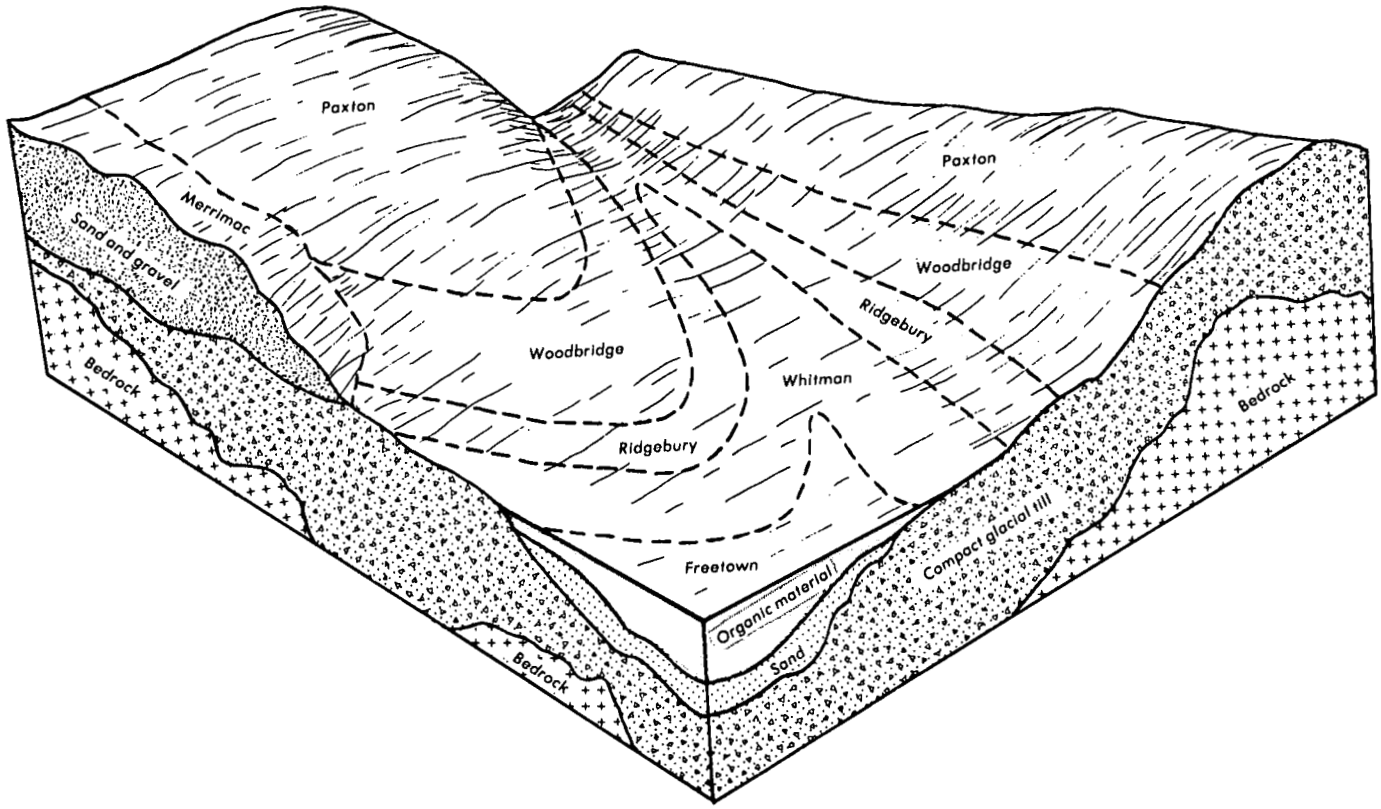


Figure 1.—Typical pattern of soils and underlying material in the Paxton-Woodbridge-Whitman association.

substratum. The Windsor soils are excessively drained, and the Deerfield soils are moderately well drained.

Most areas of this association are in woodland. Several large sand and gravel pits are in the association. A few small areas are farmed, and a few are used for housing or other types of community development.

The main limitations for farming and woodland in this association are the droughtiness of the Hinckley soils and the wetness of the Freetown and Scarboro soils.

The wetness and slope of the association limit community development on all but the nearly level and gently sloping Hinckley soils.

3. Urban land association

Nearly level to moderately steep areas occupied by urban works and structures; on glaciated uplands

This association mostly consists of areas that are so altered or obscured by urban works and structures that identification of the soils is not practical. Slopes range from 0 to 25 percent.

This association makes up about 9 percent of the survey area. The association is about 80 percent urbanized areas and 20 percent minor soils.

The urbanized areas are mostly covered by buildings, roads, and parking lots. The minor soils in this unit include the Paxton and Woodbridge soils and Udorthents. The Paxton soils are well drained and have a very firm substratum at a depth of about 22 inches. The Udorthents consist of areas formed by cutting and filling, usually during the construction of urban projects. The Woodbridge soils are moderately well drained and have a very firm substratum at a depth of about 27 inches.

Onsite investigation is needed to determine the suitability of this association for most uses.

4. Paxton-Woodbridge-Ridgebury association

Nearly level to moderately steep soils that are well drained, moderately well drained, and poorly drained; on glaciated uplands

This association consists of upland hills and ridges dissected by many small drainageways. Stones and boulders cover about 3 percent of the surface of many areas.

This association makes up about 8 percent of the survey area. The association is about 15 percent Paxton

soils, 15 percent Woodbridge soils, 10 percent Ridgebury soils, and 60 percent minor soils.

The Paxton soils are nearly level to moderately steep. They are well drained and have a very firm substratum at a depth of about 22 inches that restricts the movement of water and the development of roots.

The Woodbridge soils are nearly level and gently sloping. They are moderately well drained and have a very firm substratum at a depth of about 27 inches that restricts the movement of water and the development of roots.

The Ridgebury soils are nearly level and gently sloping and are adjacent to waterways. The soils are poorly drained and have a very firm substratum at a depth of about 29 inches. This substratum restricts the movement of water. Root development is restricted by a seasonal high water table and the very firm substratum.

The minor soils in this unit include the Pawcatuck, Ipswich, and Whitman soils and Udipsamments. The Pawcatuck and Ipswich soils are very poorly drained and are in tidal marshes. The Whitman soils are very poorly drained and have a very firm substratum at a depth of about 15 inches. Udipsamments consist of sand dunes along the seashore.

Most of this association is in woodland. Some areas have been cleared and are used for dairy farms and orchards. Some large areas are used for homesites and other types of community development.

The main limitations of this association for farming are stones on the surface and wetness. The Paxton and Woodbridge soils are well suited to trees.

Slope, the stones on the surface, slow permeability, and wetness are the main limitations of this association for community development.

5. Newport-Urban land-Udorthents association

Gently sloping and moderately sloping soils that are well drained, and urbanized and developed areas; on glaciated uplands and outwash plains

This association consists of soils on upland hills and ridges, areas so altered by urban works and structures that identification of soils is not practical, and areas altered by cutting and filling.

This association makes up about 2 percent of the survey area. The association is about 25 percent Newport soils, 25 percent urbanized areas, 10 percent cut and filled areas, and 40 percent minor soils.

The Newport soils are deep and well drained and have a very firm substratum at a depth of about 28 inches that restricts the movement of water and the development of roots.

The urbanized areas are mostly covered by buildings, roads, and parking lots.

The Udorthents consist of areas formed by cutting and filling during construction.

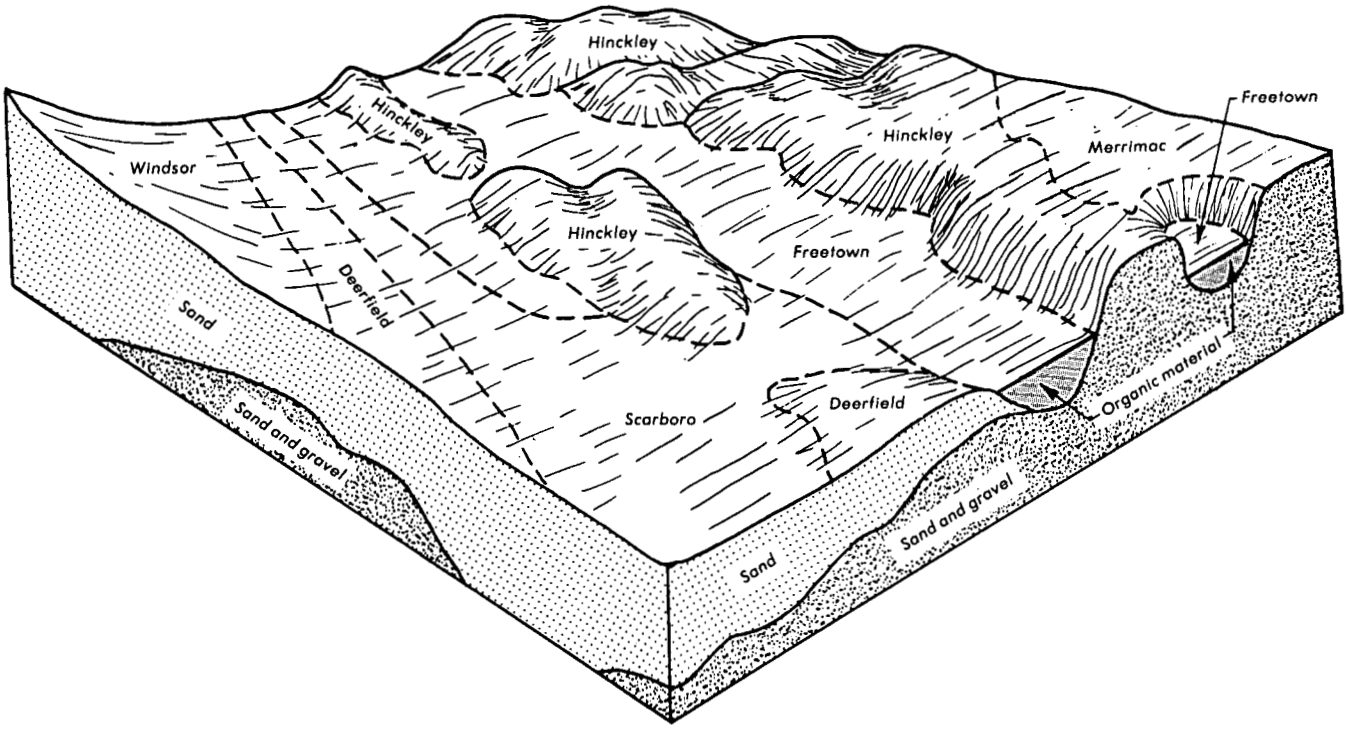


Figure 2.—Typical pattern of soils and underlying material in the Hinckley-Freetown-Scarboro association.

The minor soils in this association include the Ridgebury, Pittstown, and Windsor soils. The Ridgebury soils are very poorly drained, and the Pittstown soils are moderately well drained. Both soils have a very firm substratum at a depth of about 29 inches. The Windsor soils are excessively drained.

Many areas of the Newport soils and minor soils are used for homesites. A few small areas are farmed.

The main limitation in the undeveloped areas of the association is the restricted movement of water caused by the very firm substratum.

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, *Paxton very stony fine sandy loam, 8 to 15 percent slopes,* is one of several phases in the Paxton series.

Some map units are made up of two or more major soils. These map units are called soil complexes or 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. *Gloucester-Hinckley complex, undulating,* 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. *Pawcatuck and Ipswich 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, quarry,* 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

AgA—Agawam fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and well drained. It is in areas that are irregular in shape. The areas range from 5 to 80 acres, but most are about 30 acres.

Typically, the surface layer is black fine sandy loam about 1 inch thick. The subsoil is brown fine sandy loam 17 inches thick. The substratum extends to a depth of 60 inches or more. It is brown loamy fine sand to a depth of 28 inches, brown sand between depths of 28 and 41 inches, and brown gravelly sand at a depth of more than 41 inches.

Included with this soil in mapping are a few places where the soil is silt loam or very fine sandy loam throughout. Most units have small areas of Merrimac and Windsor soils, and some have small areas of Ninigret soils in slight depressions. Some areas of this unit have slopes of 3 to 5 percent. Included soils make up about 20 percent of the unit.

The permeability of this Agawam soil is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Available water capacity is moderate. The surface layer is very friable and easily tilled.

Most areas of this soil are in woodland, and the soil is well suited to trees. A few areas are farmed, and some are used for homesites.

This soil is well suited to row crops and to hay and pasture. Incorporating crop residue into the soil and adding animal manure to the surface layer increase the organic matter content in areas used for crops. The use of proper stocking rates, deferred grazing, and pasture rotation help to maintain the desirable pasture plant species.

The rapid permeability in the substratum is the main limitation of the soil for community development. The permeability causes a hazard of ground-water pollution in areas used for septic tank absorption fields or sanitary landfills.

Capability class: I.

AgB—Agawam fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is in areas that are irregular in shape. The areas range from 5 to 80 acres, but most are about 30 acres.

Typically, the surface layer is black fine sandy loam about 1 inch thick. The subsoil is brown fine sandy loam 17 inches thick. The substratum extends to a depth of 60 inches or more. It is brown loamy fine sand to a depth of 28 inches, brown sand between depths of 28 and 41 inches, and brown gravelly sand at a depth of more than 41 inches.

Included with this soil in mapping are a few places where the soil is silt loam or very fine sandy loam throughout. Most units have small areas of Merrimac and Windsor soils, and some have small areas of Ninigret soils in slight depressions. Included soils make up about 20 percent of the unit.

The permeability of this Agawam soil is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid to rapid in the lower part of the subsoil, and rapid in the substratum. Available water capacity is moderate. The surface layer is very friable and easily tilled.

Most areas of this soil are in woodland, and the soil is well suited to trees. A few areas are farmed, and some are used for homesites.

This soil is well suited to row crops and to hay and pasture. Minimum tillage and the use of cover crops and grasses and legumes in the cropping system help to control an erosion hazard, improve tilth, and increase the organic matter content of the soil. The main pasture management concern is the prevention of overgrazing, which reduces the density and hardiness of plants. Use of proper stocking rates and restricted grazing during wet periods help to maintain pastures and reduce surface compaction.

The main limitation of this soil for community development is the rapid permeability in the substratum. The permeability causes a hazard of ground-water pollution in areas used for sanitary landfills or septic tank absorption fields. Slope is a limitation for some types of building sites.

Capability subclass: IIe.

Be—Beaches. This unit consists of nearly level and gently sloping coastal areas (fig. 3). The areas range from about 5 to 100 acres. Most are about 20 acres. The part of the unit closest to the water is inundated daily by tides, and the entire unit is inundated by spring tides and storm tides.

Included with this unit in mapping are small areas of Udipsamments, hilly, and small areas of Pawcatuck and Ipswich soils. Included areas make up about 10 percent of the unit.

Tidal inundation makes this unit unsuitable for most uses other than recreation.

Capability subclass: not assigned.

CtB—Charlton-Paxton fine sandy loams, rocky, 3 to 8 percent slopes. This unit consists of gently sloping, deep, well drained soils on hills and ridges. The surface is covered by areas of exposed bedrock 50 to 100 feet apart and stones and boulders that cover from less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape and range from 5 to 60 acres. Most are about 40 acres. The unit is about 50 percent Charlton soils, 20 percent Paxton soils, 10 percent exposed bedrock, and 20 percent other soils. The Charlton and Paxton soils are so intermingled that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is yellowish brown fine sandy loam 21 inches thick. The substratum is pale olive sandy loam to a depth of 60 inches or more.

Typically, the Paxton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is about 20 inches thick. The upper 14 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum extends to a depth of 60 inches or more. It is pale olive, very firm and brittle gravelly sandy loam.

Included with these soils in mapping are small areas of Gloucester, Hinckley, Woodbridge, and Ridgebury soils. Also included are areas where stones and boulders cover more than 3 percent of the surface and areas where rock exposures are less than 50 feet apart.

The permeability of these Charlton soils is moderate or moderately rapid throughout the soil. The permeability of the Paxton soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate in both soils. Root growth in the Paxton soils is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this unit are in woodland, and the soils are well suited to trees. Some areas are used for pasture, and a few are used for homesites.

The stones, boulders, and exposed rock on the surface limit the use of equipment and make the unit poorly suited to farming.

Figure 3.—A typical area of Beaches.

The rapid permeability in the Charlton soils, the slow permeability in the substratum of the Paxton soils, and a seasonal high water table in the Paxton soils are the main limitations for community development. The rapid permeability of the Charlton soils and the water table in the Paxton soils limit the unit as a site for sanitary landfills. The slow permeability in the Paxton soils is a limitation for septic tank absorption fields. The areas of exposed rock on the surface limit the unit for most types of community development.

Capability subclass: VIs.

CtC—Charlton-Paxton fine sandy loams, rocky, 8 to 15 percent slopes. This unit consists of moderately sloping, deep, well drained soils on hills and ridges. The surface is covered by areas of exposed bedrock 50 to 100 feet apart and stones and boulders that cover from less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape and range from 10 to 100 acres. Most are about 60 acres. The unit is about 50 percent Charlton soils, 20 percent Paxton soils, 10 percent exposed bedrock, and 20 percent other soils. The Charlton and Paxton soils are so intermingled that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is yellowish brown fine sandy loam 21 inches thick. The substratum is pale olive sandy loam to a depth of 60 inches or more.

Typically, the Paxton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is about 20 inches thick. The upper 14 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum extends to a depth of 60 inches or more. It is pale olive, very firm and brittle gravelly sandy loam.

Included with these soils in mapping are small areas of Gloucester, Hinckley, Woodbridge, and Ridgebury soils. Also included are areas where stones and boulders cover more than 3 percent of the surface and areas where bedrock exposures are less than 50 feet apart.

The permeability of the Charlton soils is moderate or moderately rapid throughout the soil. The permeability of the Paxton soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate in both soils. Root growth in the Paxton soils is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are in woodland, and the soil is well suited to trees. Some areas are used for pasture, and a few are used for homesites.

The stones, boulders, and exposed bedrock on the surface limit the use of equipment and make the soil poorly suited to farming.

Slope, the rapid permeability in the Charlton soils, the slow permeability in the substratum of the Paxton soils, and a seasonal high water table in the Paxton soils are the main limitations for community development. Slope, the rapid permeability of the Charlton soils, and the water table in the Paxton soils limit the unit as a site for sanitary landfills. Slope and the slow permeability in the Paxton soils are limitations for septic tank absorption fields. The areas of exposed rock on the surface limit the unit for most types of community development.

Capability subclass: VIs.

CuC—Charlton-Rock outcrop-Paxton complex, 3 to 15 percent slopes. This unit consists of gently sloping and moderately sloping, deep, well drained soils and of areas of exposed bedrock 5 to 50 feet apart. Stones and boulders cover 3 to 15 percent of the surface of the areas. The areas of this unit are on hills and ridges, are irregular in shape, and range from 10 to 300 acres. Most are about 100 acres. The unit is about 35 percent Charlton soils, 25 percent exposed bedrock, 20 percent Paxton soils, and 20 percent other soils. The Charlton and Paxton soils and exposed rock are so intermingled that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is yellowish brown fine sandy loam 21 inches thick. The substratum is pale olive sandy loam to a depth of 60 inches or more.

Typically, the Paxton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 20 inches thick. The upper 14 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum extends to a depth of 60 inches or more. It is pale olive, very firm and brittle gravelly sandy loam.

Included with these soils in mapping are small areas of Gloucester, Hinckley, Woodbridge, and Ridgebury soils. Also included are areas where stones and boulders cover less than 3 percent of the surface and areas where the bedrock exposures are more than 50 feet apart.

The permeability of the Charlton soils is moderate or moderately rapid throughout the soil. The permeability of the Paxton soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate in both soils. Root growth in the Paxton soils is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this unit are in woodland, and the soils are suitable for trees. A few areas are used for pasture.

The stones, boulders, and exposed rock on the surface limit the use of farm equipment and make the unit poorly suited to farming. The stones, boulders, and exposed rock also limit the use of timber harvesting equipment.

Slope, the rapid permeability in the Charlton soils, the slow permeability in the substratum of the Paxton soils, and a seasonal high water table in the Paxton soils are the main limitations for community development. Slope, the rapid permeability of the Charlton soils, and the water table in the Paxton soils limit the unit as a site for sanitary landfills. Slope and the slow permeability in the Paxton soils are limitations for septic tank absorption fields. The areas of exposed rock on the surface limit the unit for most types of community development.

Capability subclass: VIs.

CuE—Charlton-Rock outcrop-Paxton complex, 15 to 35 percent slopes. This unit consists of moderately steep and steep, deep, well drained soils and of areas of exposed bedrock 5 to 50 feet apart. Stones and boulders cover 3 to 15 percent of the surface of the areas. The areas of this unit are on hills and ridges, are irregular in shape, and range from 10 to 200 acres. Most are about 100 acres. The unit is about 35 percent Charlton soils, 25 percent exposed bedrock, 20 percent Paxton soils, and 20 percent other soils. The Charlton and Paxton soils and exposed rock are so intermingled that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is yellowish brown fine sandy loam 21 inches thick. The substratum is pale olive sandy loam to a depth of 60 inches or more.

Typically, the Paxton soils have a surface layer of very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 20 inches thick. The upper 14 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum extends to a depth of 60 inches or more. It is pale olive, very firm and brittle gravelly sandy loam.

Included with these soils in mapping are small areas of Gloucester, Hinckley, Woodbridge, and Ridgebury soils. Also included are areas where stones and boulders cover less than 3 percent of the surface and areas where the rock exposures are more than 50 feet apart.

The permeability of the Charlton soils is moderate or moderately rapid throughout the soil. The permeability of the Paxton soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate in both soils. Root growth in the Paxton soils is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this unit are in woodland, and the soils are suitable for trees. A few areas are used for pasture.

Slope and the stones, boulders, and exposed rock on the surface limit the use of farming equipment and make the unit poorly suited to farming. They also limit the use of timber harvesting equipment.

Slope, the rapid permeability in the Charlton soils, the slow permeability in the substratum of the Paxton soils, and a seasonal high water table in the Paxton soils are the main limitations for community development. Slope, the rapid permeability of the Charlton soils, and the water table in the Paxton soils limit the unit as a site for sanitary landfills. Slope and the slow permeability in the Paxton soils are limitations for septic tank absorption fields. The areas of exposed rock on the surface limit the unit for most types of community development.

Capability subclass: VIIs.

DeA—Deerfield loamy sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping, deep, and moderately well drained. Most areas are near or adjacent to streams and rivers. The areas of this soil are irregularly shaped and range from 5 to 50 acres (fig. 4). Most are about 10 acres.

Typically, the surface layer is dark brown loamy sand about 7 inches thick. The subsoil is yellowish brown and 16 inches thick. The upper 8 inches of the subsoil is loamy sand, and the lower 8 inches is mottled sand. The substratum is gray, mottled sand to a depth of 60 inches or more.

Included with this soil in mapping are a few places where the subsoil and substratum are gravelly. Also included are small areas of Wareham and Pipestone soils in slight depressions. Included areas make up about 20 percent of the unit.

The permeability of this Deerfield soil is rapid in the surface layer and subsoil and rapid or very rapid in the substratum. Available water capacity is low. The surface layer of this soil is very friable and easily tilled, but root growth is restricted by sand at a depth of about 15 inches. This soil has a seasonal high water table in the winter and spring.

Most areas of this soil are farmed. Some areas are in woodland, and the soil is suitable for trees. A few areas are used for homesites.

This soil is suited to row crops. The limited rooting zone, low available water capacity, and seasonal high water table are the main limitations for farming; erosion is a hazard on the gently sloping areas. The main management practices are using irrigation during dry periods, using cover crops, incorporating crop residue into the soil, and adding manure to the surface layer.

This soil is suited to pasture and hay. The main management concern is the prevention of overgrazing, which compacts the surface layer and reduces the hardiness and density of plants. Use of proper stocking rates and restricted grazing during wet periods help to maintain plant densities and reduce surface compaction.

Figure 4.—Light-colored Deerfield loamy sand, 0 to 5 percent slopes, surrounds a dark-colored area of Wareham soils.

The seasonal high water table is the main limitation of this soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The rapid permeability of the soil causes a hazard of pollution to ground water in areas used for septic tanks or landfills.

Capability subclass: IIIw.

Du—Dumps. This unit consists of areas used to dispose of trash. Most are adjacent to streams or areas of very poorly drained soils. The areas of the unit range from 5 to 40 acres, but most are about 25 acres.

The material deposited in these areas is mostly paper, metal, and plastic compacted between layers of mineral soil material.

This unit requires onsite investigation and evaluation to determine its suitability or limitations for any use.

Capability subclass: not assigned.

Fm—Freetown muck. This soil is nearly level, deep, and very poorly drained. It is in depressions. Areas of this soil range from 4 to 500 acres, but most are about 20 acres.

Typically, the upper part of the soil is 2 inches of reddish brown mucky peat. The next part is black and dark reddish brown muck to a depth of 60 inches or more.

Included with this soil in mapping are areas of Swansea soils and small areas of Scarboro and Whitman soils. Also included are areas where the organic material consists of layers of muck and peat. 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 high. A high water table is at or near the surface most of the year.

Most areas of this soil are in woodland. A few small areas have been filled and are used for community development.

The high water table makes the soil poorly suited to farming. Areas of this soil are difficult to drain because of the lack of suitable outlets.

This soil is poorly suited to trees other than Atlantic white-cedar. Unless frozen, the soil will not support harvesting equipment. A shallow rooting depth causes a hazard of uprooting during windy periods. The rate of seedling mortality is high for trees that are not water tolerant.

The seasonal high water table and the low strength of the soil are the main limitations for community development, especially as a building site or as a site for septic tanks or sanitary landfills.

Capability subclass: Vw.

Fp—Freetown muck, ponded. This soil is level and very poorly drained. It is in depressional areas that are typically adjacent to lakes and ponds, and water covers the surface nearly all year. The areas of this soil are irregular in shape and range from 5 to 100 acres. Most are about 25 acres.

Typically, this soil is black muck to a depth of 60 inches or more.

Included with this soil in mapping are areas of soils where the mucky material is less than 51 inches thick.

The permeability of this Freetown soil is moderate or moderately rapid. Available water capacity is high.

The water on the surface and low strength make the soil generally unsuitable for farming, trees, or community development. Water-tolerant shrubs such as leatherleaf and swamp loosestrife cover most areas.

Capability subclass: VIIw.

GcB—Gloucester-Hinckley complex, undulating. The soils in this unit are deep and somewhat excessively drained and excessively drained. They are on small hills. Areas of the unit are irregular in shape and range from 5 to 15 acres. Most are about 10 acres. The unit is about 35 percent Gloucester soils, 25 percent Hinckley soils, and 40 percent other soils. The Gloucester and Hinckley soils are so intermingled that it was not practical to map them separately.

Typically, the Gloucester soils have a surface layer of dark brown fine sandy loam about 8 inches thick. The subsoil is strong brown and yellowish brown and is 15 inches thick. The upper 3 inches of the subsoil is gravelly fine sandy loam, the next 7 inches is gravelly sandy loam, and the lower 5 inches is very gravelly loamy sand. The substratum is olive very gravelly loamy coarse sand to a depth of 60 inches or more.

Typically, the Hinckley soils have a surface layer of dark brown gravelly fine sandy loam about 6 inches thick. The subsoil is 14 inches thick. The upper 3 inches of the subsoil is yellowish brown gravelly fine sandy loam, and the lower 11 inches is light olive brown gravelly loamy coarse sand. The substratum is light olive brown very gravelly coarse sand to a depth of 60 inches or more.

Included with these soils in mapping are small, nearly level areas and a few moderately sloping areas. Also included are areas of Charlton, Merrimac, and Paxton soils. In some areas the upper part of the substratum is a firm layer 6 to 24 inches thick and is typically underlain by loose sand and gravel.

The permeability of the Gloucester soils is rapid. Permeability of the Hinckley soils is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is low in the Gloucester soils and very low in the Hinckley soils. Root growth in both soils is inhibited by the gravelly and sandy substratum. These soils are droughty in late summer.

Most areas of this unit are farmed. Some areas are used for homesites and other types of community development.

The soils of this unit are suited to row crops, but droughtiness makes irrigation necessary in most years and erosion is a hazard. Incorporating crop residue and manure into the surface layer helps to maintain the

organic matter content and good tilth. The use of winter cover crops reduces runoff and helps to reduce erosion.

These soils are suited to hay and pasture, especially to drought-resistant plants. The main pasture management practices include use of proper stocking rates, deferred grazing, and pasture rotation.

The soils of this unit are suited to trees, but droughtiness causes a high rate of seedling mortality, especially on the Hinckley soils. Reducing plant competition and planting drought-resistant tree species help to reduce seedling mortality.

The rapid permeability of these soils is the main limitation for community development, especially for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used as a site for septic tanks or landfills. Stones and boulders on some areas of the Gloucester soils are a limitation for building sites.

Capability subclass: IIs.

GhB—Gloucester-Hinckley complex, very stony, undulating. The soils in this unit are deep and somewhat excessively drained and excessively drained. They are on small hills. Stones and boulders cover from less than 1 percent to 3 percent of the surface and are typically on the Gloucester part of the unit. Areas of this unit are irregular in shape and range from 5 to 300 acres. Most are about 100 acres. The unit is about 35 percent Gloucester soils, 25 percent Hinckley soils, and 40 percent other soils. The Gloucester and Hinckley soils are so intermingled that it was not practical to map them separately.

Typically, the Gloucester soils have a surface layer of black fine sandy loam about 2 inches thick. The subsoil is strong brown and yellowish brown and is 21 inches thick. The upper 9 inches of the subsoil is gravelly fine sandy loam, the next 7 inches is gravelly sandy loam, and the lower 5 inches is very gravelly loamy sand. The substratum is olive very gravelly loamy coarse sand to a depth of 60 inches or more.

Typically, the Hinckley soils have a surface layer of dark brown gravelly fine sandy loam about 2 inches thick. The subsoil is 18 inches thick. The upper 7 inches of the subsoil is yellowish brown gravelly fine sandy loam, and the lower 11 inches is light olive brown gravelly loamy coarse sand. The substratum is light olive brown very gravelly coarse sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of soils with slopes of 0 to 3 percent; areas of Charlton, Merrimac, and Paxton soils; and areas of soils where the upper part of the substratum is a firm layer 6 to 24 inches thick and is typically underlain by sand and gravel. Also included are areas where stones and boulders cover more than 3 percent of the surface and small areas of Woodbridge and Ridgebury soils.

The permeability of these Gloucester soils is rapid. The permeability of the Hinckley soils is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is low in Gloucester soils and very low in the Hinckley soils. Root growth is inhibited by the gravelly and sandy substratum of both soils. These soils are droughty in late summer.

Most areas of this unit are in woodland. Some areas are used for homesites and other types of community development.

The soils of this unit are poorly suited to row crops. Droughtiness makes irrigation necessary in most years, and the stones and boulders on the surface limit the use of equipment.

The soils are suited to pasture, but the limitations to the use of equipment make the soils poorly suited to hay.

These soils are suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant tree species help to reduce seedling mortality.

The rapid permeability of these soils is the main limitation for community development, especially for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used as a site for septic tanks or landfills. The stones and boulders on the Gloucester soils are a limitation for building sites.

Capability subclass: VIs.

GhC—Gloucester-Hinckley complex, very stony, rolling. The soils in this unit are deep and somewhat excessively drained and excessively drained. They are on small hills. Stones and boulders cover from less than 1 percent to 3 percent of the surface and are typically on the Gloucester part of the unit. Areas of this unit are irregular in shape and range from 5 to 300 acres. Most are about 75 acres. The unit is about 35 percent Gloucester soils, 25 percent Hinckley soils, and 40 percent other soils. The Gloucester and Hinckley soils are so intermingled that it was not practical to map them separately.

Typically, the Gloucester soils have a surface layer of black fine sandy loam about 2 inches thick. The subsoil is strong brown and yellowish brown and is 21 inches thick. The upper 9 inches of the subsoil is gravelly fine sandy loam, the next 7 inches is gravelly sandy loam, and the lower 5 inches is very gravelly loamy sand. The substratum is olive very gravelly loamy coarse sand to a depth of 60 inches or more.

Typically, the Hinckley soils have a surface layer of dark brown gravelly fine sandy loam about 2 inches thick. The subsoil is about 18 inches thick. The upper 7 inches of the subsoil is yellowish brown gravelly fine sandy loam, and the lower 11 inches is light olive brown gravelly loamy coarse sand. The substratum is light olive brown very gravelly coarse sand to a depth of 60 inches or more.

Included with these soils in mapping are small hilly areas; areas of Charlton, Merrimac, and Paxton soils;

and areas where the upper part of the subsoil is a firm layer 6 to 24 inches thick and is typically underlain by sand and gravel. Also included are areas where stones and boulders cover more than 3 percent of the surface and small areas of Woodbridge and Ridgebury soils.

The permeability of the Gloucester soils is rapid. The permeability of the Hinckley soils is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is low in the Gloucester soils and very low in the Hinckley soils. Root growth is inhibited by the gravelly and sandy substratum of both soils. These soils are droughty in late summer.

Most areas of this unit are in woodland. Some areas are used for homesites and other types of community development.

These soils are poorly suited to row crops. Droughtiness makes irrigation necessary in most years, and the stones and boulders on the surface limit the use of equipment.

The soils are suited to pasture, but the limitations to the use of equipment make the soils poorly suited to hay.

These soils are suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant tree species help to reduce seedling mortality.

The rapid permeability of these soils is the main limitation for community development, especially for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used as a site for septic tanks or landfills. Slope and the stones and boulders on the Gloucester soils are limitations for building sites.

Capability subclass: VIs.

HgA—Hinckley gravelly fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and excessively drained. It is near large streams and rivers. Areas of this soil are irregular in shape and range from 5 to 150 acres. Most are about 30 acres.

Typically, the surface layer is dark brown gravelly fine sandy loam about 6 inches thick. The subsoil is 14 inches thick. The upper 3 inches of the subsoil is yellowish brown, very friable gravelly fine sandy loam, and the lower 11 inches is light olive brown gravelly loamy coarse sand. The substratum is 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 Deerfield, Merrimac, and Windsor soils. In some places this unit is bounded by short, steep slopes. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is very low. The surface layer of this soil is very friable and easily tilled. Root growth is restricted to a depth of about 20 inches by the loose sand and gravel. This soil is droughty in late summer.

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

This soil is suited to row crops, but droughtiness makes irrigation necessary in most years. The main management practices include using cover crops and incorporating crop residue and manure into the surface layer.

This soil is suited to hay and pasture, especially to drought-resistant plants. The main management concern is the prevention of overgrazing. Using proper stocking rates helps to maintain plant densities and desirable species.

The soil is suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant tree species help to reduce seedling mortality.

The rapid permeability is the main limitation of this soil for community development, especially as a site for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used for landfills or septic tanks. The soil is a potential source of sand and gravel.

Capability subclass: IIIs.

HgB—Hinckley gravelly fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and excessivley drained. It is near large streams and rivers. Areas of this soil are irregular in shape and range from 5 to 150 acres. Most are about 30 acres.

Typically, the surface layer is dark brown gravelly fine sandy loam about 6 inches thick (fig. 5). The subsoil is 14 inches thick. The upper 3 inches of the subsoil is

Figure 5.—Typical profile of Hinckley gravelly fine sandy loam, 3 to 8 percent slopes.

yellowish brown gravelly fine sandy loam, and the lower 11 inches is light olive brown gravelly loamy coarse sand. The substratum is 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 Deerfield, Merrimac, and Windsor soils. In some places this unit is bounded by short, steep slopes. Included areas make up about 20 percent of this unit.

The permeability of this Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is very low. The surface layer of this soil is very friable and easily tilled. Root growth is restricted to a depth of about 20 inches by the loose sand and gravel. This soil is droughty in late summer.

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

This soil is suited to row crops, but droughtiness makes irrigation necessary in most years. Erosion is a hazard. Using cover crops and incorporating crop residue and manure into the surface layer help to control erosion.

The soil is suited to hay and pasture, especially to drought-resistant plants. The main management concern is the prevention of overgrazing. Using proper stocking rates helps to maintain plant densities and desirable species.

This soil is suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant tree species help to reduce seedling mortality.

The rapid permeability is the main limitation of this soil for community development, especially as a site for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used for landfills or septic tanks. The soil is a potential source of sand and gravel.

Capability subclass: IIIs.

HgC—Hinckley gravelly fine sandy loam, 8 to 15 percent slopes. This soil is moderately sloping, deep, and excessively drained. It is near large streams and rivers. Areas of this soil are irregular in shape and range from 5 to 150 acres. Most are about 30 acres.

Typically, the surface layer is dark brown gravelly fine sandy loam about 2 inches thick. The subsoil is 18 inches thick. The upper 7 inches of the subsoil is yellowish brown gravelly loamy coarse sand, and the lower 11 inches is light olive brown gravelly loamy coarse sand. The substratum is 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, Wareham, and Windsor soils. Also included are areas where stones and boulders cover up to 3 percent of the surface, areas with slopes of 3 to 8 percent, and areas with slopes of 15 to 25 percent. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is very low. The surface layer of this soil is very friable and easily tilled. Root growth is restricted to a depth of about 20 inches by loose sand and gravel. This soil is droughty in late summer.

Most areas of this soil are in woodland. Some areas are used for homesites and other types of community development.

Droughtiness, slope, and an erosion hazard make this soil poorly suited to row crops. The soil is suited to hay and pasture, but drought-resistant plants are needed. The main pasture management concern is the prevention of overgrazing. Using proper stocking rates helps to maintain plant densities and desirable species.

This soil is suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant species help to reduce seedling mortality.

Slope and the rapid permeability of the soil are the main limitations for community development. Slope limits the soil as a building site. The permeability causes a hazard of ground-water pollution in areas used for landfills or septic tanks. The soil is a potential source of sand and gravel.

Capability subclass: IVs.

HgD—Hinckley gravelly fine sandy loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and excessively drained. It is adjacent to or near large streams and rivers. Areas of this soil are irregular in shape and range from 10 to 150 acres. Most are about 30 acres.

Typically, the surface layer is dark brown gravelly fine sandy loam about 2 inches thick. The subsoil is 18 inches thick. The upper 7 inches of the subsoil is yellowish brown gravelly fine sandy loam, and the lower 11 inches is light olive brown gravelly loamy coarse sand. The substratum is 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, Wareham, and Windsor soils. Also included are areas with slopes of 8 to 15 percent and areas with slopes of 25 to 35 percent slopes. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is very low. The surface layer of this soil is very friable. Root growth is restricted to a depth of about 20 inches by the loose sand and gravel. The soil is droughty in late summer.

Most areas of this soil are in woodland. Some areas are used for homesites or other types of community development.

Droughtiness, slope, and an erosion hazard make this soil poorly suited to farming.

The soil is suited to trees, but droughtiness causes a high rate of seedling mortality and slope limits the use of

harvesting equipment. Planting drought-resistant tree species and reducing plant competition help to reduce seedling mortality.

Slope is the main limitation of this soil for most types of community development, including use as a building site or as a site for sanitary landfills or septic tank absorption fields. The permeability of the soil causes a hazard of ground-water pollution in areas used for septic tanks or landfills. The soil is a potential source of sand and gravel.

Capability subclass: VIs.

MeA—Merrimac fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and somewhat excessively drained. It is adjacent to or near large streams and rivers. Areas of this soil are irregularly shaped and range from about 4 to 75 acres. Most are about 15 acres.

Typically, the surface layer is dark brown fine sandy loam about 11 inches thick. The subsoil is 12 inches thick. The upper 8 inches of the subsoil is yellowish brown gravelly sandy loam and gravelly coarse sandy loam, and the lower 4 inches is yellowish brown gravelly loamy coarse sand. The substratum is pale brown gravelly coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Agawam, Hinckley, and Sudbury soils. Also included are small areas with slopes of 3 to 8 percent and areas with surface stones that are over 100 feet apart. Included areas make up about 20 percent of the unit.

The permeability of this Merrimac soil is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Available water capacity is moderate. The surface layer of this soil is very friable and easily tilled. Root growth is restricted to a depth of about 23 inches by loose sand and gravel. The soil is droughty in late summer.

Many areas of this soil are farmed. Some areas are in woodland, and some are used for homesites and other types of community development.

This soil is suited to row crops, but droughtiness makes irrigation necessary. Incorporating crop residue and manure into the soil helps to maintain or increase the organic matter content of the surface layer.

This soil is well suited to hay and pasture, especially to plants that tolerate drought in late summer. The main management concern is the prevention of overgrazing, which causes surface compaction and reduces the density and hardiness of plants. Use of proper stocking rates and restricted grazing during wet periods help to maintain plant densities and reduce surface compaction.

The soil is suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant species help to reduce seedling mortality.

The rapid permeability in the substratum is the main limitation of this soil for community development, especially as a site for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used for landfills or septic tanks.

Capability subclass: IIs.

MeB—Merrimac fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and somewhat excessively drained. It is adjacent to or near large streams and rivers. Areas of this soil are irregularly shaped and range from about 4 to 75 acres. Most are about 15 acres.

Typically, the surface layer is dark brown fine sandy loam about 11 inches thick. The subsoil is about 12 inches thick. The upper 8 inches of the subsoil is yellowish brown gravelly sandy loam and gravelly coarse sandy loam, and the lower 4 inches is yellowish brown gravelly loamy coarse sand. The substratum is pale brown, gravelly coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Agawam, Hinckley, and Sudbury soils. Also included are small areas with slopes of 0 to 3 percent and areas with surface stones that are over 100 feet apart. Included areas make up about 20 percent of the unit.

The permeability of this Merrimac soil is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Available water capacity is moderate. The surface layer of this soil is very friable and easily tilled. Root growth is restricted to a depth of about 23 inches by the loose sand and gravel. The soil is droughty in late summer.

Many areas of this soil are farmed. Some areas are in woodland, and some are used for homesites and other types of community development.

This soil is suited to row crops. Droughtiness and an erosion hazard are the main limitations. Incorporating crop residue and manure into the surface layer helps to maintain or increase the organic matter content. The use of winter cover crops reduces surface runoff and helps reduce erosion.

The soil is suited to hay and pasture, especially to drought-resistant plants. The main management concern is the prevention of overgrazing, which causes surface compaction and reduces the density and hardiness of plants. Using proper stocking rates and restricted grazing during wet periods help to maintain plant densities and reduce surface compaction.

This soil is suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant tree species help to reduce seedling mortality.

The rapid permeability in the substratum is the main limitation of this soil for community development, especially as a site for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of

ground-water pollution in areas used for septic tanks and landfills.

Capability subclass: IIs.

NeB—Newport loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on the upper slopes of ridges and hills. Areas of this soil are typically rectangular and range from about 10 to 150 acres. Most are about 20 acres.

Typically, the surface layer is very dark grayish brown loam about 9 inches thick. The subsoil is olive loam 19 inches thick. The substratum is olive gray, very firm gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas with slopes of 0 to 3 percent, areas with slopes of 8 to 15 percent slopes, and areas of Pittstown and Ridgebury soils in depressions and drainageways. Also included are areas where stones cover 1 to 3 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Newport soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer of this soil is very friable and is easily tilled under proper moisture conditions. After prolonged rains, a water table between the depths of 22 and 28 inches is perched above the substratum. Root development is restricted to a depth of 28 inches by the very firm substratum.

Many areas of this soil are used for homesites and other types of community development. A few areas are farmed. A few areas are in woodland, and the soil is well suited to trees.

This soil is well suited to row crops, but erosion is a hazard. Practices that reduce runoff and control erosion include minimum tillage, use of cover crops, and incorporating crop residue and manure into the surface layer.

The soil is suited to hay and pasture. The main management concern is the prevention of overgrazing and grazing when the soil is too wet, which reduce the hardiness and density of plants and compact the surface layer. Using proper stocking rates and restricted grazing when the soil is wet help to reduce compaction and maintain plant densities.

The seasonal perched water table is the main limitation of this soil as a building site or as a site for sanitary landfills. The slow permeability in the substratum is a limitation for septic tank absorption fields.

Capability subclass: IIe.

NfC—Newport very stony loam, 3 to 15 percent slopes. This soil is gently sloping to moderately sloping, deep, and well drained. It is on ridges and hills. Stones and boulders cover from less than 1 percent to 3 percent of the surface. Areas of this soil are irregular in shape and range from 5 to 25 acres. Most are about 15 acres.

Typically, the surface layer is very dark grayish brown loam about 9 inches thick. The subsoil is olive loam 19 inches thick. The substratum is olive gray, very firm gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Pittstown and Ridgebury soils in depressions and along drainageways. Also included are nearly level areas and areas where stones and boulders cover more than 3 percent of the surface. Included areas make up about 20 percent of this unit.

The permeability of this Newport soil is moderate to moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. After prolonged rains, a water table between the depths of 22 and 28 inches is perched above the substratum. Root growth is restricted to a depth of 28 inches by the very firm substratum.

Most areas of this soil are used for pasture. Some areas are in woodland. Some are used for homesites and other types of community development.

The stones and boulders on the surface limit the use of equipment and make this soil poorly suited to row crops. The soil is suited to hay and pasture, but the limitations to the use of equipment make it difficult to seed and fertilize. Other management concerns are the prevention of overgrazing and grazing when the soil is wet, which reduce the hardiness and density of plants and compact the surface layer. Using proper stocking rates and restricted grazing when the soil is wet reduce compaction and help to maintain plant hardiness and density.

This soil is well suited to trees. The use of timber harvesting equipment is limited by the stones and boulders on the surface.

Slope and the seasonal perched water table limit this soil as a building site or as a site for sanitary landfills. The slow permeability in the substratum is a limitation for septic tank absorption fields.

Capability subclass: VIs.

NgA—Ninigret fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and moderately well drained. It is near or adjacent to streams and rivers. Areas of this soil are irregular in shape and range from 5 to 25 acres. Most are about 10 acres.

Typically, the surface layer is dark yellowish brown fine sandy loam about 9 inches thick. The subsoil is fine sandy loam 17 inches thick and is mottled in the lower part. The substratum is grayish brown, mottled sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Agawam soils on knolls and Deerfield and Walpole soils in depressions. Also included are areas that have a substratum of silt loam or very fine sandy loam. Included areas make up about 20 percent of the unit.

The permeability of this Ninigret soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. The surface layer is very friable and easily tilled. This soil has a seasonal high water table in winter and spring.

Most areas of this soil are farmed. A few areas are in woodland, and the soil is well suited to trees. Some areas are used for homesites and other types of community development.

This soil is suited to row crops. The seasonal high water table is the main limitation for crops. The main management practices include using drainage and cover crops and incorporating crop residue and manure into the surface layer to maintain the organic matter content.

The soil is suited to hay or pasture. The main management concerns are the prevention of overgrazing, which causes surface compaction and reduces the hardiness and density of plants. The use of proper stocking rates, rotational grazing, and restricted grazing during wet periods help to maintain plant hardiness and density.

The seasonal high water table and rapid permeability in the substratum are the main limitations of the soil for community development. The water table especially limits the soil as a building site and, along with the rapid permeability, is a limitation for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IIw.

Pa—Pawcatuck and Ipswich peats. These soils are deep and very poorly drained. They are in coastal tidal marshes that are subject to daily tidal flooding (fig. 6). Areas are irregular in shape and range from about 5 to 200 acres. Most are more than 100 acres. The areas of this unit consist of Pawcatuck soils or Ipswich soils or both. The soils were mapped together because there are no major differences in their use and management.

The acreage of this unit is about 50 percent Pawcatuck soils, 35 percent Ipswich soils, and 15 percent other soils.

Typically, the upper 31 inches of the Pawcatuck soils is grayish brown peat and mucky peat. The substratum is gray sand to a depth of 60 inches or more.

Typically, the upper 22 inches of the Ipswich soils is dark grayish brown peat and mucky peat. The next 4 inches is very dark grayish brown muck. The lower layer, to a depth of 60 inches or more, is dark olive gray mucky peat.

Included with these soils in mapping are areas where the depth to mineral material is less than 16 inches; a few areas where stones cover about 3 percent of the surface; and areas where the material underlying the Pawcatuck soils is very fine sandy loam, loamy very fine sand, or silt loam. Included areas make up about 15 percent of the unit.

The permeability of these Pawcatuck soils is moderate to rapid in the organic material and very rapid in the substratum. The permeability of the Ipswich soils is moderate to rapid. Available water capacity is high in both soils.

Figure 6.—Typical area of Pawcatuck and Ipswich peats.

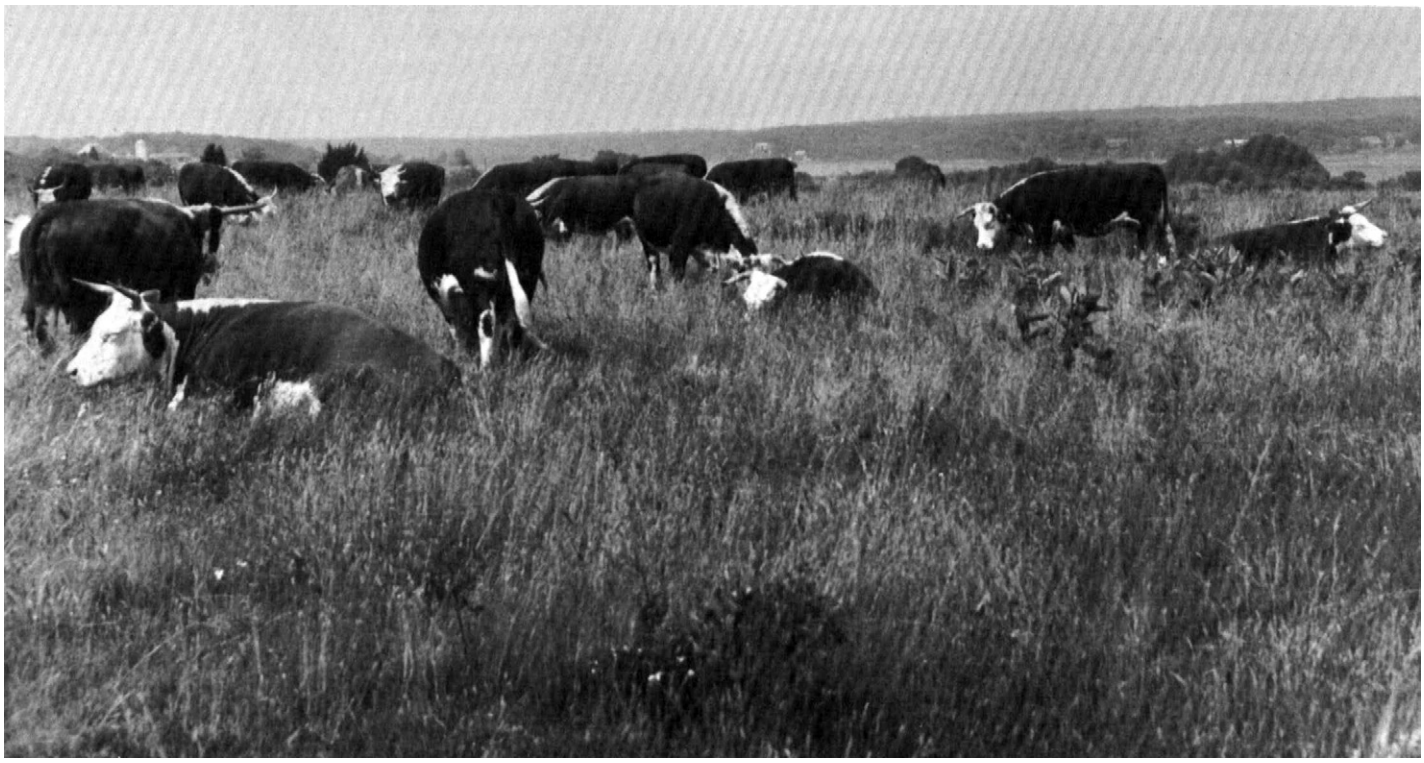


Figure 7.—Improved pasture on an area of Paxton fine sandy loam, 0 to 3 percent slopes.

The daily tidal flooding makes these soils poorly suited to most uses other than wetland wildlife habitat.

Capability subclass: VIIIw.

PfA—Paxton fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and well drained. It is on the tops of ridges and hills. Areas of this soil are typically rectangular and range from 5 to 25 acres. Most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is 14 inches thick. The upper 8 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge soils, areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand, and areas where the substratum is at a depth of more than 36 inches. Also included are small areas with slopes of 3 to 8 percent and a few places where the surface layer and upper part of the subsoil are very fine sandy loam. Included areas make up about 20 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer is very friable and easily tilled. After prolonged rains, a water table between the depths of 16 and 22 inches is perched above the substratum. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are used for hay, improved pasture, or cultivated crops. A few areas are in woodland, and the soil is well suited to trees. Some areas are used for homesites and other types of community development.

This soil is well suited to row crops. Mixing crop residue and manure into the surface layer helps to maintain the organic matter content and tilth of the soil.

The soil is well suited to hay and pasture (fig. 7). The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Using proper stocking rates and restricted grazing during wet periods help to maintain plant densities and reduce surface compaction.

The seasonal perched water table is the main limitation of the soil for community development, especially as a building site and a site for sanitary landfills. The slow permeability in the substratum is a limitation for septic tank absorption fields.

Capability class: I.

PfB—Paxton fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on the tops and sides of ridges and hills.

Areas of this soil are typically irregular in shape and range from 5 to 150 acres. Most are about 50 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is 14 inches thick. The upper 8 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge soils and areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand. In places the substratum is at a depth of more than 36 inches. Also included are areas with slopes of 0 to 3 percent. Included areas make up 20 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer is very friable and easily tilled. During and following rainy periods, a temporary water table is often between depths of 16 and 22 inches. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are used for hay, improved pasture, or cultivated crops (fig. 8). A few areas are in woodland, and the soil is well suited to trees. Some areas are used for homesites or other types of community development.

This soil is well suited to row crops, but erosion is a hazard. Management practices that help reduce runoff and control erosion include minimum tillage, using cover crops, and incorporating crop residue and manure into the surface layer.

The soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which compacts the surface layer and reduces the hardiness and density of plants. Using proper stocking rates and restricted grazing when the soil is wet help to maintain plant densities and reduces surface compaction.

The seasonal perched water table is the main limitation of this soil for community development, especially as a building site or as a site for sanitary landfills. The slow permeability in the substratum of the soil is a limitation for septic tank absorption fields.

Capability subclass: IIe.

PfC—Paxton fine sandy loam, 8 to 15 percent slopes. This soil is moderately sloping, deep, and well drained. It is on the sides of ridges and hills. Areas of this soil range from about 5 to 150 acres. Most are about 50 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick (fig. 9). The subsoil is 14 inches thick. The upper 8 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge soils, areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand, and areas where the substratum is at a depth of less than 20 inches or at a depth of more than 36 inches. Wet seep spots are common in this unit, and in a few places the surface layer and upper part of the subsoil are very fine sandy loam. Included areas make up about 20 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The

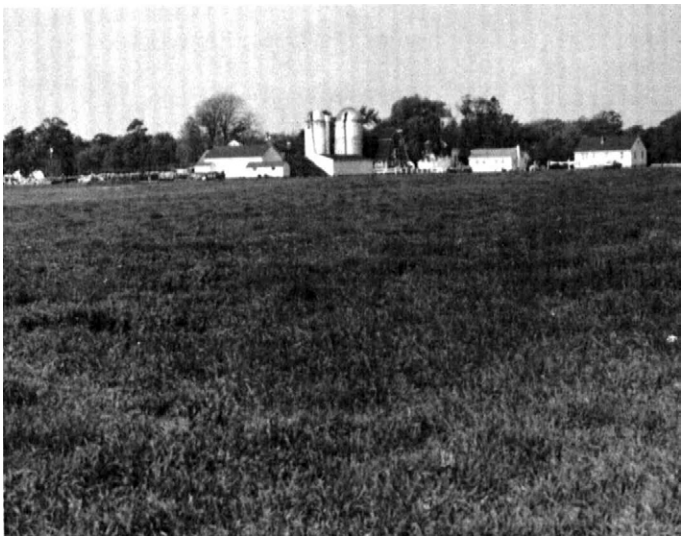


Figure 8.—Alfalfa-grass hay on an area of Paxton fine sandy loam, 3 to 8 percent slopes.

Figure 9.—Typical profile of Paxton fine sandy loam 8 to 15 percent slopes. The light-colored area is the very firm substratum.

surface layer is very friable and easily tilled. After prolonged rains, a water table is perched between depths of 16 and 22 inches. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are used for hay or improved pasture. Some areas are used for cultivated crops. Some small areas are in woodland, and the soil is well suited to trees. A few areas are used for homesites or other types of community development.

This soil is suited to row crops, but erosion is a hazard. Management practices that help reduce runoff and control erosion include minimum tillage, using cover crops, and incorporating crop residue and manure into the surface layer.

The soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of plants. Using proper stocking rates and restricted grazing during wet periods help to maintain plant densities and reduce surface compaction.

Slope and the seasonal perched water table are the main limitations of this soil for community development, especially as a building site and as a site for sanitary landfills. The slow permeability in the substratum of the soil is a limitation for septic tank absorption fields.

Capability subclass: IIIe.

PgB—Paxton very stony fine sandy loam, 0 to 8 percent slopes. This soil is nearly level to gently sloping, deep, and well drained. It is on the tops and sides of ridges and hills. Stones and boulders cover from less than 1 percent to 3 percent of the surface. Areas of this soil are irregular in shape and range from about 5 to 300 acres. Most are about 200 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is 14 inches thick. The upper 8 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge soils and areas where stones and boulders cover 3 to 15 percent of the surface. Also included are areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand and areas where the substratum is at a depth of more than 36 inches. Wet seepage areas are common in this unit. Included areas make up about 20 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. During and following rainy periods, a temporary water table is often between depths of 16 and 22 inches. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are in woodland, and the soil is well suited to trees. Some areas are used for pasture, and a few small areas are used for cultivated crops. A few areas are used for homesites or other types of community development.

The stones and boulders on the surface limit the use of equipment and make this soil poorly suited to row crops. The soil is suited to pasture, but the limitations to the use of equipment make the soil poorly suited to hay. Using proper stocking rates and restricted grazing during wet periods help to maintain pasture plant densities and reduce surface compaction.

The seasonal perched water table is the main limitation of this soil for community development, especially as a building site or as a site for sanitary landfills. The slow permeability in the substratum of the soil is a limitation for septic tank absorption fields.

Capability subclass: VIs.

PgC—Paxton very stony fine sandy loam, 8 to 15 percent slopes. This soil is moderately sloping, deep, and well drained. It is on the sides of ridges and hills. Stones and boulders cover from less than 1 percent to about 3 percent of the surface. Areas of this soil are irregular in shape and range from about 5 to 300 acres. Most are about 150 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is 14 inches thick. The upper 8 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Woodbridge soils and small areas where stones and boulders cover 3 to 15 percent of the surface. Also included are areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand and areas where the substratum is at a depth of more than 36 inches. Wet seepage areas are common in this unit. Included areas make up about 20 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. During and following rainy periods, a temporary water table is often between depths of 16 and 22 inches. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are in woodland, and the soil is well suited to trees. Some areas are used for pasture and cultivated crops, and some are used for homesites or other types of community development.

The stones and boulders on the surface limit the use of equipment and, along with a hazard of erosion, make the soil poorly suited to row crops. The soil is suited to pasture, but the limitation to the use of equipment makes the soil poorly suited to hay. Using proper stocking rates and restricted grazing during wet periods help to maintain pasture plant densities and reduce surface compaction.

Slope and the seasonal perched water table are the main limitations of this soil for community development, especially as a building site or as a site for sanitary landfills. The slow permeability in the substratum of the soil is a limitation for septic tank absorption fields.

Capability subclass: VIs.

PgD—Paxton very stony fine sandy loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on the sides of ridges and hills. Stones and boulders cover from less than 1 percent to 3 percent of the surface. Areas of this soil are irregular in shape and range from about 5 to 50 acres. Most are about 15 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 18 inches thick. The upper 12 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is at a depth of less than 20 inches or at a depth of more than 36 inches. Also included are areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand and areas where stones and boulders cover 3 to 15 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. After prolonged rains, a water table between depths of 16 and 22 inches is perched above the firm substratum. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

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

Slope, the stones and boulders on the surface, and an erosion hazard make this soil poorly suited to row crops. The soil is suited to pasture, but the slope and stones and boulders on the surface limit the use of equipment and make the soil poorly suited to hay.

This soil is suited to trees, but the slope limits the use of timber harvesting equipment.

Slope and the seasonal perched water table are the main limitations of the soil for community development, especially as a building site or as a site for septic tank absorption fields or sanitary landfills. The slow permeability in the substratum, which causes a hazard of effluent seeping to the surface, is an additional limitation for septic tanks.

Capability subclass: VIs.

PhB—Paxton extremely stony fine sandy loam, 0 to 8 percent slopes. This soil is nearly level to gently sloping, deep, and well drained. It is on the tops and sides of ridges and hills. Stones and boulders cover 3 to 15 percent of the surface. Areas of this soil are irregular in shape and range from about 10 to 1,000 acres. Most are about 300 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 20 inches thick. The upper 14 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand and areas where the substratum is a depth of more than 36 inches. Also included are areas of Woodbridge soils and a few areas of exposed bedrock. Included areas make up about 25 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. During and following rainy periods, a water table is often between depths of 16 and 22 inches. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are in woodland. A few areas are used for permanent pasture, and a few are used for homesites (fig. 10).

The stones and boulders on the surface limit the use of equipment and make the soil poorly suited to farming. The soil is suited to trees, but the stones and boulders limit the use of timber harvesting equipment.

The seasonal perched water table is the main limitation of this soil for community development, especially as a building site or as a site for sanitary landfills. The slow permeability in the substratum of the soil is a limitation for septic tank absorption fields.

Capability subclass: VIIs.

PhC—Paxton extremely stony fine sandy loam, 8 to 15 percent slopes. This soil is moderately sloping, deep, and well drained. It is on the sides of ridges and hills. Stones and boulders cover 3 to 15 percent of the surface. Areas of this soil are irregular in shape and range from about 10 to 500 acres. Most are about 150 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 20 inches thick. The upper 14 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand or the substratum is at a depth of more than 36 inches. Also included are areas of Woodbridge soils and a few areas of bedrock exposures. Wet seepage areas are common in this unit. Included areas make up about 25 percent of the unit.

Figure 10.—This area of Paxton extremely stony fine sandy loam, 0 to 8 percent slopes, is used for unimproved pasture.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. During and following rainy periods, a water table is often between depths of 16 and 22 inches. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are in woodland. A few small areas are used for permanent pasture. A few acres are used for homesites.

The stones and boulders on the surface limit the use of equipment and, along with an erosion hazard, make the soil poorly suited to farming. The soil is suitable for trees, but the stones and boulders also limit the use of timber harvesting equipment.

The seasonal perched water table and slope are the main limitations of this soil for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: VIIs.

PhD—Paxton extremely stony fine sandy loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and moderately well drained. It is on the sides of ridges and hills. Stones and boulders cover 3 to 15 percent of the surface. Areas of this soil are irregularly shaped and range from about 10 to 100 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 20 inches thick. The upper 14 inches of the subsoil is yellowish brown fine sandy loam, and the lower 6 inches is olive yellow sandy loam. The substratum is pale olive, very firm and brittle gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is gravelly loamy sand or gravelly loamy coarse sand. Also included are areas of Woodbridge soils and a few areas of exposed bedrock. Wet seepage areas are common in this unit. Included areas make up about 25 percent of the unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. During and following rainy periods, a water table is often between depths of 16 and 22 inches. Root growth is restricted to a depth of about 22 inches by the very firm substratum.

Most areas of this soil are in woodland. A few small areas are used for permanent pasture. A few acres are used for homesites.

Slope and the stones and boulders on the surface make this soil poorly suited to farming. The soil is

suitable for trees, but the slope and stones and boulders also limit the use of timber harvesting equipment.

Slope and the seasonal perched water table are the main limitations of the soil for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The slow permeability in the substratum also limits the soil for septic tanks.

Capability subclass: VIIs.

PoA—Pipestone loamy sand, 0 to 3 percent slopes. This soil is nearly level, deep, and somewhat poorly drained. It is in low lying areas that are mainly near or adjacent to streams and other waterways. Areas of this soil are irregular in shape and range from about 5 to 30 acres. Most are about 10 acres.

Typically, organic material about 3 inches thick covers the surface layer. The surface layer is black loamy sand about 3 inches thick. The subsurface layer is gray loamy sand 1 inch thick. The subsoil is 20 inches thick. The upper 4 inches of the subsoil is dark reddish brown, mottled sand; the lower 16 inches is brown, mottled loamy sand. The substratum is light brownish gray sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Deerfield, Scarboro, and Wareham soils and areas where the surface layer is fine sandy loam. Also included are areas where the upper part of the subsoil is extremely firm and areas that have more gravel in the subsoil and substratum than does this Pipestone soil. Included areas make up 15 percent of this unit.

The permeability of this Pipestone soil is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is low. The rooting zone of plants is restricted by a seasonal high water table that is at or near the surface in winter and spring. These soils are droughty in late summer.

Most areas of this soil are in woodland. A few areas are farmed.

The soil is suited to row crops. The main limitation is the seasonal high water table. Open ditches or tile drains, or a combination of the two, help to drain the soil. Minimum tillage, using cover crops, and incorporating crop residue and manure into the surface soil improve tilth and maintain the organic matter content.

The soil is suited to hay and pasture, especially to water-tolerant plants. Drainage is generally needed. The main pasture management concerns are the prevention of both overgrazing and grazing when the soil is wet, which reduce the hardiness and density of plants. Using proper stocking rates and restricted grazing during wet periods help to maintain plant hardiness and density.

The soil is suited to trees, but droughtiness causes a high rate of seedling mortality. Reducing plant competition and planting drought-resistant tree species help to reduce the rate of seedling mortality.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site or as a site for septic tank absorption fields or sanitary landfills. The rapid permeability of the soil causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IVw.

Pr—Pits, quarry. This unit consists of areas that have been excavated for stone, mostly granite. All soil material has been removed or covered with waste material. The walls and floor of the quarry are typically rock. Areas of this unit are irregular in shape and range from about 5 to 70 acres. Most are smaller than 25 acres.

Use of these areas requires onsite investigation and evaluation.

Capability subclass: not assigned.

Ps—Pits-Udorthents complex, gravelly. This unit consists of areas that have been excavated for sand and gravel. Depth of the excavations ranges from about 5 to 25 feet, and some extend into the water table. In some areas the water table is at or near the surface. Areas of this unit are irregular in shape and range from 5 to 50 acres. The unit is about 60 percent Pits, 30 percent Udorthents, and 10 percent other soils. The Pits and Udorthents are so intermingled that it was not practical to map them separately.

Included with this unit in mapping are pits that consist of loamy material or that have been used as disposal areas for a wide variety of material.

Some parts of this unit, especially the steep banks, have little or no vegetation. Other areas are covered with native species such as bayberry, sweet fern, pitch pine, and gray birch.

The lack of soil material in the areas of this unit make the unit poorly suited to most uses. Use of the unit requires onsite investigation and evaluation.

Capability subclass: not assigned.

PtB—Pittstown loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and moderately well drained. It is on the tops of hills and at the base of long slopes. Areas of this soil are irregular in shape and range from 5 to 30 acres. Most are about 10 acres.

Typically, the surface layer is very dark grayish brown loam about 10 inches thick. The subsoil is olive loam 19 inches thick and is mottled in the lower part. The substratum is olive, very firm, mottled loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the soil is fine sandy loam throughout. Also included are slightly convex areas of Newport soils and areas of Ridgebury soils along drainageways and in depressions. In a few places stones and boulders cover 1 to 3 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Pittstown soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer of this soil is friable and is easily tilled under proper moisture conditions. After prolonged rains, a water table between the depths of 23 and 29 inches is perched above the substratum. Root growth is restricted to a depth of about 29 inches by the very firm substratum.

Most areas of this soil are in woodland, and the soil is well suited to trees. Some areas are used for homesites.

This soil is suited to row crops. The main limitation is a seasonal high water table in winter and spring. The main management practices include using drainage, using cover crops, and incorporating crop residue and manure into the surface layer.

The soil is suited to hay and pasture. Use of proper stocking rates, deferred grazing, pasture rotation, and keeping livestock and equipment off the pasture when the soil is wet help to maintain the hardiness and density of plants and prevent surface compaction.

The seasonal perched water table is the main limitation of this soil for community development, especially as a building site or as a site for septic tank absorption fields or sanitary landfills. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: IIw.

PvB—Pittstown very stony loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and moderately well drained. It is on the tops of hills and at the lower end of long slopes. Stones and boulders cover from less than 1 percent to 3 percent of the surface. Areas of this soil are irregularly shaped and range from 5 to 25 acres. Most are about 15 acres.

Typically, the surface layer is very dark grayish brown loam about 10 inches thick. The subsoil is olive loam 19 inches thick and is mottled in the lower part. The substratum is olive, very firm, mottled loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the soil is fine sandy loam throughout. Also included are slightly convex areas of Newport soils and areas of Ridgebury soils in depressions and along drainageways. In a few places stones and boulders cover 3 to 15 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Pittstown soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer of this soil is friable and is easily tilled under proper moisture conditions. After prolonged rains, a water table between the depths of 23 and 29 inches is perched above the very firm substratum. Root growth is restricted to a depth of about 29 inches by the very firm substratum.

Many areas of this soil are used for pasture. Some areas are in woodland, and the soil is well suited to trees. A few areas are used for homesites and other types of community development.

The stones and boulders on the surface restrict the use of equipment and make the soil poorly suited to row crops. A seasonal high water table in winter and spring also limits the soil for crops.

The soil is suited to pasture, but the limitation to the use of equipment makes the soil poorly suited to hay. Use of proper stocking rates, deferred grazing, pasture rotation, and keeping livestock and equipment off the pasture when the soil is wet help to maintain the hardiness and density of pasture plants and prevent surface compaction.

The seasonal perched water table is the main limitation of this soil for community development, especially as a building site or as a site for septic tanks or sanitary landfills. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: VIs.

RdA—Ridgebury fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and poorly drained and somewhat poorly drained. It is in depressions and along drainageways. Areas of this soil are irregular in shape and range from 5 to 20 acres. Most are about 10 acres.

Typically, the surface layer is black fine sandy loam about 7 inches thick. The subsoil is mottled and is 22 inches thick. The upper 6 inches of the subsoil is pale brown fine sandy loam; the lower 16 inches is light brownish gray, firm sandy loam. The substratum is light olive gray, mottled, very firm sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Pittstown, Whitman, and Woodbridge soils. Also included are areas of soils that are very fine sandy loam, gravelly loamy sand, or gravelly loamy coarse sand throughout. In some areas the very firm substratum extends to a depth of 4 feet or less. Included areas make up about 20 percent of the unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The soil has a seasonal high water table at or near the surface in winter and spring and during periods of heavy rainfall. The surface layer of the soil is very friable and is easily tilled under proper moisture conditions. Root growth is restricted by the seasonal high water table and by the very firm substratum at a depth of about 29 inches.

Most areas of this soil are used for pasture, hay, and cultivated crops (fig. 11). Some areas are used for homesites and other types of community development.

This soil is suited to cultivated crops. The seasonal high water table is the main limitation; surface drainage, diversions, tile drains, or a combination of these practices is needed. Minimum tillage, returning crop

Figure 11.—Pond and pasture on Ridgebury fine sandy loam, 0 to 3 percent slopes.

residue to the soil, and adding manure to the surface layer help to maintain the organic matter content and improve tilth.

This soil is suited to hay and pasture, especially to water-tolerant plants. Drainage is generally needed. The prevention of both overgrazing and grazing when the soil is wet and the use of proper stocking rates help to maintain desirable pasture plant species and prevent surface compaction.

The seasonal high water table makes this soil poorly suited to trees. The water table causes a high rate of seedling mortality. It also restricts rooting, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: IIIw.

RdB—Ridgebury fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and poorly drained and somewaht poorly drained. It is in drainageways and on hillsides. Areas of this soil are irregular in shape and range from about 5 to 20 acres. Most are about 10 acres.

Typically, the surface layer is black fine sandy loam about 7 inches thick. The subsoil is mottled and is 22 inches thick. The upper 6 inches of the subsoil is pale brown fine sandy loam; the lower 16 inches is light brownish gray, firm sandy loam. The substratum is light olive gray, mottled, very firm sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Pittstown, Whitman, and Woodbridge soils. Also included are areas of soils that are very fine sandy loam, gravelly loamy sand, or gravelly loamy coarse sand throughout. In some areas the substratum extends to a depth of 4 feet or less. Included areas make up about 20 percent of the unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The soil has a seasonal high water table at or near the surface in winter

and spring and during periods of heavy rainfall. The surface layer of the soil is very friable and is easily tilled under proper moisture conditions. Root growth is restricted by the seasonal high water table and by the very firm substratum at a depth of about 29 inches.

Most areas of this soil are used for hay, pasture, and cultivated crops. Some areas are used for homesites and other types of community development.

This soil is suited to cultivated crops. The seasonal high water table is the main limitation, and erosion is a hazard. Surface drainage, diversions, tile drains, or a combination of these practices is needed. Cover crops, minimum tillage, returning crop residue to the soil, and adding manure to the surface layer help to maintain the organic matter content and improve tilth.

The soil is suited to hay and pasture, especially to water-tolerant plants. Drainage generally is needed. The prevention of both overgrazing and grazing when the soil is wet and the use of proper stocking rates help to maintain desirable pasture plant species and prevent surface compaction.

The seasonal high water table makes this soil poorly suited to trees. The water table causes a high rate of seedling mortality. It also restricts rooting, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: IIIw.

ReA—Ridgebury extremely stony fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and poorly drained and somewhat poorly drained. It is in depressions and drainageways. Stones and boulders cover 3 to 15 percent of the surface. Areas of this soil are irregular in shape and range from about 5 to 300 acres. Most are about 50 acres.

Typically, the surface layer is black fine sandy loam about 7 inches thick. The subsoil is mottled and is 22 inches thick. The upper 6 inches of the subsoil is pale brown fine sandy loam; the lower 16 inches is light brownish gray, firm sandy loam. The substratum is light olive gray, mottled, very firm sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Pittstown, Whitman, and Woodbridge soils. Also included are areas of soils that are very fine sandy loam, gravelly loamy sand, or gravelly loamy coarse sand throughout. Stones and boulders cover more than 15 percent of the surface of some areas. Included areas make up about 25 percent of the unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. A seasonal high water table is at or near the surface in winter and spring. Root growth is restricted by the seasonal high water table and by the very firm substratum at a depth of about 29 inches.

Most areas of this soil are in woodland (fig. 12). A few areas are used for permanent pasture. Some areas are used for homesites and other types of community development.

The high water table and the stones and boulders on the surface make this soil poorly suited to farming. Use of this soil for cultivation requires drainage and stone removal.

The seasonal high water table makes this soil poorly suited to trees. The water table causes a high rate of seedling mortality. It also restricts rooting, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: VIIs.

ReB—Ridgebury extremely stony fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and poorly drained and somewhat poorly drained. It is in drainageways and on hillsides. Stones and boulders cover 3 to 15 percent of the surface. Areas of this soil are irregular in shape and range from about 5 to 300 acres. Most are about 50 acres.

Typically, the surface layer is black fine sandy loam about 7 inches thick. The subsoil is mottled and is 22 inches thick. The upper 6 inches of the subsoil is pale brown fine sandy loam; the lower 16 inches is light brownish gray, firm sandy loam. The substratum is light olive gray, mottled, very firm sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Pittstown, Whitman, and Woodbridge soils. Also included are areas of soils that are very fine sandy loam, gravelly loamy sand, or gravelly loamy coarse sand throughout. Stones and boulders cover more than 15 percent of the surface of some areas. Included areas make up about 25 percent of the unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. A seasonal high water table is at or near the surface in winter and spring. Root growth is restricted by the seasonal high water table and by the very firm substratum at a depth of about 29 inches.

Most areas of this soil are in woodland. A few areas are used for permanent pasture. Some areas are used for homesites and other types of community development.

Figure 12.—This pond provides fire protection for woodland on Ridgebury extremely stony fine sand loam, 0 to 3 percent slopes.

The seasonal high water table and the stones and boulders on the surface make this soil poorly suited to farming. Use of the soil for cultivation requires drainage and stone removal.

The seasonal high water table makes this soil poorly suited to trees. The water table causes a high rate of seedling mortality. It also restricts rooting, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: VIIs.

Sc—Scarboro muck. This soil is nearly level, deep, and very poorly drained. It is in low lying depressional areas that are mostly adjacent to rivers and streams. Areas of this soil are irregular in shape and range from 5 to 125 acres. Most are about 50 acres.

Typically, a 4-inch-thick layer of black muck covers the surface layer. The surface layer consists of black mucky loamy fine sand about 9 inches thick. The subsurface layer is light gray loamy fine sand 8 inches thick. The substratum is gray and extends to a depth of 60 inches or more. The upper 7 inches of the substratum is loamy sand, and the next 4 inches is fine sand. The lower part of the substratum is sand that is partly mottled.

Included with this soil in mapping are areas of Swansea, Pipestone, Walpole, and Wareham soils. Also included are areas where the substratum is firm and areas of silt loam or very fine sandy loam. Included areas make up over 30 percent of many units.

The permeability of this Scarboro soil is rapid or very rapid. Available water capacity is low. Root growth is restricted by a seasonal high water table that is at or near the surface most of the year.

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

The seasonal high water table makes this soil poorly suited to farming. The soil is in low lying areas, and the lack of suitable outlets makes it difficult to drain.

The seasonal high water table makes this soil poorly suited to trees. The water table causes a high rate of seedling mortality. It also restricts rooting, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The rapid permeability of the soil causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: Vw.

SdA—Sudbury fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and moderately well drained. It is near or adjacent to streams and rivers. Areas of this soil are irregular in shape and range from 5 to 40 acres. Most are about 10 acres.

Typically, the surface layer is black fine sandy loam about 2 inches thick. The subsurface layer is grayish brown sandy loam 2 inches thick. The subsoil is brown and is 24 inches thick. The upper 14 inches of the subsoil is fine sandy loam, and the lower 10 inches is mottled gravelly coarse sandy loam. The substratum is light olive brown, mottled gravelly coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are convex areas of Merrimac soils on rises and areas of Walpole soils in depressions. Also included are small areas of Deerfield and Ninigret soils and a few areas of gently sloping soils. Included areas make up about 20 percent of the unit.

The permeability of this Sudbury soil is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Available water capacity is moderate. A seasonal high water table is within 3 feet of the surface in the winter and spring and after periods of heavy rain. The surface layer of this soil is very friable and easily tilled. Root development is restricted to a depth of about 28 inches by loose sand and gravel.

Most areas of this soil are in woodland, and the soil is suited to trees. A few areas are farmed. A few are used for homesites and other types of community development.

This soil is suited to row crops. The seasonal high water table is the main limitation. The main management practices include using drainage, using cover crops, and incorporating crop residue and manure into the surface layer to maintain the organic matter content.

The soil is suited to hay and pasture. The main management concerns are the prevention of overgrazing, the prevention of grazing when the soil is wet, and avoiding the use of equipment when the soil is wet, all of which reduce the hardiness and density of plants and cause surface compaction.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site or as a site for septic tank absorption fields or sanitary landfills. The rapid permeability in the substratum causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IIw.

SdB—Sudbury fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is near or adjacent to streams and rivers. Areas of this soil are irregular in shape and range from 5 to 40 acres. Most are about 10 acres.

Typically, the surface layer is black fine sandy loam about 2 inches thick. The subsurface layer is grayish brown sandy loam 2 inches thick. The subsoil is brown and is 24 inches thick. The upper 14 inches of the subsoil is fine sandy loam, and the lower 10 inches is mottled gravelly coarse sandy loam. The substratum is light olive brown, mottled gravelly coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are convex areas of Merrimac soils on rises and areas of Walpole soils in depressions. Also included are small areas of Deerfield and Ninigret soils and a few areas of nearly level soils. Included areas make up about 20 percent of the unit.

The permeability of this Sudbury soil is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Available water capacity is moderate. A seasonal high water table is within 3 feet of the surface in the winter and spring and after periods of heavy rain. The surface layer of this soil is very friable and easily tilled. Root development is restricted to a depth of about 28 inches by loose sand and gravel.

Most areas of this soil are in woodland, and the soil is suited to trees. A few areas are farmed. Some areas are used for homesites and other types of community development.

This soil is suited to row crops. The seasonal high water table is the main limitation, and erosion is a hazard. The main management practices include using drainage, using cover crops, and incorporating crop residue and manure into the surface layer to maintain the organic matter content.

The soil is suited to hay and pasture. The main management concerns are the prevention of overgrazing, the prevention of grazing when the soil is wet, and avoiding the use of equipment when the soil is wet, all of which reduce the hardiness and density of plants and cause surface compaction.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site or as a site for septic tank absorption fields or sanitary landfills. The rapid permeability in the

substratum causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IIe.

Ss—Swansea coarse sand. This soil is nearly level, deep, and very poorly drained. It is in depressional areas surrounded by gently sloping soils. Most areas have a network of dug ditches. Areas of this soil are typically rectangular and range from 3 to 125 acres. Most are about 10 acres.

Typically, the surface layer is light yellowish brown coarse sand about 10 inches thick and is underlain by black organic material 26 inches thick. The substratum is light olive gray loamy coarse sand and gravelly loamy coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are areas where the thickness of the organic material is less than 16 inches. Also included are areas of Freetown soils. Included areas make up about 15 percent of the unit.

The permeability of this Swansea soil is rapid in the surface layer, moderate or moderately rapid in the organic material, and very rapid in the substratum. Available water capacity is high. This soil has a high water table at or near the surface during most of the year.

Most areas of this soil are used for cranberries. A few areas have been abandoned and have reverted to brush and trees.

The high water table makes this soil poorly suited to row crops, hay, or pasture. Installing drainage sufficient for the common field crops is difficult because of the lack of suitable outlets. The high water table also makes this soil poorly suited to trees. It causes a high rate of seedling mortality and restricts rooting, making trees susceptible to uprooting during windy periods. The wetness of the soil restricts the use of harvesting equipment.

The high water table is the main limitation of this soil for community development, especially as a building site or as a site for septic tank absorption fields and sanitary landfills. The low strength of the organic material is also a limitation for building, and the rapid permeability in the substratum causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IVw.

Sw—Swansea muck. This soil is level, deep, and very poorly drained. It is in depressional areas surrounded by gently sloping mineral soils. Areas of this soil are irregular in shape and range from 5 to 75 acres. Most are about 10 acres.

Typically, this soil consists of black organic material 26 inches thick. The substratum is light olive gray loamy coarse sand and gravelly loamy coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are areas where the organic deposits are thicker than 51 inches and a few areas where the organic deposits are less than 16 inches thick. Included areas make up about 15 percent of the unit.

The permeability of this Swansea soil is moderate or moderately rapid in the organic material and very rapid in the substratum. Available water capacity is high. This soil has a high water table at or near the surface during most of the year.

Most areas of this soil are in woodland, mainly water-tolerant trees such as red maple.

The high water table makes this soil poorly suited to row crops, hay, or pasture. Establishing drainage is difficult because of the lack of suitable outlets. The water table also makes the soil poorly suited to trees. It causes a high rate of seedling mortality and restricts rooting, making trees susceptible to uprooting during windy periods. The wetness of the soil restricts the use of harvesting equipment.

The high water table is the main limitation of the soil for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The low strength of the organic material is also a limitation for building, and the rapid permeability in the substratum causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: Vw.

UaD—Udipsamments, hilly. This soil is steep, deep, and excessively drained. It is on sand dunes along the seashore (fig. 13). Areas of this unit are irregular in shape and range from 5 to 500 acres. Most are about 200 acres.

Generally, the surface layer is pale brown fine sandy loam about 7 inches thick. The substratum is light gray fine sand to a depth of 60 inches or more.

Included with this unit in mapping are beaches and areas of Pawcatuck and Ipswich soils. Also included are areas of sandy and moderately well drained, poorly drained, and very poorly drained soils in depressional and low-lying areas. This unit has a few areas that are devoid of vegetation and that are less than 2 acres each. Included areas make up about 15 percent of the unit.

The permeability of Udipsamments is very rapid. Available water capacity is low. The soil is droughty.

The recently deposited areas of this soil have little or no vegetation. The older deposits are covered mostly by pitch pine, beach grass, bull briers, scrub oak, and beach plum.

The droughtiness, low fertility, and steep slopes of this soil make it poorly suited to farming or trees.

Slope and the rapid permeability of this soil are the main limitations for community development. The slope limits the soil as a building site and as a site for septic tank absorption fields or sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used for landfills or septic tanks.

Capability subclass: VIIIs.

Figure 13.—Typical area of Udipsamments, hilly.

Ud—Udorthents, smoothed. This unit consists of mainly nearly level areas formed by excavating or filling for construction projects. Areas of this unit are irregular in shape and range from 5 to 200 acres. Most are about 50 acres.

Included with this unit in mapping are small urbanized areas and small areas of undisturbed soils. These areas make up about 15 percent of the unit.

Most of the areas of Udorthents are in athletic fields and near interstate highways. Some areas are in housing developments where the soils have been so disturbed that their identification is not possible. Some areas were gravel pits that have been smoothed, had topsoil added, and have been seeded for hay.

The characteristics of the areas of this unit are so variable that onsite investigation is needed to determine the suitability of the areas for any use.

Capability subclass: not assigned.

Ur—Urban land. This unit consists of areas covered by structures. Some examples are industrial areas, shopping centers, and parking lots and roads. The areas are irregular in shape. They range from 5 to 5,000 acres, but most are about 100 acres.

Included with this unit in mapping are small areas of Udorthents, smoothed, and small areas of undisturbed soils. Included areas make up about 15 percent of the unit.

Use of this unit requires onsite investigation and evaluation.

Capability subclass: not assigned.

WaA—Walpole fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and poorly drained and somewhat poorly drained. It is in low lying areas that are near or adjacent to streams and rivers. Areas of this soil are irregular in shape and range from 4 to 50 acres. Most are about 25 acres.

Typically, a 3-inch-thick layer of organic material covers the surface layer. The surface layer is dark grayish brown, mottled fine sandy loam about 5 inches thick. The subsoil is brown, mottled sandy loam about 14 inches thick. The upper 4 inches of the substratum is grayish brown, mottled sand. The lower part, to a depth of 60 inches or more, is grayish brown gravelly coarse sand.

Included with this soil in mapping are areas of Pipestone, Scarboro, Sudbury, and Wareham soils. Also included are areas of soils that are very fine sandy loam or silt loam throughout. In a few places the lower part of the subsoil consists of firm fine sand or very fine sand. Included areas make up about 30 percent of the unit.

The permeability of this Walpole soil is moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. Available water capacity is moderate. Root growth is restricted by a seasonal high water table that is at or near the surface in winter and spring. The surface layer of the soil is friable and is easily tilled under proper moisture conditions.

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

This soil is suited to cultivated crops. The seasonal high water table is the main limitation. A system of open drains or tile drains or a combination of the two helps to drain the soil. Minimum tillage and returning crop residue to the soil help to maintain tilth and the organic matter content.

The soil is suited to hay and pasture, especially to water-tolerant plants. Drainage is generally needed. Use of proper stocking rates, deferred grazing, pasture rotation, and restricted grazing when the soil is wet help to maintain plant densities and desirable plant species.

The seasonal high water table makes the soil poorly suited to trees. It causes a high rate of seedling mortality and restricts the rooting depth, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The rapid permeability in the substratum causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capabilty subclass: IIIw.

WcA—Wareham loamy sand, 0 to 3 percent slopes. This soil is nearly level, deep, and poorly drained and somewhat poorly drained. It is in depressions. Areas of this soil are irregular in shape and range from 5 to 40 acres. Most are 10 acres.

Typically, the surface layer is very dark gray loamy sand about 9 inches thick. The subsoil is light olive brown, mottled loamy sand 6 inches thick. The substratum is grayish brown, mottled sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Deerfield, Scarboro, and Pipestone soils. Some areas have a surface layer of fine sandy loam. Included areas make up about 20 percent of the unit.

The permeability of this Wareham soil is rapid, and available water capacity is low. The rooting zone of plants is restricted by a seasonal high water table that is at or near the surface in winter and spring.

Most areas of this soil are in woodland, and some areas are used for farming.

Areas of this soil that have been adequately drained are suited to row crops. Surface drainage, open ditches, tile drains, or a combination of the three helps to remove excess water from the soil. The soil is droughty in some summers. Minimum tillage, using cover crops, and mixing crop residue and manure into the soil help to maintain and improve tilth and the organic matter content.

This soil is suited to hay and pasture, especially to water-tolerant plants. Drainage is generally needed. The main management concern is the prevention of both overgrazing and grazing when the soil is wet, which reduce the hardiness and density of plants.

The seasonal high water table makes the soil poorly suited to trees. It causes a high rate of seedling mortality and restricts the rooting depth, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The rapid permeability in the substratum causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IVw.

WgA—Whitman fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and very poorly drained. It is in depressions and in low-lying areas adjacent to drainageways. Areas of this soil are irregular in shape and range from 5 to 20 acres. Most are smaller than 10 acres.

Typically, the surface layer is very dark brown fine sandy loam about 8 inches thick. The substratum extends to a depth of 60 inches or more. It is gray fine sandy loam to a depth of 21 inches. At a depth of more than 21 inches, it is light olive gray, very firm, mottled fine sandy loam and silt loam.

Included with this soil in mapping are areas of soils that are very fine sandy loam, loamy sand, or loamy coarse sand throughout. Also included are small areas of Ridgebury and Scarboro soils that occupy similar positions on the landscape and a few areas where stones cover up to 3 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Whitman soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. A seasonal high water table is at or near the surface in the fall, winter, and spring and after periods of heavy rainfall. The surface layer of this soil is very friable and is easily tilled under proper moisture conditions. Root growth is impeded by the seasonal high water table and the very firm substratum.

Most areas of this soil are covered with brush and trees. Some areas have been drained and are used for

hay or pasture. A few areas have been drained and filled and are used for community development.

This soil is poorly suited to cultivated crops. The seasonal high water table is the main limitation. Surface drainage, diversions, tile drainage, or a combination of these practices helps to remove water from the soil. Minimum tillage and returning crop residue to the soil help to maintain tilth and organic matter content in cultivated areas.

The seasonal high water table makes the soil poorly suited to hay and pasture. Drainage and water-tolerant plants are needed. The main management concerns are the restriction of grazing when soil is wet and using proper stocking rates.

The seasonal high water table makes the soil poorly suited to trees. It causes a high rate of seedling mortality and restricts the rooting depth, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: Vw.

WhA—Whitman extremely stony fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and very poorly drained. It is in depressions and in low-lying areas adjacent to drainageways. Stones and boulders cover 3 to 15 percent of the surface. Areas of this soil are irregular in shape and range from 5 to 750 acres. Most are about 200 acres.

Typically, the upper layers of this soil consist of 1 inch of matted organic material over 5 inches of black muck. The next layer consists of gray fine sandy loam 15 inches thick. It is underlain by light olive gray, firm, mottled fine sandy loam and silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of soils that are fine sandy loam, very fine sandy loam, loamy sand, or loamy coarse sand throughout. Also included are areas of Ridgebury and Scarboro soils that occupy similar positions on the landscape and areas where stones and boulders cover more than 15 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Whitman soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. A seasonal high water table is at or near the surface in the fall, winter, and spring and after periods of heavy rainfall. The surface layer of this soil is very friable. Root growth is impeded by the seasonal high water table and the firm lower layers.

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

This soil is poorly suited to farming. The seasonal high water table is the main limitation. Stones and boulders on the surface limit the use of most types of equipment.

The seasonal high water table makes the soil poorly suited to trees. It causes a high rate of seedling mortality and restricts the rooting depth, making trees susceptible to uprooting during windy periods. Planting water-tolerant species helps to reduce the rate of seedling mortality, and establishing dense stands of trees reduces the hazard of uprooting. The wetness of the soil limits the use of timber harvesting equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The slow permeability in the substratum is an additional limitation for septic tanks.

Capability subclass: VIIs.

WnA—Windsor loamy sand, 0 to 3 percent slopes. This soil is nearly level, deep, and excessively drained. It is near or adjacent to streams and rivers. Areas of this soil are irregular in shape and range from 5 to 50 acres. Most are about 10 acres.

Typically, the surface and subsurface layers are dark grayish brown loamy sand and have a combined thickness of about 2 inches. The subsoil is yellowish brown and is 24 inches thick. The upper 10 inches of the subsoil is loamy sand, and the lower 14 inches is sand. The substratum is light brownish gray sand to a depth of 60 inches or more.

Included with this soil in mapping are areas where the upper 10 inches of the soil is fine sandy loam or sandy loam. Also included are areas of Agawam, Deerfield, and Hinckley soils and a few areas with slopes of 3 to 8 percent slopes. In some areas of the unit the subsoil and substratum are loamy coarse sand or coarse sand. Included areas make up about 20 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid, and available water capacity is low. The surface layer of this soil is very friable and easily tilled. Root growth is restricted to a depth of about 12 inches by loose sand.

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

This soil is suited to cultivated crops. Irrigation helps to overcome a drought limitation in the soil (fig. 14). The main management practices include using frequent applications of fertilizer, using cover crops, and incorporating crop residue and manure into the surface layer.

The soil is suited to hay and pasture, especially to drought-resistant plants. Using proper stocking rates and timely grazing helps to maintain pasture plant hardiness and density.

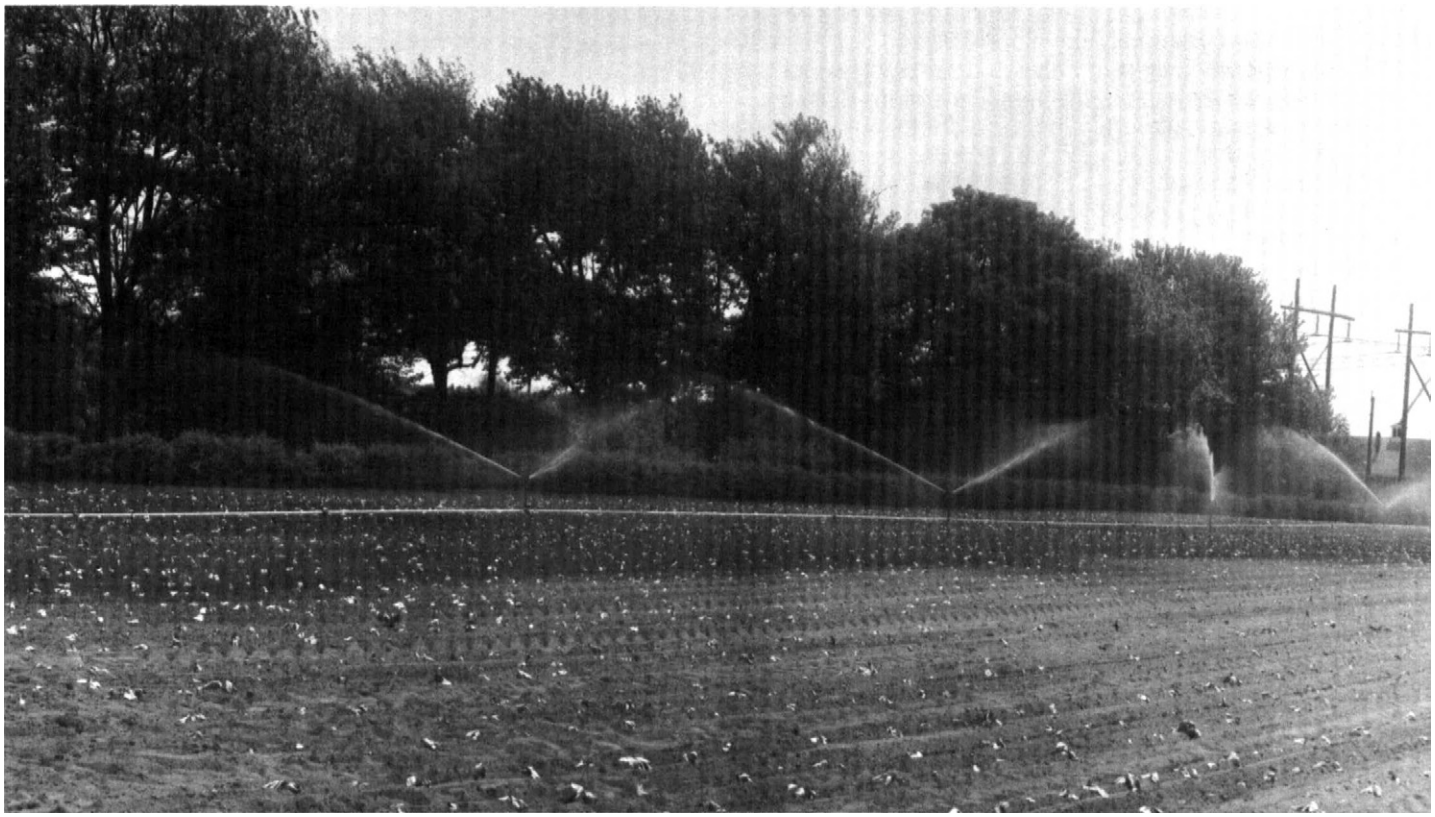


Figure 14.—Irrigation for truck crops on Windsor loamy sand, 0 to 3 percent slopes.

The soil is suited to trees, but droughtiness causes a high rate of seedling mortality and drought-resistant species are needed.

The rapid permeability is the main limitation of the soil for community development, especially as a site for septic tank absorption fields and sanitary landfills. The permeability causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IIIs.

WnB—Windsor loamy sand, 3 to 8 percent slopes. This soil is gently sloping, deep, and excessively drained. It is near or adjacent to streams and rivers. Areas of this soil are irregular in shape and range from 5 to 50 acres. Most are about 10 acres.

Typically, the surface and subsurface layers are dark grayish brown loamy sand and have a combined thickness of about 2 inches. The subsoil is yellowish brown and is 24 inches thick. The upper 10 inches of the subsoil is loamy sand, and the lower 14 inches is sand. The substratum is light brownish gray sand to a depth of 60 inches or more.

Included with this soil in mapping are areas where the upper 10 inches of the soil is fine sandy loam or sandy loam. Also included are areas of Agawam, Deerfield, and Hinckley soils and a few areas with slopes of 8 to 20 percent. In some areas of this unit the subsoil and substratum are loamy coarse sand or coarse sand. Included areas make up about 20 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid, and available water capacity is low. The surface layer of this soil is very friable and easily tilled. Root growth is restricted to a depth of about 12 inches by loose sand.

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

This soil is suited to cultivated crops. Droughtiness is the main limitation, and erosion is a hazard. The main management practices are using irrigation, using frequent applications of fertilizer, growing cover crops, and incorporating crop residue and manure into the surface layer.

The soil is suited to hay and pasture, especially to drought-resistant plants. Using proper stocking rates and timely grazing helps to maintain plant hardiness and density.

The soil is suited to trees, but droughtiness causes a high rate of seedling mortality and drought-resistant species are needed.

The rapid permeability of this soil is the main limitation for community development, especially for septic tank absorption fields and sanitary landfills. The permeability

causes a hazard of ground-water pollution in areas used for septic tanks or landfills.

Capability subclass: IIIs.

WnC—Windsor loamy sand, 8 to 20 percent slopes. This soil is moderately sloping and moderately steep, deep, and excessively drained. It is near or adjacent to streams and rivers. Areas of this soil are irregular in shape and range from 5 to 200 acres. Most are about 30 acres.

Typically, the surface and subsurface layers are dark grayish brown loamy sand and have a combined thickness of about 2 inches. The subsoil is yellowish brown and is 24 inches thick. The upper 10 inches of the subsoil is loamy sand, and the lower 14 inches is sand. The substratum is light brownish gray sand to a depth of 60 inches or more.

Included with this soil in mapping are areas where the upper 10 inches of the soil is fine sandy loam or sandy loam. Also included are areas of Agawam, Deerfield, and Hinckley soils. In some areas of this unit the subsoil is loamy coarse sand or coarse sand. Included areas make up about 20 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid, and available water capacity is low. The surface layer is very friable and is easily tilled. Root growth is restricted to a depth of about 12 inches by loose sand.

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

Slope and an erosion hazard make this soil poorly suited to cultivated crops. Droughtiness is a major limitation. The main management practices in cultivated areas include using irrigation, frequent applications of fertilizer, and cover crops and incorporating crop residue and manure into the surface layer.

This soil is suited to hay and pasture, especially to drought-resistant plants. Using proper stocking rates and timely grazing helps to maintain plant hardiness and density.

The soil is suited to trees, but droughtiness causes a high rate of seedling mortality and drought-resistant species are needed.

Slope and the rapid permeability are the main limitations of the soil for community development. The slope limits the soil as a building site, and the permeability causes a hazard of ground-water pollution in areas used for septic tank absorption fields or sanitary landfills.

Capability subclass: IVs.

WrA—Woodbridge fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, deep, and moderately well drained. It is on hilltops and at the base of long slopes. Areas of this soil are irregular in shape and range from 5 to 60 acres. Most are about 20 acres.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is brown fine sandy loam and mottled gravelly fine sandy loam 18 inches thick. The substratum is light brownish gray, very firm, mottled gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is gravelly loamy sand, gravelly loamy coarse sand, and gravelly coarse sandy loam. Also included are convex areas of Paxton soils and areas of Ridgebury soils in depressions and along drainageways. In a few areas stones and boulders cover up to 3 percent of the surface, and in a few others the surface layer and upper part of the subsoil are very fine sandy loam. A few areas have slopes of 3 to 8 percent. Included areas make up about 20 percent of the unit.

The permeability of this Woodbridge soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer of this soil is friable and is easily tilled under proper moisture conditions. After prolonged rains, a water table between the depths of 20 and 27 inches is perched above the substratum. Root growth is restricted to a depth of about 27 inches by the very firm substratum.

Most areas of this soil are used for farming. Some areas are in woodland, and the soil is well suited to trees. A few areas are used for homesites and other types of community development.

This soil is suited to row crops. A seasonal high water table is the main limitation. The main management practices include using drainage and cover crops and incorporating crop residue and manure into the surface layer.

The soil is well suited to hay and pasture. Use of proper stocking rates, deferred grazing, pasture rotation, and restricted grazing when the soil is wet help to maintain the hardiness and density of pasture plants and prevent surface compaction.

The seasonal perched water table is the main limitation of this soil for community development, especially as a building site and as a site for sanitary landfills and septic tank absorption fields. The slow permeability in the substratum also limits the soil for septic tanks.

Capability subclass: IIw.

WrB—Woodbridge fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is on the tops and sides of hills. Areas of this soil are irregular in shape and range from 5 to 60 acres. Most are about 30 acres.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is brown fine sandy loam and mottled gravelly fine sandy loam 18 inches thick. The substratum is light brownish gray, very firm, mottled gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is gravelly loamy sand, gravelly loamy coarse sand, and gravelly coarse sandy loam. Also included are convex areas of Paxton soils and areas of Ridgebury

soils in depressions and along drainageways. In a few areas stones and boulders cover up to 3 percent of the surface, and in a few others the surface layer and upper part of the subsoil are very fine sandy loam. A few areas have slopes of 0 to 3 percent. Included areas make up about 20 percent of the unit.

The permeability of this Woodbridge soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer of this soil is friable and is easily tilled under proper moisture conditions. After prolonged rains, a water table between the depths of 20 and 27 inches is perched above the substratum. Root growth is restricted to a depth of about 27 inches by the very firm substratum.

Most areas of this soil are used for farming (fig. 15). Some areas are in woodland, and the soil is well suited to trees. A few are used for homesites and other types of community development.

This soil is suited to row crops. A seasonal high water table is the main limitation, and erosion is a hazard. The main management practices include using drainage, using cover crops, and incorporating crop residue and manure into the surface layer.

The soil is well suited to hay and pasture. Use of proper stocking rates, deferred grazing, pasture rotation, and restricted grazing when the soil is wet help to maintain the hardiness and density of pasture plants and prevent surface compaction.

Figure 15.—Highbush blueberries on Woodbridge fine sandy loam, 3 to 8 percent slopes.

The seasonal perched water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow permeability in the substratum is also a limitation for septic tanks.

Capability subclass: IIw.

WsB—Woodbridge very stony fine sandy loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and moderately well drained. It is on the tops and sides of hills. Stones and boulders cover from less than 1 percent to 3 percent of the surface. Areas of this soil are irregular in shape and range from 5 to 200 acres. Most are about 100 acres.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is brown fine sandy loam and mottled gravelly fine sandy loam 18 inches thick. The substratum is light brownish gray, very firm, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is gravelly loamy sand, gravelly loamy coarse sand, or gravelly coarse sandy loam. Also included are convex areas of Paxton soils and areas of Ridgebury soils in depressions and along drainageways. In a few areas stones and boulders cover up to 12 percent of the surface, and a few others have slopes of more than 8 percent. Included areas make up about 20 percent of the unit.

The permeability of this Woodbridge soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer of this soil is friable and is easily tilled if the stones are removed. After prolonged rains, a water table between the depths of 20 and 27 inches is perched above the substratum. Root growth is restricted to a depth of about 27 inches by the very firm substratum.

Most areas of this soil are in woodland, and the soil is well suited to trees. Some areas are used for pasture. A few are used for homesites and other types of community development.

The stones and boulders on the surface limit the use of most types of equipment and make this soil poorly suited to row crops. A seasonal high water table is also a major limitation for crops.

The soil is suited to hay and pasture, but the limitations to the use of equipment make it difficult to seed and fertilize. Use of proper stocking rates, deferred grazing, pasture rotation, and restricted grazing when the soil is wet help to maintain the hardiness and density of pasture plants and prevent surface compaction.

The seasonal perched water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow

permeability in the substratum is also a limitation for septic tanks.

Capability subclass: VIs.

WtB—Woodbridge extremely stony fine sandy loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and moderately well drained. It is on the tops and sides of hills. Stones and boulders cover 3 to 15 percent of the surface. Areas of this soil are irregular in shape and range from 5 to 200 acres. Most are about 100 acres.

Typically, the surface layer is dark brown fine sandy loam about 4 inches thick. The subsoil is brown fine sandy loam and mottled gravelly fine sandy loam 23 inches thick. The substratum is light brownish gray, very firm, mottled gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas where the substratum is gravelly loamy sand, gravelly loamy coarse sand, or gravelly coarse sandy loam. Also included are convex areas of Paxton soils and areas of Ridgebury soils in depressions and along drainageways. In a few areas stones and boulders cover up to 25 percent of the surface, and a few others have slopes of more than 8 percent. Included areas make up about 20 percent of the unit.

The permeability of this Woodbridge soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate. The surface layer of this soil is friable. After prolonged rains, a water table between the depths of 20 and 27 inches is perched above the substratum. Root growth is restricted to a depth of about 27 inches by the very firm substratum.

Most areas of this soil are in woodland. Some areas are used for pasture. A few areas are used for homesites and other types of community development.

The stones and boulders on the surface limit the use of most types of equipment and make this soil poorly suited to farming. A seasonal high water table is also a major limitation. The soil is suited to trees, but the stones and boulders also limit the use of timber equipment.

The seasonal perched water table is the main limitation of the soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow permeability in the substratum is also a limitation for septic tanks.

Capability subclass: VIIs.

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 20,000 acres used for crops and pasture (*6*). An estimated 75 percent of this acreage is used for hay and pasture; 20 percent for row crops, mainly silage corn; and 5 percent for orchards, vegetables, nursery plants, and cranberries. The acreage in crops and pasture has steadily declined, mostly because of urban pressure from Boston, Providence, Fall River, and New Bedford.

Erosion is a major concern on much of the cropland and pastures in the survey area, especially in areas where the slope exceeds 3 percent. Many Paxton soils, for example, have slopes of more than 3 percent and are erodible.

Erosion is especially damaging on soils that have a restrictive layer in or below the subsoil that limits the depth of the root zone for crops. Examples of soils that have such a layer, called a fragipan, are the Paxton and Woodbridge soils.

Erosion of soil also results in sediment entering streams, which causes lower water quality for municipal use, for recreation, and for fish and wildlife.

Erosion-control practices should provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps plant cover on the soil for extended periods, for example, can hold erosion loss to an amount that will not reduce the productive capacity of the soil. On livestock farms, which require pasture and hayland, the legume and grass forage crops in the cropping system reduce erosion on sloping land and provide nitrogen and improved tilth for the following crop (fig. 16).

Some other practices that help to control erosion are terracing, stripcropping, and minimum tillage. Field terraces and diversion terraces effectively control erosion, but many parts of the survey area have short and irregular slopes that are not suited to terraces. Stripcropping, a system in which alternate strips of row crops and close-growing crops are planted across the slope, is best suited to soils with long, uniform slopes.

Minimum tillage or no-till farming of crops that are normally intertilled can be used on fields that are not

Figure 16.—Hayfield on a drained area of Ridgebury fine sandy loam, 3 to 8 percent slopes.

suited to other practices and on most soils in the survey area.

A *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. Examples of such soils are Scarboro, Whitman, Freetown, and Swansea soils, all of which are very poorly drained.

Poorly drained soils, such as Ridgebury and Walpole soils, are too wet for good crop production during most years. Random tile drainage, drainage ditches, and the use of moisture-tolerant crops are effective measures for farming these soils.

Moderately well drained soils cannot be tilled or worked until late spring or early summer and are not well suited to early-season crops. Examples of such soils are Woodbridge, Pittstown, Sudbury, and Deerfield soils.

Natural fertility is low in the soils of the survey area, and the soils are naturally strongly acid or very strongly acid. They require applications of lime to raise the pH level sufficiently for crops that are best suited to slightly acid or nearly neutral soils.

Tilth is important for the germination of seeds and for the infiltration of water into the soil. Soils that have good tilth are granular and porous. Many of the soils used for crops in the survey area are light in color and low in organic matter content. Generally, the surface layer of these soils is granular and has good tilth. Regular additions of crop residue help to maintain tilth and permeability to water.

Special crops grown commercially in the survey area are cranberries, vegetables, and nursery plants. Cranberries are grown only on very poorly drained, organic soils. The most common vegetables grown are squash, sweet corn, tomatoes, snap beans, and lettuce (fig. 17). Deep, friable soils that have good natural drainage are especially well suited to vegetables and nursery crops. The Agawam soils are suitable for vegetables and nursery crops; the Hinckley, Merrimac, and Windsor soils that have slopes of less than 8 percent are also suitable if irrigation is provided.

Figure 17.—Lettuce on an area of Paxton fine sandy loam, 3 to 8 percent slopes.

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.

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.

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 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 slight 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

In 1968 the survey area had about 100,000 acres of woodland (*6*) which consisted of stands that had been cut over two, three, or four times (fig. 18). The dominant forest cover is northern hardwoods, mainly upland oaks and red maple.

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; *s*, sandy texture; 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, s, 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 a few trees may be blown down by

Figure 18.—A stand of white pine on Paxton fine sandy loam, 3 to 8 percent slopes.

normal 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 50 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

Richard Turner, wildlife biologist for the Massachusetts Divison of Fisheries and Wildlife, and Robert W. Franzen, biologist for the Soil Conservation Service, assisted in preparing this section.

The Massachusetts Division of Fisheries and Wildlife and the Massachusetts Division of Forests and Parks both own and manage wildlife habitat in the survey area. The forest cover on these properties consists of upland hardwoods, primarily oaks, and of wooded swamps dominated by red maple. The main wildlife species in these areas are white-tailed deer, ruffed grouse, and fox.

White-tailed deer is the only large game animal in the southern part of Bristol County. The types of small game include ring-necked pheasant, bobwhite quail, ruffed grouse, woodcock, opossum, gray squirrel, cottontail rabbit, and red and gray foxes. The ponds, streams, and marshes provide habitat for native black ducks, mallards, and wood ducks and many other species of migratory waterfowl. Muskrat, otter, mink, and raccoons live in or around the wetland areas.

The main fresh water game fish are brook trout, brown trout, rainbow trout, largemouth bass, and chain pickerel. Flounder, bluefish, and striped bass are the major saltwater species.

Wildlife species that have recently expanded their range into this area include the cardinal, tufted titmouse, mockingbird, and opossum.

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 (*1*). 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, rye, oats, and buckwheat.

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, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, dandelion, pokeweed, ragweed, and deertongue.

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 oak, aspen, cherry, ash, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are honeysuckle, autumn-olive, and crabapple.

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

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, arrowhead, cattail, arrowarum, cordgrass, rushes, sedges, and phragmites.

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, hay, 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 bobwhite quail, pheasant, meadowlark, field sparrow, killdeer, cottontail, woodchuck, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

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

engineering

William P. Annable, conservation engineer, Soil Conservation Service, assisted in preparing 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 effectively filter the effluent. 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 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, irrigation, terraces and diversions, and grassed waterways.

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

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.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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 a soil contains particles coarser than sand, 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 (*3*) and the system adopted by the American Association of State Highway and Transportation Officials (*2*).

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 oven-dry 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.

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.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils 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.

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 and water in swamps and marshes are not considered flooding.

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 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.

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 (*5*). 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. In table 17, the soils of the survey area are classified according to the system. 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 (*Frag*, meaning brittle horizon, 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 (*4*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*5*). 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."

Agawam series

The Agawam series consists of deep, well drained soils on glacial outwash plains. The soils formed in windblown deposits over material derived mainly from schist, granite, and gneiss. Slopes range from 0 to 8 percent.

Agawam soils are similar to Windsor soils and in many places are near Merrimac and Ninigret soils. Agawam soils have more silt and clay in the solum than the Windsor soils and have less gravel between the surface and a depth of 40 inches than the Merrimac soils. Agawam soils do not have the mottles of the Ninigret soils and are at a higher position on the landscape.

Typical pedon of Agawam fine sandy loam, 0 to 3 percent slopes, in a wooded area 1/2 mile northwest of the intersection of Pleasant Street, Vinnicum Road, Reed Road, and Locust Street; and 600 feet south:

O1—2 inches to 1 inch; loose and matted leaves.
O2—1 inch to 0; black (10YR 2/1) decomposed organic matter.
A1—0 to 1 inch; black (10YR 2/1) fine sandy loam; moderate fine and medium granular structure; very friable; many medium roots; strongly acid; abrupt wavy boundary.
B21h—1 to 3 inches; dark brown (7.5YR 4/4) fine sandy loam; massive; very friable; common medium roots; strongly acid; abrupt wavy boundary.
B22—3 to 9 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; very friable; common medium roots; strongly acid; clear wavy boundary.
B23—9 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; very friable; common coarse roots; strongly acid; gradual wavy boundary.
IIC1—18 to 28 inches; light olive brown (2.5Y 5/4) loamy fine sand; massive; very friable; few medium roots; strongly acid; abrupt wavy boundary.
IIC2—28 to 33 inches; light olive brown (2.5Y 5/4) sand; single grain; loose; few medium roots; 15 percent gravel; strongly acid; abrupt wavy boundary.
IIC3—33 to 41 inches; light yellowish brown (2.5Y 6/4) sand; single grain; loose; 10 percent gravel; strongly acid; abrupt wavy boundary.
IIC4—41 to 60 inches; light olive brown (2.5Y 5/4) gravelly sand; single grain; loose; 35 percent gravel; strongly acid.

The solum ranges from 15 to 35 inches in thickness. Coarse fragments make up 0 to 5 percent, by volume, of the A horizon; 0 to 10 percent of the B horizon; 0 to 10 percent of the part of the C horizon above a depth of 40 inches; and 0 to 40 percent of the part of the C horizon below a depth of 40 inches. Reaction of the soil in unlimed areas is strongly or medium acid.

The A1 horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. Some pedons have an Ap horizon that has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The A horizon is fine sandy loam or very fine sandy loam. The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 3 to 8. It is fine sandy loam or very fine sandy loam. The lower part has a hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8.

The IIC horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 2 to 4. It is loamy fine sand, loamy sand, sand or their gravelly analogs. In some pedons it is very gravelly below a depth of 40 inches.

Charlton series

The Charlton series consists of deep, well drained soils on uplands. The soils formed in glacial till derived mainly from granitic and gneissic materials. Slopes range from 3 to 35 percent.

Charlton soils are similar to Paxton, Woodbridge, and Gloucester soils. The Charlton soils do not have the very firm substratum typical of the Paxton and Woodbridge soils and do not have the mottling of the Woodbridge soils. The Charlton soils do not have as much gravel and sand as the Gloucester soils.

Typical pedon of Charlton fine sandy loam, in a wooded area of Charlton-Paxton fine sandy loams, rocky, 3 to 8 percent slopes, 200 feet east of Washburn Road and 200 feet south of the Bristol County-Plymouth County boundary:

O1—3 inches to 1 inch; loose leaves over matted leaves, pine needles, and twigs.
O2—1 inch to 0; black (10YR 2/1) decomposed organic material.
A1—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; 5 percent coarse fragments; very strongly acid; abrupt wavy boundary.
B21—2 to 15 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; many fine and medium roots; 5 percent coarse fragments; strongly acid; clear wavy boundary.
B22—15 to 23 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak medium subangular blocky structure; very friable; few medium and fine roots; 5 percent coarse fragments; strongly acid; clear wavy boundary.
C—23 to 60 inches; pale olive (5Y 6/3) sandy loam; massive; friable; 10 percent coarse fragments; medium acid.

The thickness of the solum ranges from 20 to 36 inches. The depth to bedrock is commonly more than 6 feet. The coarse fragment content ranges from 5 to 35 percent throughout the soil. The soil ranges from very strongly acid through medium acid in unlimed areas.

The A 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 B21 horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 6. The B22 horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 4 through 6. The B horizon is fine sandy loam, sandy loam, or very fine sandy loam. It has weak subangular blocky or granular structure, or the horizon is massive. It is very friable or friable.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. It is sandy loam or fine sandy loam or their gravelly analogs. It is very friable through firm.

Deerfield series

The Deerfield series consists of deep, moderately well drained soils on the lower parts of glacial outwash plains. The soils formed in glacial outwash derived mainly from granite, gneiss, and quartzite. Slopes range from 0 to 5 percent.

The Deerfield soils formed in material similar to that in which the Windsor, Wareham, and Pipestone soils formed. Deerfield soils are also associated with Hinckley soils. Deerfield soils are mottled in the lower part of the subsoil, but the Windsor and Hinckley soils do not have mottles and the Wareham and Pipestone soils are mottled throughout the subsoil.

Typical pedon of Deerfield loamy sand, 0 to 5 percent slopes, 150 feet north of Route 6 and 400 feet east of the Rehoboth town line:

Ap—0 to 7 inches; dark brown (10YR 3/3) loamy sand; massive; very friable; few medium roots; slightly acid; abrupt smooth boundary.

B21—7 to 15 inches; yellowish brown (10YR 5/6) loamy sand; massive; very friable; few fine roots; medium acid; clear wavy boundary.

B22—15 to 23 inches; yellowish brown (10YR 5/4) sand; few medium prominent red (2.5YR 5/8) mottles and common medium distinct grayish brown (2.5Y 5/2) mottles; single grain; loose; medium acid; clear wavy boundary.

C—23 to 60 inches; gray (5Y 6/1) sand; common coarse light reddish brown (2.5YR 6/4) mottles; single grain; loose; slightly acid.

The solum ranges from 15 to 35 inches in depth. Coarse fragments make up 0 to 15 percent of the solum and 0 to 20 percent of the substratum. Mottles are between depths of 15 and 40 inches. Unless limed, the soil ranges from very strongly acid through slightly acid.

The Ap horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It ranges from fine sandy loam to loamy sand.

The B horizon has hue of 7.5YR to 2.5Y, value of 3 through 6, and chroma of 2 through 6. Within 10 inches of the surface, it ranges from fine sandy loam to loamy sand. Below a depth of 10 inches, it ranges from loamy fine sand to coarse sand.

The C horizon has hue of 10YR to 5Y, value of 4 through 6, and chroma of 1 through 4. It ranges from fine sand to coarse sand. In some pedons the C horizon is not mottled below a depth of 40 inches.

Freetown series

The Freetown series consists of deep, very poorly drained soils on uplands and outwash plains. The soils formed in thick deposits of organic material. Slopes are less than 1 percent.

Freetown soils are similar to Swansea soils and in many places are near Scarboro and Whitman soils. The Freetown soils formed in organic deposits that are 51 inches thick or more, and the Swansea soils formed in organic deposits that are 16 to 51 inches thick. The Freetown soils are organic soils, and the Whitman and Scarboro soils are mostly mineral soils that have an organic surface layer less than 6 inches thick.

Typical pedon of Freetown muck, in a wooded area 0.7 mile north of Braley Road, 100 feet east of Route 140:

Oe—0 to 2 inches; dark reddish brown (5YR 3/2) broken face mucky peat (hemic material); dark reddish brown (5YR 2/2) rubbed; 75 percent fiber, 35 percent rubbed; moderate medium platy structure; very friable; common medium roots; herbaceous and woody fiber; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa1—2 to 5 inches; black (N 2/0) broken face and rubbed muck (sapric material); 5 percent fiber, 3 percent rubbed; weak fine granular structure; very friable; common medium roots; herbaceous fiber; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa2—5 to 20 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); 10 percent fiber, 3 percent rubbed; massive; very friable; few fine roots; 2 percent brown (7.5YR 5/4) woody fragments 1 to 10 centimeters in diameter; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa3—20 to 30 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); 20 percent fiber, 5 percent rubbed; massive; very friable; 5 percent brown (7.5YR 5/4) woody fragments 1 to 10 centimeters in diameter; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa4—30 to 44 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); 20 percent fiber, 3 percent rubbed; massive; very friable; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa5—44 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 is 51 inches thick or more. In many places it is more than 6 feet thick. Woody fragments are in some part of the profile in some pedons and throughout the profile in other pedons.

The surface tier is neutral or has hue of 5YR to 10YR, value of 2 or 3, and chroma of 0 through 2. It is dominantly sapric material; however, in some pedons it has various proportions of sapric and hemic material. It has weak or moderate, fine or medium, granular or subangular blocky structure, or has moderate medium platy structure, or is massive. In some pedons the upper 4 to 10 inches of the surface tier is sand or coarse sand, is single grain, and is loose.

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. The subsurface tier is dominated by sapric material with a rubbed fiber content of less than 16 percent of the organic volume. It has granular, subangular blocky, or platy structure, or it is massive. It is very friable or friable.

The bottom tier is neutral or has hue of 5YR to 10YR, value of 2 to 4, and chroma of 0 through 4. It is typically massive, but some pedons have platy or subangular blocky structure. It is very friable or friable.

Gloucester series

The Gloucester series consists of deep, somewhat excessively drained soils on uplands. The soils formed in glacial till derived mainly from granite and gneiss. Slopes range from 3 to 15 percent.

The Gloucester soils are similar to Hinckley and Merrimac soils and are near or intermingled with these soils and with Paxton and Woodbridge soils. Gloucester soils have more silt and clay in the subsoil than the Hinckley soils, more gravel in the profile than the Merrimac soils, and more sand and gravel than the Paxton or Woodbridge soils. Gloucester soils do not have the fragipan typical of the Paxton and Woodbridge soils.

Typical pedon of Gloucester fine sandy loam, in an area of Gloucester-Hinckley complex, very stony, undulating, on the west bank of Copicut Road, 200 feet south of Indian Town Road:

A1—0 to 2 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; very friable; few medium and fine roots; 5 percent coarse fragments; very strongly acid; abrupt wavy boundary.

B21—2 to 11 inches; strong brown (7.5YR 5/8) gravelly fine sandy loam; weak medium granular structure; very friable; common medium and fine roots; 45 percent coarse fragments; strongly acid; gradual wavy boundary.

B22—11 to 18 inches; yellowish brown (10YR 5/6) gravelly sandy loam; massive; very friable; common fine and medium roots; 45 percent coarse fragments; strongly acid; gradual wavy boundary.

B23—18 to 23 inches; yellowish brown (10YR 5/6) very gravelly loamy sand; single grain; loose; few fine roots; 50 percent coarse fragments; strongly acid; clear wavy boundary.

C—23 to 60 inches; olive (5Y 5/3) very gravelly loamy coarse sand; single grain; loose; 60 percent coarse fragments; strongly acid.

The solum thickness ranges from 20 to 36 inches. Coarse fragments make up 5 to 35 percent of the A horizon, 20 to 65 percent of the B horizon, and 35 to 65 percent of the C horizon. The soil ranges from medium acid to extremely acid except where limed. The volume of stones ranges from 0 to 15 percent throughout the profile.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is coarse sandy loam, sandy loam, fine sandy loam, or their gravelly analogs.

The B21 and B22 horizons have hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 8. They are fine sandy loam, sandy loam, coarse sandy loam, or their gravelly analogs. The B23 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 6. It is gravelly or very gravelly loamy fine sand, loamy sand, or loamy coarse sand.

The C horizon has hue of 10YR to 5Y, value of 4 through 6, and chroma of 1 through 4.

Hinckley series

The Hinckley series consists of deep, excessively drained soils on glacial outwash plains, kames, and eskers. The soils formed in glacial outwash material derived mainly from granite and gneiss. Slopes range from 0 to 25 percent.

Hinckley soils are similar to Merrimac soils and in many places are near Windsor, Wareham, Scarboro, and Freetown soils. Hinckley soils have less silt and clay and more gravel in the solum than do the Merrimac soils. Hinckley soils have more gravel in the solum and substratum than the Windsor soils. They do not have the mottles typical of the Wareham and Scarboro soils. Hinckley soils formed in mineral material, and Freetown soils formed in organic material.

Typical pedon of Hinckley gravelly fine sandy loam, 3 to 8 percent slopes, on the north side of a gravel pit in Dartmouth, 500 feet east of Reed Road and 1,200 feet north of the railroad tracks:

Ap—0 to 6 inches; dark brown (10YR 3/3) gravelly fine sandy loam; weak fine granular structure; very friable; many fine roots; 20 percent gravel; very strongly acid; clear wavy boundary.

B2—6 to 9 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; weak fine granular structure; very friable; many fine roots; 25 percent gravel; very strongly acid; clear wavy boundary.

IIB3—9 to 20 inches; light olive brown (2.5Y 5/4) gravelly loamy coarse sand; single grain; loose; few fine roots; 40 percent gravel, 10 percent cobblestones; strongly acid; gradual wavy boundary.

IIC—20 to 60 inches; light olive brown (2.5Y 5/4) very gravelly coarse sand; single grain; loose; few fine roots in upper 4 inches; 50 percent gravel, 15 percent cobblestones; strongly acid.

The solum ranges from 12 to 30 inches in thickness. Reaction of the soil in unlimed areas ranges from extremely acid to medium acid. The content of gravel and cobblestones in the solum ranges from 10 to 50 percent and in the substratum from 35 to 70 percent.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It ranges from fine sandy loam to loamy coarse sand or their gravelly analogs.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. It ranges from fine sandy loam to loamy coarse sand or their gravelly analogs. The lower part of the B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 4 through 8. It ranges from loamy fine sand to loamy coarse sand or their gravelly analogs.

The C horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 2 through 8. It ranges from gravelly or very gravelly loamy fine sand to gravelly or very gravelly coarse sand.

Ipswich series

The Ipswich series consists of deep, very poorly drained soils on tidal marshes. The soils formed in thick deposits of organic material. Slopes are less than 1 percent.

Ipswich soils are similar to and formed in the same kind of material as the Pawcatuck soils. The Ipswich soils consist of organic deposits over 51 inches thick; the organic deposits in the Pawcatuck soils are 16 to 51 inches thick and are over mineral material.

Typical pedon of Ipswich peat, in an area of Pawcatuck and Ipswich peats, 1,000 feet north of Potomska Road and 50 feet west of Little River:

Oi1—0 to 5 inches; dark grayish brown (10YR 4/2) peat; 90 percent fiber, 60 percent rubbed; weak fine granular structure; very friable, many medium and coarse roots; herbaceous fibers; 5 percent silt; mildly alkaline; abrupt smooth boundary.

Oi2—5 to 7 inches; dark grayish brown (2.5Y 4/2) peat; 80 percent fiber, 65 percent rubbed; massive; very friable; many medium and coarse roots; herbaceous fibers; 10 percent silt; mildly alkaline; clear smooth boundary.

Oi3—7 to 14 inches; dark grayish brown (10YR 4/2) peat; 80 percent fiber, 40 percent rubbed; massive; very friable; 10 percent silt; mildly alkaline; clear smooth boundary.

Oe1—14 to 22 inches; dark grayish brown (10YR 4/2) mucky peat; 65 percent fiber; 25 percent rubbed; massive; very friable; 30 percent silt; mildly alkaline; clear smooth boundary.

Oa—22 to 26 inches; very dark grayish brown (2.5Y 3/2) muck; 40 percent fiber, 15 percent rubbed; massive; very friable; 60 percent silt; mildly alkaline; clear smooth boundary.

Oe2—26 to 60 inches; dark olive gray (5Y 3/2) mucky peat; 30 percent fiber, 25 percent rubbed; massive; very friable; 60 percent silt; mildly alkaline.

The thickness of the organic deposits is more than 51 inches. Reaction ranges from slightly acid to mildly alkaline.

The surface tier is neutral or has hue of 10YR to 5Y, value of 2 through 4, and chroma of 0 through 3. The fiber content is 45 to 90 percent; the rubbed fiber content is 40 to 65 percent. The mineral content is 5 to 50 percent.

The subsurface tier is neutral or has hue of 10YR or 5Y, value of 2 through 4, and chroma of 0 through 3. The fiber content is 30 to 85 percent; the rubbed fiber content is mainly 20 to 40 percent, but layers up to 10 inches thick are 10 to 60 percent rubbed fiber. The mineral content is 10 to 60 percent.

The bottom tier is neutral or has hue of 2.5Y or 5Y, value of 2 through 4, and chroma of 0 through 3. The fiber content is 30 to 70 percent; the rubbed fiber content is 10 to 40 percent. The mineral content ranges from 25 to 75 percent.

Merrimac series

The Merrimac series consists of deep, somewhat excessively drained soils on glacial outwash plains. The soils formed in glacial outwash material derived mainly from granite and gneiss. Slopes range from 0 to 8 percent.

Merrimac soils are similar to the Sudbury and Hinckley soils and in many places are near the Agawam, Freetown, and Swansea soils. Merrimac soils have less gravel and more silt and clay in the solum than the Hinckley soils, do not have the mottling of the Sudbury soils, and have more gravel in the solum than the Agawam soils. Merrimac soils formed in mineral material and are at higher elevations than the Freetown or Swansea soils, both of which formed in organic material.

Typical pedon of Merrimac fine sandy loam, 0 to 3 percent slopes, adjacent to a gravel pit in the town of Westport, 900 feet west of Cadman Neck Road, 1,400 feet south of Hix Bridge Road:

Ap—0 to 11 inches; dark brown (7.5YR 4/2) fine sandy loam; moderate fine and medium granular structure; very friable; many medium and coarse roots; 15 percent coarse fragments; very strongly acid; abrupt wavy boundary.

B21—11 to 14 inches; yellowish brown (10YR 5/4) gravelly sandy loam; massive; very friable; common medium and coarse roots; 20 percent gravel; very strongly acid; clear wavy boundary.

B22—14 to 19 inches; yellowish brown (10YR 5/4) gravelly coarse sandy loam; massive; very friable; common medium and coarse roots; 30 percent gravel; very strongly acid; clear wavy boundary.

B23—19 to 23 inches; yellowish brown (10YR 5/6) gravelly loamy coarse sand; massive; very friable; common medium roots; 30 percent gravel; strongly acid; abrupt wavy boundary.

IIC—23 to 60 inches; pale brown (10YR 6/3) gravelly coarse sand; single grain; loose; few medium roots at top; 35 percent gravel; 5 percent cobblestones; strongly acid.

The solum ranges from 18 to 30 inches in thickness and typically corresponds with the depth to the stratified sand and gravel. The gravel content ranges from 10 to 20 percent in the upper part of the solum and from 10 to 30 percent in the lower part. In the IIC horizon the gravel content ranges from 35 to 55 percent and the content of cobblestones from 5 to 15 percent. Reaction of the soil in unlimed areas is very strongly or strongly acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. The A1 horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. 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 3 through 6, and chroma of 3 through 8. It is sandy loam or fine sandy loam or their gravelly analogs. Structure is granular, or the horizon is massive. The lower part of the B horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 3 through 8. It is single grain or massive. It is gravelly loamy coarse sand, gravelly loamy sand, gravelly coarse sandy loam, or gravelly sandy loam.

The IIC horizon has hue of 10YR to 5Y, value of 3 through 7, and chroma of 2 through 6. It is gravelly sand, very gravelly sand, gravelly coarse sand, or very gravelly coarse sand.

Newport series

The Newport series consists of deep, well drained soils on upland hills and ridges. The soils formed in compact glacial till derived mainly from conglomerate and phyllite. Slopes range from 3 to 15 percent.

Newport soils are similar to Paxton soils and are near Pittstown and Ridgebury soils. Newport soils have a different lithology and finer texture than the Paxton soils. Newport soils are not mottled as the Pittstown or Ridgebury soils.

Typical pedon of Newport loam, 3 to 8 percent slopes, in the middle of a cultivated field on the north side of Route 105, 1,200 feet east of Brayton Point Road:

Ap—0 to 9 inches; very dark grayish brown (2.5Y 3/2) loam; weak fine granular structure; very friable; many fine roots; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

B21—9 to 21 inches; olive (5Y 5/4) loam; weak fine granular structure; very friable; common fine roots; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B22—21 to 28 inches; olive gray (5Y 4/2) loam; massive; friable; few fine roots; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.

Cx—28 to 60 inches; olive gray (5Y 4/2) channery loam; weak thick platy structure; very firm; 25 percent coarse fragments; very strongly acid.

Thickness of the solum ranges from 20 to 38 inches and corresponds to the depth to the substratum. The content of coarse fragments ranges from 5 to 30 percent in the solum and from 10 to 35 percent in the substratum. Unless limed, the soil is very strongly acid through medium acid.

The A horizon has hue of 10YR or 2.5Y, value of 2 through 4, and chroma of 1 through 3. It is silt loam, loam, very fine sandy loam, or fine sandy loam.

The B21 horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 2 through 4. Structure is granular subangular blocky, or the horizon is massive. The B22 horizon has hue of 2.5Y or 5Y, value of 3 through 5, and chroma of 2 through 4. Structure is subangular blocky, or the horizon is massive. The B horizon is silt loam, loam, very fine sandy loam, or fine sandy loam.

The C horizon has hue of 2.5Y or 5Y, value of 2 through 5, and chroma of 1 through 3. It is silt loam, loam, very fine sandy loam, and fine sandy loam or their channery analogs. Structure is thin to thick platy, or the horizon is massive. The horizon is firm or very firm.

Ninigret series

The Ninigret series consists of deep, moderately well drained soils on outwash plains. The soils formed in glacial outwash material derived mainly from granite and gneiss. Slopes range from 0 to 3 percent.

Ninigret soils are similar to Agawam soils and in many places are near Walpole soils. Ninigret soils are mottled in the lower part of the subsoil and in the substratum; the Agawam soils are not mottled, and the Walpole soils are mottled throughout the subsoil and substratum.

Typical pedon of Ninigret fine sandy loam, 0 to 3 percent slopes, in a wooded area 100 feet north of Howland Road, about 500 feet west of the Lakeville town line:

O1—3 inches to 0; litter of pine needles and twigs.

Ap—0 to 9 inches; dark yellowish brown (10YR 3/4) fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; very strongly acid; abrupt wavy boundary.

B21—9 to 16 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; very friable; many coarse and medium roots; very strongly acid; clear smooth boundary.

B22—16 to 26 inches; light olive brown (2.5Y 5/4) fine sandy loam; common medium distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; massive; very friable; many medium roots; 5 percent gravel; very strongly acid; clear smooth boundary.

IIC—26 to 60 inches; grayish brown (2.5Y 5/2) sand; common medium distinct strong brown (7.5YR 5/8) mottles; single grain; loose; few medium roots; 10 percent gravel; very strongly acid.

The solum ranges from 18 to 34 inches in thickness and corresponds to the depth to the sandy substratum. The content of coarse fragments ranges from 0 to 10 percent in the solum, from 0 to 20 percent in the substratum to a depth of 40 inches, and from 0 to 60 percent at a depth of more than 40 inches. The soil is medium acid to very strongly acid throughout in unlimed areas.

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 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 6. The B22 horizon has hue of 10YR to 5Y, value of 4 through 6, and chroma of 2 through 6, and it is mottled. The B horizon is very fine sandy loam or fine sandy loam.

The IIC horizon has a hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 6, and it is mottled. It ranges from loamy fine sand to sand. It is massive or single grain and is very friable or loose.

Pawcatuck series

The Pawcatuck series consists of deep, very poorly drained soils in tidal marshes. The soils formed in deposits of organic material 16 to 51 inches thick. The organic deposits are underlain by sandy mineral material. Slopes are less than 1 percent.

Pawcatuck soils are similar to the Ipswich soils, which also formed in tidal marshes. The organic material in the Pawcatuck soils is 16 to 51 inches thick, but the organic material in the Ipswich soils is more than 51 inches thick.

Typical pedon of Pawcatuck peat, in an area of Pawcatuck and Ipswich peats, 1,000 feet north of Route 88 and 300 feet west of the road along the edge of the tidal marsh in the town of Westport:

Oi1—0 to 4 inches; dark grayish brown (10YR 4/2) peat; 90 percent fiber, 80 percent rubbed; weak fine granular structure; very friable; dense mat of roots; herbaceous fibers; 10 percent silt; mildly alkaline; abrupt smooth boundary.

Oi2—4 to 6 inches; very dark grayish brown (10YR 3/2) peat; 75 percent fiber, 60 percent rubbed; massive; very friable; herbaceous fibers; 20 percent silt; mildly alkaline; abrupt smooth boundary.

Oe1—6 to 16 inches; dark grayish brown (10YR 4/2) mucky peat; 65 percent fiber, 35 percent rubbed; massive; very friable; herbaceous fibers; 30 percent silt; neutral; clear smooth boundary.

Oe2—16 to 31 inches; very dark grayish brown (10YR 3/2) mucky peat; 65 percent fiber, 35 percent rubbed; massive; very friable; 30 percent silt; neutral; abrupt smooth boundary.

IIC—31 to 60 inches; gray (5Y 5/1) sand; single grain; loose; medium acid.

The thickness of the organic layers and depth to the underlying mineral material range from 16 to 51 inches. Reaction ranges from medium acid to mildly alkaline.

The surface tier is neutral or has hue of 10YR to 5Y, value of 2 through 4, and chroma of 0 through 2. The organic matter content ranges from 20 to 95 percent.

The subsurface and bottom tiers are neutral or have hue of 10YR to 5Y, value of 2 through 5, and chroma of 0 through 3. The organic matter content of the O horizons ranges from 20 to 70 percent.

The texture of the IIC horizon is sand or loamy sand.

Paxton series

The Paxton series consists of deep, well drained soils on uplands. The soils formed in compact glacial till derived mainly from granitic and gneissic material. Slopes range from 0 to 25 percent.

Paxton soils are similar to Charlton and Woodbridge soils. Paxton soils do not have the mottles typical of the Woodbridge soils. The Paxton soils have a firm or very firm layer that the Charlton soils do not have.

Typical pedon of Paxton fine sandy loam, in an area of Paxton very stony fine sandy loam, 0 to 8 percent slopes, in a bank on the south side of a pipeline, 1,800 feet north of the intersection of Conduit Road and Braley Road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; few large roots and many medium roots; 5 percent coarse fragments; very strongly acid; abrupt wavy boundary.

B21—8 to 16 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; very friable; many medium roots and few large roots; 5 percent coarse fragments; very strongly acid; clear wavy boundary.

B22—16 to 22 inches; olive yellow (2.5Y 6/6) sandy loam; massive; very friable; many medium roots and few large roots; 5 percent coarse fragments; very strongly acid; clear wavy boundary.

Cx—22 to 60 inches; pale olive (5Y 6/4) gravelly sandy loam; massive; very firm; 25 percent coarse fragments; brittle; very strongly acid.

The thickness of the solum ranges from 20 to 36 inches and typically corresponds to the depth of the fragipan. The content of coarse fragments ranges from 5 to 30 percent in the solum and 10 to 30 percent in the substratum. Reaction of the soil is medium acid to very strongly acid in unlimed areas.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is fine sandy loam, sandy loam, or their gravelly analogs.

The B21 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is fine sandy loam, sandy loam, or their gravelly analogs. The structure is granular, or the horizon is massive. The B22

horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 6. It is fine sandy loam, sandy loam, or their gravelly analogs. The structure is weak platy and weak subangular blocky, or the horizon is massive. Consistence is friable or very friable.

The Cx horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 3 or 4. It is fine sandy loam, sandy loam, or coarse sandy loam and their gravelly analogs. The structure is weak or moderate and medium or thick platy, or the horizon is massive. Consistence is firm or very firm.

Pipestone series

The Pipestone series consists of deep, somewhat poorly drained soils on glacial outwash plains. The soils formed in sandy glacial outwash. Slopes range from 0 to 3 percent.

Pipestone soils are similar to Wareham and Walpole soils and in many places are near Deerfield and Scarboro soils. Pipestone soils have a spodic horizon, but the Wareham and Walpole soils do not. The Pipestone soils do not have the yellowish brown colors typical of the Deerfield soils or the mucky surface of the Scarboro soils.

Typical pedon of Pipestone loamy sand, 0 to 3 percent slopes, 50 feet east of Braley Road and 0.8 mile west of the Rochester town line:

O1—3 to 2 inches; layer of loose leaves and litter.
O2—2 inches to 0; dark reddish brown (5YR 2/2) decomposed organic matter.
A1—0 to 3 inches; black (10YR 2/1) loamy sand; moderate fine granular structure; very friable; many fine and medium roots; 10 percent fine gravel; strongly acid; clear irregular boundary.
A2—3 to 4 inches; gray (10YR 5/1) loamy sand; single grain; loose; common fine and medium roots; 10 percent fine gravel; very strongly acid; clear irregular boundary.
B21hir—4 to 8 inches; dark reddish brown (5YR 3/4) loamy sand; many coarse distinct dark reddish brown (5YR 2/2) mottles; single grain; loose; common fine and medium roots; 10 percent coarse fragments; very strongly acid; clear irregular boundary.
B22—8 to 24 inches; brown (10YR 5/3) loamy sand; few fine faint dark reddish brown (5YR 3/2) mottles and common medium distinct brown (7.5YR 5/4) mottles; single grain; loose; 10 percent fine gravel; very strongly acid; clear wavy boundary.
Cg—24 to 60 inches; light brownish gray (10YR 6/2) sand; single grain; loose; 10 percent fine gravel; very strongly acid.

The solum ranges from 20 to 36 inches in thickness. The content of gravel-size coarse fragments is 10 percent or less throughout the profile. Reaction of the solum mainly ranges from very strongly acid to medium acid. The upper 15 inches is extremely acid in some pedons.

The A1 horizon has hue of 10YR or 7.5YR, value of 2 through 4, and chroma of 1 or 2. It is sand, fine sand, loamy sand, or loamy fine sand.

The A2 horizon has hue of 10YR or 7.5YR, value of 5 through 7, and chroma of 1 through 3. In some pedons it has faint to distinct mottles. It is sand, loamy sand, or fine sand.

The B21hir horizon has hue of 5YR through 10YR, value of 2 through 5, chroma of 2 through 6, and in most pedons has faint or distinct mottles. It has weak, fine to coarse granular or subangular blocky structure, or it is single grain. The B22 horizon has hue of 5YR through 10YR, value of 4 through 6, chroma of 3 through 8. It has few to many, faint or distinct mottles. The B horizon is sand, loamy sand, or fine sand.

The C horizon has hue of 7.5YR or 10YR, value of 5 through 7, and chroma of 2 through 6. It is mainly sand or fine sand; it is finer textured at a depth of more than 40 inches in some pedons.

Pittstown series

The Pittstown series consists of deep, moderately well drained soils on uplands. The soils formed in glacial till derived mainly from slate, phyllite, and conglomerate. Slopes range from 0 to 8 percent.

Pittstown soils are similar to Woodbridge soils and in many places are near Newport and Ridgebury soils. Pittstown soils are mottled in the lower part of the subsoil, but the Newport soils are not mottled and the Ridgebury soils are mottled throughout the subsoil. The Pittstown soils have more silt and clay than the Woodbridge soils.

Typical pedon of Pittstown loam, 0 to 8 percent slopes, in the northwestern corner of a cultivated field 400 feet north of Wilbur Avenue and 900 feet east of Brayton Point Road:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; friable; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.
B21—10 to 18 inches; olive brown (2.5Y 4/4) loam; weak medium granular structure; friable; 10 percent coarse fragments; very strongly acid; abrupt smooth boundary.
B22—18 to 29 inches; olive (5Y 4/3) loam; common medium distinct gray (5Y 5/1) and dark yellowish brown (10YR 4/4) mottles; massive; friable; 15 percent coarse fragments; very strongly acid; abrupt smooth boundary.
Cx—29 to 60 inches; olive (5Y 5/3) channery loam; many coarse distinct olive gray (5Y 5/2) and dark yellowish brown (10YR 4/4) mottles; massive; very firm, brittle; 20 percent coarse fragments; very strongly acid.

The thickness of the solum ranges from 15 to 30 inches and corresponds to the depth to the fragipan. The depth to distinct or prominent mottling ranges from 15 to 25 inches. The content of coarse fragments ranges from 5 to 30 percent in the solum and 10 to 30 percent in the substratum. Reaction of the soil in unlimed areas ranges from very strongly acid to medium acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 2 or 3. It is loam, very fine sandy loam, or silt loam. It has weak or moderate, fine or medium granular structure.

The B21 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. The B22 horizon has hue of 2.5Y or 5Y, value of 4 or 5, chroma of 3 or 4, and is distinctly or prominently mottled. The B horizon is loam, silt loam, or very fine sandy loam.

The Cx horizon has hue of 2.5Y or 5Y, value of 4 or 5, chroma of 2 or 3, and is mottled. It is loam, silt loam, or very fine sandy loam or their channery analogs. It is very firm or extremely firm.

Ridgebury series

The Ridgebury series consists of deep, poorly drained and somewhat poorly drained soils on uplands. The soils formed in glacial till derived mainly from granite and gneiss. Slopes range from 0 to 8 percent.

Ridgebury soils are similar to Whitman soils and in many places are adjacent to Paxton and Woodbridge soils. Ridgebury soils have a subsoil within 30 inches of the surface that is not as gray as the subsoil of the Whitman soils. Ridgebury soils are mottled throughout the subsoil, but the Woodbridge soils are not mottled in the upper part of the subsoil and the Paxton soils do not have mottles.

Typical pedon of Ridgebury fine sandy loam, 0 to 3 percent slopes, in a wooded area 40 feet south of Bridge Street and 800 feet west of New Boston Road:

O1—3 inches to 1 inch; loose leaves over layer of matted leaves.

O2—1 inch to 0; black (10YR 2/1) decomposed organic matter.

A1—0 to 7 inches; black (10YR 2/1) fine sandy loam; moderate fine granular structure; very friable; many medium roots; 5 percent gravel; very strongly acid; abrupt smooth boundary.

B21—7 to 13 inches; pale brown (10YR 6/3) fine sandy loam; few medium faint grayish brown (2.5Y 5/2) and brownish yellow (10YR 6/8) mottles; massive; friable; common medium roots; 10 percent gravel; very strongly acid; clear wavy boundary.

B22—13 to 29 inches; light brownish gray (2.5Y 6/2) sandy loam; common coarse prominent strong brown (7.5YR 5/8) and reddish yellow (7.5YR 6/8) mottles; massive; firm; 10 percent gravel; strongly acid; abrupt wavy boundary.

Cxg—29 to 60 inches; light olive gray (5Y 6/2) sandy loam; few medium faint brownish yellow (10YR 6/8) mottles; moderate medium platy structure; very firm, brittle; 15 percent gravel; strongly acid.

The depth to the fragipan ranges from 10 to 30 inches. The content of coarse fragments within the soil ranges from 5 to 35 percent. Reaction of the unlimed soil ranges from very strongly acid to medium acid.

The A horizon is neutral or has a hue of 10YR to 5Y, value of 2 or 3, and chroma of 0 through 2. It is fine sandy loam, sandy loam, or loam or their gravelly counterparts.

The B horizon is neutral or has hue of 10YR to 5Y, value of 4 through 6, and chroma of 0 through 3. It is sandy loam, fine sandy loam, or loam and their gravelly analogs. It has subangular blocky structure, or the horizon is massive.

The Cxg horizon has hue of 10YR to 5Y, value of 3 through 6, and chroma of 1 through 4. It is fine sandy loam, sandy loam, or loam and their gravelly analogs. It has platy structure, or the horizon is massive.

Scarboro series

The Scarboro series consists of deep, very poorly drained soils on glacial outwash plains. The soils formed in glacial outwash material derived mainly from granite and gneiss. Slopes are less than 1 percent.

Scarboro soils are similar to Walpole and Wareham soils and in many places are near Freetown, Pipestone, and Swansea soils. Scarboro soils are grayer than Walpole or Wareham soils. Scarboro soils are mineral soils, and the Freetown and Swansea soils are organic soils. Scarboro soils do not have the reddish brown subhorizon typical of the Pipestone soils.

Typical pedon of Scarboro muck, in Freetown, 25 feet east of the pipeline and 700 feet north of the intersection of Conduit Road and Braley Road:

O2—4 inches to 0; black (10YR 2/1) muck; weak fine granular structure; very friable; few medium roots; very strongly acid; abrupt smooth boundary.

A1—0 to 9 inches; black (10YR 2/1) mucky loamy fine sand; gray (10YR 5/1) dry; moderate medium granular structure; very friable; few medium roots; very strongly acid; abrupt smooth boundary.

A2g—9 to 17 inches; light gray (10YR 6/1) loamy fine sand; weak fine granular structure; friable; strongly acid; abrupt wavy boundary.

C1g—17 to 24 inches; gray (N 5/0) loamy sand; massive; very friable; strongly acid; abrupt wavy boundary.

C2g—24 to 28 inches; gray (5Y 5/1) fine sand; massive; very friable; strongly acid; abrupt wavy boundary.

C3g—28 to 38 inches; gray (5Y 5/1) sand; massive; very friable; strongly acid; abrupt wavy boundary.

C4g—38 to 48 inches; gray (5Y 5/1) sand; common medium distinct reddish yellow (5YR 6/8 and 7.5YR 6/8) mottles; massive; very friable; medium acid; abrupt wavy boundary.

C5g—48 to 60 inches; gray (5Y 5/1) sand; massive; very friable; medium acid.

The content of coarse fragments at a depth of less than 40 inches ranges from 0 to 10 percent. Below a depth of 40 inches, individual strata are up to 50 percent fine gravel. Reaction ranges from medium acid to very strongly acid.

The O horizon consists of muck or mucky peat.

The A horizon is neutral or has hue of 7.5YR through 2.5Y, value of 2 or 3, and chroma of 0 through 2. It is loamy sand, sand, sandy loam, fine sandy loam, or loamy fine sand or their mucky analogs. The A2 horizon is neutral or has hue of 10YR through 5Y, value of 4 through 7, and chroma of 0 or 1. It is mottled in some pedons. It ranges from loamy fine sand to sand.

The C horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 0 through 2. It is mottled in some pedons. It is fine sand, loamy sand, or sand. It is single grain or massive.

Sudbury series

The Sudbury series consists of deep, moderately well drained soils on glacial outwash plains. The soils formed in glacial outwash material derived mainly from granitic and gneissic material. Slopes range from 0 to 8 percent.

Sudbury soils are similar to Merrimac soils and in many places are near Ninigret, Deerfield, and Walpole soils. Sudbury soils have more gravel in the solum and subsoil than the Deerfield or Ninigret soils and have more silt and clay in the solum than the Deerfield soils. Sudbury soils are mottled in the lower part of the solum, but the Walpole soils are mottled throughout the subsoil and the Merrimac soils are not mottled.

Typical pedon of Sudbury fine sandy loam, 0 to 3 percent slopes, in a wooded area 50 feet southwest of the intersection of the railroad tracks and the power line, 1/2 mile west of Phillips Road:

O2—2 inches to 0; black (10YR 2/1) decomposed organic matter.

A1—0 to 2 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; very friable; many medium roots; extremely acid; abrupt wavy boundary.

A2—2 to 4 inches; grayish brown (10YR 5/2) sandy loam; massive; very friable; many medium roots; extremely acid; abrupt wavy boundary.

B21—4 to 8 inches; strong brown (7.5YR 5/6) fine sandy loam; massive; very friable; many medium roots; 5 percent gravel; extremely acid; clear wavy boundary.

B22—8 to 18 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; very friable; many fine roots; 10 percent gravel; extremely acid; clear wavy boundary.

IIB3—18 to 28 inches; yellowish brown (10YR 5/6) gravelly coarse sandy loam; many coarse prominent brownish yellow (10YR 6/8) and grayish brown (2.5Y 5/2) mottles; massive; very friable; few fine roots; 30 percent gravel; very strongly acid; clear wavy boundary.

IIC—28 to 60 inches; light olive brown (2.5Y 5/4) gravelly coarse sand; common coarse prominent brownish yellow (10YR 6/8) and grayish brown (2.5Y 5/2) mottles; single grain; loose; 30 percent coarse fragments; very strongly acid.

The solum ranges from 18 to 30 inches thick. The depth to mottles ranges from 12 to 24 inches. The content of coarse fragments ranges from 0 to 30 percent in the solum and from 25 to 75 percent in the C horizon. Reaction in unlimed areas ranges from extremely acid to medium acid throughout the soil.

The A1 horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 1 through 3. The A2 horizon has hue of 10YR, value of 4 through 6, 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, 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. The lower part of the B horizon ranges from sandy loam to coarse sand and their gravelly analogs.

The IIC horizon has hue of 10YR through 5Y, value of 5, and chroma of 2 through 4. It is gravelly coarse sand or stratified sand, gravel, and cobblestones.

Swansea series

The Swansea series consists of deep, very poorly drained soils on uplands and outwash plains. The soils formed in highly decomposed organic material underlain by sandy or gravelly mineral material. Slopes are less than 1 percent.

Swansea soils are similar to Freetown soils and in many places are near Scarboro and Whitman soils. The Swansea soils formed in organic deposits ranging from 16 to 51 inches thick; the Freetown soils formed in organic deposits more than 51 inches thick, and the Scarboro and Whitman soils are mineral soils with an organic surface layer less than 6 inches thick.

Typical pedon of Swansea muck, in a wooded area 1,000 feet east of Old Fall River Road, 1,000 feet south of I-195, and 80 feet north of the telephone line:

Oa1—0 to 2 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); about 15 percent fiber content, 2 percent rubbed; weak medium granular structure; very friable; many medium roots; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa2—2 to 9 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); about 10 percent fiber content, 2 percent rubbed; weak medium granular structure; very friable; common medium

roots; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa3—9 to 13 inches; black (N 2/0) broken face and rubbed muck (sapric material); about 10 percent fiber, 2 percent rubbed; massive; very friable; few fine roots; 5 percent brown (7.5YR 4/4) woody fragments 1 to 10 centimeters in diameter; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa4—13 to 26 inches; black (N 2/0) broken face and rubbed muck (sapric material); about 5 percent fiber, 0 percent rubbed; massive; very friable; few fine roots; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

IIC1g—26 to 32 inches; light olive gray (5Y 6/2) loamy coarse sand; single grain; loose; very strongly acid; abrupt wavy boundary.

IIC2g—32 to 60 inches; light olive gray (5Y 6/2) gravelly loamy coarse sand; single grain; loose; 30 percent gravel; very strongly acid.

The depth to mineral material ranges from 16 to 51 inches. Woody fragments are in some part of the organic material in some pedons and throughout the organic material in others.

The surface tier is neutral or has hue of 5YR to 10YR, value of 2 or 3, and chroma of 0 through 2. It is dominantly sapric material; however, in some pedons there are varying amounts of hemic material. The upper 4 to 10 inches is sand or coarse sand in some pedons.

The subsurface and bottom tiers are neutral or have hue of 5YR to 10YR, value of 2 or 3, and chroma of 0 or 2. The rubbed fiber content ranges from 0 to 16 percent. Structure is platy, or the tiers are massive.

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 fine sand and includes their gravelly analogs. Reaction is strongly acid to extremely acid.

Udipsamments

Udipsamments consist of deep, excessively drained soils. The soils formed in thick deposits of windblown sand along the seashore. Slopes range from 3 to 35 percent.

Udipsamments are near Ipswich and Pawcatuck soils and Beaches. Udipsamments are sandy and mineral soils, but the Ipswich and Pawcatuck soils are very poorly drained organic soils that formed in tidal marshes. Udipsamments are not subject to daily tidal flooding by tides, as are Beaches.

Reference pedon of Udipsamments, on the north side of Massachusetts Route 88, 0.9 mile northwest of the intersection of Massachusetts Route 88 and East Beach Road:

A1—0 to 7 inches; pale brown (10YR 6/3) fine sand; single grain; lose; few fine roots; medium acid; clear wavy boundary.

C—7 to 60 inches; light gray (5Y 7/1) fine sand; single grain; loose; medium acid.

The A horizon has hue of 10YR or 7.5YR, value of 2 through 6, and chroma of 2 through 6. It is fine sand or sand. The A horizon ranges to as much as 11 inches thick in areas where vegetation has been established, but some pedons do not have an A horizon. Reaction of the A horizon ranges from medium acid to extremely acid.

The C horizon has hue of 2.5Y or 5Y, value of 6 or 7, and chroma of 1 or 2. It is mottled in some pedons. It is fine sand or sand. Reaction of the C horizon ranges from medium acid to strongly acid.

Udorthents

Udorthents consists of areas of soils formed by cutting or filling for construction projects. Udorthents are near or adjacent to most of the soils of the survey area. Because of the extreme variability of Udorthents, a reference pedon is not given.

The A horizon in Udorthents ranges in thickness from 0 to 8 inches. It has a hue of 10YR or 7.5YR, value of 3 through 6, and chroma of 1 through 4. It is loam, fine sandy loam, sandy loam, and loamy fine sand.

The C horizon has hue of 7.5YR to 5Y, value of 3 through 6, and chroma of 1 through 4. It is loam, fine sandy loam, sandy loam, loamy sand, sand, coarse sand, and their gravelly and cobbly analogs.

Walpole series

The Walpole series consists of deep, poorly drained and somewhat poorly drained soils on glacial outwash plains. The soils formed in material derived mainly from granite or gneiss. Slopes range from 0 to 3 percent.

Walpole soils are similar to Scarboro and Wareham soils and in many places are near or mixed with Freetown, Pipestone, Scarboro, Sudbury, Swansea, and Wareham soils. The Walpole soils are mineral soils, and the Freetown and Swansea soils are organic soils. Walpole soils do not have the reddish brown subsoil typical of the Pipestone soils. The Walpole soils have a grayer subsoil than the Sudbury soils, have a finer textured subsoil than the Wareham soils, and are browner than the Scarboro soils.

Typical pedon of Walpole fine sandy loam, 0 to 3 percent slopes, in a wooded area on the east side of Forge Pond, 1,000 feet northwest of Richmond Road from a point 0.35 mile northeast of the intersection of Richmond Road and Forge Road:

O1—3 inches to 1 inch; matted organic material.

O2—1 inch to 0; black (5YR 2/1) muck; many medium and coarse roots; extremely acid; abrupt smooth boundary.
A1—0 to 5 inches; dark grayish brown (10YR 3/2) fine sandy loam; many coarse prominent dark reddish brown (5YR 3/3) and strong brown (7.5YR 5/8) mottles; weak medium granular structure; friable; very strongly acid; abrupt wavy boundary.
B2—5 to 19 inches; brown (10YR 5/3) sandy loam; common medium distinct red (2.5YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; clear broken boundary.
IIC—19 to 23 inches; grayish brown (2.5Y 5/2) sand; common medium distinct yellowish red (5YR 5/6) and strong brown (7.5YR 5/8) mottles; single grain; loose; very strongly acid; abrupt wavy boundary.
IIIC—23 to 60 inches; grayish brown (2.5Y 5/2) gravelly coarse sand; single grain; loose; 35 percent coarse fragments; very strongly acid.

The thickness of the solum ranges from 18 to 24 inches. the content of coarse fragments ranges from 0 to 25 percent in the solum and from 0 to 50 percent in the C horizon. The soil is medium acid to very strongly acid in unlimed areas.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

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 or their gravelly analogs. It has subangular blocky structure, or it is massive.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. It is mainly gravelly sand, gravelly coarse sand, sand, or loamy sand. Some pedons have thin strata ranging from fine sandy loam to gravel.

Wareham series

The Wareham series consists of deep, poorly drained and somewhat poorly drained soils on outwash plains, deltas, and stream terraces. The soils formed in sandy glacial outwash. Slopes range from 0 to 3 percent.

Wareham soils are closely associated with Windsor, Hinckley, Deerfield, Scarboro, and Pipestone soils. Wareham soils are mottled throughout the subsoil, but Deerfield soils are mottled only in the lower part of the subsoil and Windsor and Hinckley soils are not mottled. The Wareham soils do not have a mucky surface layer typical of the Scarboro soils, nor do they have the dark reddish brown colors in the upper part of the subsoil typical in the Pipestone soils.

Typical pedon of Wareham loamy sand, 0 to 3 percent slopes, in a heavily limed cultivated field, 100 feet north of U.S. Route 6 and 100 feet east of Mason Street:

Ap—0 to 9 inches; very dark gray (10YR 3/1) loamy sand; weak medium granular structure; very friable; few medium roots; slightly acid; abrupt wavy boundary.
B—9 to 15 inches; light olive brown (2.5Y 5/4) loamy sand; common medium prominent dark reddish brown (5YR 3/3) mottles and common fine distinct olive gray (5Y 5/2) mottles; single grain; loose; few medium roots; slightly acid; clear wavy boundary.
C—15 to 60 inches; grayish brown (2.5Y 5/2) sand; many coarse prominent reddish yellow (7.5YR 6/8) mottles and few fine prominent red (2.5YR 4/8) mottles; single grain; loose; medium acid.

The content of coarse fragments ranges from 0 to 15 percent to a depth of 40 inches and from 0 to 60 percent at a depth of more than 40 inches. Reaction of the unlimed soil ranges from strongly acid to extremely acid.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is loamy sand or loamy fine sand.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 1 through 4. It is loamy fine sand, loamy sand, loamy coarse sand, fine sand, or sand.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 3. It is loamy sand, loamy coarse sand, or sand or their gravelly analogs.

Whitman series

The Whitman series consists of deep, very poorly drained soils on uplands. The soils formed in glacial till derived mainly from granite and gneiss. Slopes range from 0 to 3 percent.

Whitman soils are similar to Ridgebury soils and in many areas are near or adjacent to Paxton and Woodbridge soils. Whitman soils have grayer colors within 30 inches of the surface than the Ridgebury soils and are saturated with water for longer periods. Whitman soils have a grayer subsoil than do the moderately well drained Woodbridge soils or well drained Paxton soils.

Typical pedon of Whitman fine sandy loam, in a wooded area of Whitman extremely stony fine sandy loam, 0 to 3 percent slopes, 0.5 mile south of the intersection of Massachusetts Route 88 and Hix Bridge Road, and 200 feet east of Massachusetts Route 88, on the south side of a road in the woods:

O1—6 to 5 inches; loose and matted organic material.
O2—5 inches to 0; black (10YR 2/1) muck; weak fine granular structure; very friable; many roots; very strongly acid; abrupt wavy boundary.
C1g—0 to 6 inches; gray (10YR 5/1) fine sandy loam; massive; very friable; many roots; 10 percent fine gravel; very strongly acid; clear wavy boundary.
C2g—6 to 15 inches; light gray (10YR 6/1) fine sandy loam; massive; friable; common roots; 10 percent fine gravel; very strongly acid; clear wavy boundary.

C3xg—15 to 35 inches; light olive gray (5Y 6/2) fine sandy loam; many coarse prominent strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) mottles; massive; very firm; 10 percent fine gravel; very strongly acid; gradual wavy boundary.
C4xg—35 to 55 inches; light olive gray (5Y 6/2) silt loam; many coarse prominent strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) mottles; massive; very firm; 5 percent fine gravel; medium acid; gradual wavy boundary.
C5x—55 to 60 inches; brown (10YR 5/3) fine sandy loam; common medium prominent strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) mottles; massive; firm; 5 percent fine gravel; slightly acid.

The depth to the fragipan ranges from 10 to 30 inches. Some pedons have an A horizon that is 5 to 40 percent coarse fragments and 0 to 10 percent stones. The C horizon is 5 to 25 percent coarse fragments and 0 to 10 percent stones. The soil is very strongly acid to slightly acid throughout.

The A horizon, where present, is neutral or has hue of 10YR, value of 2 or 3, and chroma of 0 through 2. It ranges from sandy loam to silt loam.

The part of the C horizon above the Cx horizon has hue of 10YR to 5Y, value of 4 through 6, and chroma of 0 to 1. There are no mottles, or mottles are distinct or prominent. The horizon is fine sandy loam, sandy loam, or loam. It ranges from very friable to firm.

The Cx horizon has hue of 10YR to 5Y, value of 4 through 6, and chroma of 0 through 3. Chroma of 3 and hue of 10YR are restricted to a depth of more than 30 inches. The horizon is fine sandy loam, sandy loam, or loamy sand and has subhorizons of very fine sandy loam and silt loam. It ranges from firm to extremely firm.

Windsor series

The Windsor series consists of deep, excessively drained soils on glacial outwash plains, deltas, and windblown deposits. The soils formed in thick deposits of sand derived from granite and gneiss. Slopes range from 0 to 20 percent.

Windsor soils are similar to Agawam soils and in many places are near Deerfield, Hinckley, Scarboro, and Wareham soils. Windsor soils have more sand in the upper part of the solum than the Agawam soils and do not have the gravel content of the Hinckley soils. Windsor soils are not mottled, but the Deerfield soils are mottled in the lower part of the subsoil and in the substratum; the Wareham and Scarboro soils have grayer colors and are mottled in the subsoil and substratum.

Typical pedon of Windsor loamy sand, 0 to 3 percent slopes, in a wooded area, 100 feet north of Mason Road and 400 feet west of the intersection of County Road and Mason Road:

O1—2 inches to 1 inch; loose and matted pine needles.
O2—1 inch to 0; black (N 2/0) decomposed organic matter.
A1—0 to 1 inch; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; many medium roots; very strongly acid; abrupt wavy boundary.
A2—1 to 2 inches; dark grayish brown (10YR 4/2) loamy sand; massive; very friable; few medium roots; very strongly acid; abrupt wavy boundary.
B21—2 to 5 inches; dark yellowish brown (10YR 4/4) loamy sand; massive; very friable; many medium roots; very strongly acid; abrupt wavy boundary.
B22—5 to 12 inches; yellowish brown (10YR 5/6) loamy sand; single grain; loose; common medium roots; very strongly acid; clear wavy boundary.
B23—12 to 26 inches; yellowish brown (10YR 5/4) sand; single grain; loose; few medium roots; very strongly acid; clear wavy boundary.
C—26 to 60 inches; light brownish gray (2.5Y 6/2) sand; single grain; loose; 10 percent gravel; strongly acid.

The solum ranges from 20 to 32 inches in thickness. The content of gravel ranges from 0 to 5 percent in the solum and 0 to 10 percent in the substratum. Reaction of the soil in unlimed areas is strongly acid to very strongly acid throughout.

The A1 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 A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 1 or 2. It is sand, loamy sand, or loamy fine sand.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 through 6, and chroma of 4 through 6. The B horizon is loamy fine sand, loamy sand, fine sand, and sand.

The C horizon has hue of 10YR or 2.5Y, 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 granitic and gneissic material. Slopes range from 0 to 8 percent.

Woodbridge soils are similar to Pittstown soils and are commonly adjacent to Paxton and Ridgebury soils. Woodbridge soils have less silt and less very fine sand in the solum than the Pittstown soils. Woodbridge soils are mottled in the lower part of the subsoil, but the Ridgebury soils are mottled throughout the subsoil and the Paxton soils are not mottled.

Typical pedon of Woodbridge fine sandy loam, 0 to 3 percent slopes, in a cultivated field, 800 feet east of Horseneck Road, 1.25 miles south of the intersection of Horseneck Road and Hix Bridge Road:

Ap—0 to 9 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; friable; many fine

roots; 10 percent gravel, 5 percent cobblestones; medium acid; abrupt smooth boundary.

B21—9 to 16 inches; yellowish brown (10YR 5/8) fine sandy loam; massive; friable; common fine roots; 10 percent gravel, 5 percent cobblestones; medium acid; clear smooth boundary.

B22—16 to 20 inches; light olive brown (2.5Y 5/6) fine sandy loam; massive; friable; 10 percent gravel, 5 percent cobblestones; medium acid; clear smooth boundary.

B23—20 to 27 inches; light olive brown (2.5Y 5/6) gravelly fine sandy loam; many coarse prominent light gray (2.5Y 7/2) and strong brown (7.5YR 5/8) mottles; massive; friable; 20 percent gravel, 5 percent cobblestones; medium acid; abrupt wavy boundary.

Cx—27 to 60 inches; light brownish gray (2.5Y 6/2) gravelly sandy loam; many coarse prominent strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate thick platy structure; very firm, brittle; 25 percent gravel, 5 percent cobblestones; medium acid.

The thickness of the solum ranges from 18 to 36 inches and generally corresponds to the depth to the firm or very firm substratum. The soil is fine sandy loam, sandy loam, or their gravelly counterparts. Coarse fragments make up 5 to 30 percent of the solum and 10 to 40 percent of the substratum. Reaction in unlimed areas ranges from medium acid to strongly acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3.

The B21 horizon has hue of 7.5YR or 10YR, value of 3 through 6, and chroma of 3 through 8. The B22 and B23 horizons have hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 6.

The Cx horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 4. It has weak or moderate, medium to thick platy structure, or it is massive. It is firm or very firm.

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glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

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.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 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 slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

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 arresting grazing 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.

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 does not provide 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.

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.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

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.

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 A horizon. The B horizon is in part a layer of transition from the overlying A 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 Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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—

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.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

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.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

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.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (Also called Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

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 0.20 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.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

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.

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.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

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 mm 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.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to 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."

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. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt 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.

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.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1951-73 at Fall River, Massachusetts]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	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	36.3	21.6	29.0	57	-1	15	3.47	1.86	4.78	7	8.8
February	38.4	22.7	30.6	59	-2	12	4.18	2.88	5.37	7	10.6
March	45.2	29.6	37.4	66	11	44	4.49	2.71	6.08	8	8.4
April	56.8	38.5	47.7	80	25	237	3.94	2.58	5.16	7	.7
May	67.3	47.6	57.5	87	35	543	3.60	1.98	4.91	7	.0
June	76.6	57.6	67.1	93	44	813	2.78	1.31	3.96	6	.0
July	81.7	63.8	72.8	94	53	1,017	3.16	1.47	4.52	5	.0
August	80.3	62.4	71.3	92	49	970	3.90	1.71	5.67	6	.0
September	73.4	55.2	64.3	90	38	729	3.27	1.63	4.59	5	.0
October	63.3	45.7	54.5	81	28	450	3.16	1.80	4.26	5	.1
November	51.0	36.3	43.7	69	18	137	4.58	3.00	6.01	8	.3
December	40.2	25.8	33.1	63	4	46	4.78	2.58	6.56	8	6.7
Yearly:											
Average	59.2	42.2	50.8	---	---	---	---	---	---	---	---
Extreme	---	---	---	96	-5	---	---	---	---	---	---
Total	---	---	---	---	---	5,013	45.31	37.11	53.08	79	35.6

[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 1951-73 at Fall River, Massachusetts]

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 6	April 15	April 25
2 years in 10 later than--	April 1	April 11	April 21
5 years in 10 later than--	March 22	April 2	April 15
First freezing temperature in fall:			
1 year in 10 earlier than--	November 8	October 25	October 11
2 years in 10 earlier than--	November 13	October 31	October 16
5 years in 10 earlier than--	November 24	November 11	October 26

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1951-73 at Fall River, Massachusetts]

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	222	196	174
8 years in 10	230	205	181
5 years in 10	246	222	193
2 years in 10	261	238	206
1 year in 10	269	247	212

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AgA	Agawam fine sandy loam, 0 to 3 percent slopes	235	0.1
AgB	Agawam fine sandy loam, 3 to 8 percent slopes	195	0.1
Be	Beaches	515	0.3
CtB	Charlton-Paxton fine sandy loams, rocky, 3 to 8 percent slopes	485	0.3
CtC	Charlton-Paxton fine sandy loams, rocky, 8 to 15 percent slopes	1,065	0.6
CuC	Charlton-Rock outcrop-Paxton complex, 3 to 15 percent slopes	810	0.5
CuE	Charlton-Rock outcrop-Paxton complex, 15 to 35 percent slopes	665	0.4
DeA	Deerfield loamy sand, 0 to 5 percent slopes	1,445	0.9
Du	Dumps	165	0.1
Fm	Freetown muck	7,925	4.8
Fp	Freetown muck, ponded	995	0.6
GcB	Gloucester-Hinckley complex, undulating	720	0.4
GhB	Gloucester-Hinckley complex, very stony, undulating	3,365	2.0
GhC	Gloucester-Hinckley complex, very stony, rolling	1,650	1.0
HgA	Hinckley gravelly fine sandy loam, 0 to 3 percent slopes	305	0.2
HgB	Hinckley gravelly fine sandy loam, 3 to 8 percent slopes	3,700	2.2
HgC	Hinckley gravelly fine sandy loam, 8 to 15 percent slopes	2,940	1.8
HgD	Hinckley gravelly fine sandy loam, 15 to 25 percent slopes	1,715	1.0
MeA	Merrimac fine sandy loam, 0 to 3 percent slopes	905	0.5
MeB	Merrimac fine sandy loam, 3 to 8 percent slopes	2,415	1.5
NeB	Newport loam, 3 to 8 percent slopes	745	0.4
NfC	Newport very stony loam, 3 to 15 percent slopes	205	0.1
NgA	Ninigret fine sandy loam, 0 to 3 percent slopes	265	0.2
Pa	Pawcatuck and Ipswich peats	3,140	1.9
PfA	Paxton fine sandy loam, 0 to 3 percent slopes	1,060	0.6
PfB	Paxton fine sandy loam, 3 to 8 percent slopes	9,595	5.8
PfC	Paxton fine sandy loam, 8 to 15 percent slopes	1,005	0.6
PgB	Paxton very stony fine sandy loam, 0 to 8 percent slopes	13,235	8.0
PgC	Paxton very stony fine sandy loam, 8 to 15 percent slopes	1,930	1.2
PgD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	355	0.2
PhB	Paxton extremely stony fine sandy loam, 0 to 8 percent slopes	10,135	6.1
PhC	Paxton extremely stony fine sandy loam, 8 to 15 percent slopes	2,360	1.4
PhD	Paxton extremely stony fine sandy loam, 15 to 25 percent slopes	330	0.2
PoA	Pipestone loamy sand, 0 to 3 percent slopes	210	0.1
Pr	Pits, quarry	105	0.1
Ps	Pits-Udorthents complex, gravelly	3,650	2.2
PtB	Pittstown loam, 0 to 8 percent slopes	130	0.1
PvB	Pittstown very stony loam, 0 to 8 percent slopes	115	0.1
RdA	Ridgebury fine sandy loam, 0 to 3 percent slopes	1,040	0.6
RdB	Ridgebury fine sandy loam, 3 to 8 percent slopes	405	0.2
ReA	Ridgebury extremely stony fine sandy loam, 0 to 3 percent slopes	6,935	4.2
ReB	Ridgebury extrememly stony fine sandy loam, 3 to 8 percent slopes	4,745	2.9
Sc	Scarboro muck	4,245	2.6
SdA	Sudbury fine sandy loam, 0 to 3 percent slopes	815	0.5
SdB	Sudbury fine sandy loam, 3 to 8 percent slopes	320	0.2
Ss	Swansea coarse sand	390	0.2
Sw	Swansea muck	3,565	2.1
UaD	Udipsamments, hilly	1,000	0.6
Ud	Udorthents, smoothed	3,470	2.1
Ur	Urban land	14,055	8.5
WaA	Walpole fine sandy loam, 0 to 3 percent slopes	495	0.3
WcA	Wareham loamy sand, 0 to 3 percent slopes	850	0.5
WgA	Whitman fine sandy loam, 0 to 3 percent slopes	210	0.1
WhA	Whitman extremely stony fine sandy loam, 0 to 3 percent slopes	18,710	11.3
WnA	Windsor loamy sand, 0 to 3 percent slopes	295	0.2
WnB	Windsor loamy sand, 3 to 8 percent slopes	1,175	0.7
WnC	Windsor loamy sand, 8 to 20 percent slopes	250	0.2
WrA	Woodbridge fine sandy loam, 0 to 3 percent slopes	2,190	1.3
WrB	Woodbridge fine sandy loam, 3 to 8 percent slopes	2,705	1.6
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	7,005	4.2
WtB	Woodbridge extremely stony fine sandy loam, 0 to 8 percent slopes	9,255	5.6
	Water	1,130	0.7
	Total	166,040	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	Alfalfa hay	Grass-legume hay	Grass hay	Grass-clover	Kentucky bluegrass
	Ton	Ton	Ton	Ton	AUM*	AUM*
AgA---- Agawam	24	5.0	4.5	4.0	8.5	---
AgB---- Agawam	24	5.0	4.5	4.0	8.5	---
Be**. Beaches						
CtB, CtC---- Charlton-Paxton	---	---	---	---	---	---
CuC---- Charlton-Rock outcrop-Paxton	---	---	---	---	---	---
CuE---- Charlton-Rock outcrop-Paxton	---	---	---	---	---	---
DeA---- Deerfield	16	3.5	3.0	3.0	5.7	---
Du**. Dumps						
Fm, Fp---- Freetown	---	---	---	---	---	---
GcB---- Gloucester-Hinckley	14	3.4	2.5	---	4.8	---
GhB---- Gloucester-Hinckley	---	---	---	---	---	1.9
GhC---- Gloucester-Hinckley	---	---	---	---	---	1.9
HgA, HgB---- Hinckley	12	2.5	2.0	---	3.8	---
HgC---- Hinckley	---	---	---	---	---	---
HgD---- Hinckley	---	---	---	---	---	---
MeA, MeB---- Merrimac	18	4.0	3.0	2.5	5.7	---
NeB---- Newport	24	4.0	4.0	4.0	7.6	---
NfC---- Newport	---	---	---	---	---	3.8
NgA---- Ninigret	22	4.0	4.0	4.0	7.6	---
Pa---- Pawcatuck and Ipswich	---	---	---	---	---	---
PfA---- Paxton	24	4.5	4.0	4.0	7.6	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn silage	Alfalfa hay	Grass-legume hay	Grass hay	Grass-clover	Kentucky bluegrass
	Ton	Ton	Ton	Ton	AUM*	AUM*
PfB---- Paxton	24	4.5	4.0	4.0	7.6	---
PfC---- Paxton	22	4.5	4.0	4.0	7.6	---
PgB, PgC, PgD---- Paxton	---	---	---	---	---	3.8
PhB, PhC, PhD---- Paxton	---	---	---	---	---	---
PoA---- Pipestone	12	---	2.5	2.5	4.8	---
Pr**. Pits						
Ps---- Pits-Udorthents	---	---	---	---	---	---
PtB---- Pittstown	20	4.0	3.5	3.5	6.6	---
PvB---- Pittstown	---	---	---	---	---	3.8
RdA, RdB---- Ridgebury	16	---	3.5	4.0	6.6	---
ReA, ReB---- Ridgebury	---	---	---	---	---	---
Sc---- Scarboro	---	---	---	---	---	---
SdA---- Sudbury	18	3.5	4.0	4.0	7.6	---
SdB---- Sudbury	18	3.5	4.0	4.0	7.6	---
Ss---- Swansea	---	---	---	---	---	---
Sw---- Swansea	---	---	---	---	---	---
UaD**. Udipsamments						
Ud**. Udorthents						
Ur**. Urban land						
WaA---- Walpole	18	---	3.0	3.0	5.7	---
WcA---- Wareham	12	---	2.5	3.0	4.8	---
WgA, WhA---- Whitman	---	---	---	---	---	---
WnA, WnB---- Windsor	14	3.0	2.5	2.0	4.8	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn silage	Alfalfa hay	Grass-legume hay	Grass hay	Grass-clover	Kentucky bluegrass
	Ton	Ton	Ton	Ton	AUM*	AUM*
WnC---------- Windsor	12	3.0	2.5	2.0	4.8	---
WrA---------- Woodbridge	24	4.0	4.0	4.0	7.6	---
WrB---------- Woodbridge	24	4.0	4.0	4.0	7.6	---
WsB---------- Woodbridge	---	---	---	---	---	3.8
WtB---------- 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)
		Acres	Acres	Acres
I	1,295	---	---	---
II	21,000	10,855	6,105	4,040
III	9,865	1,005	3,385	5,475
IV	4,640	---	1,450	3,190
V	15,945	---	15,945	---
VI	31,125	---	---	31,125
VII	54,940	---	995	53,945
VIII	4,140	---	3,140	1,000

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	
AgA, AgB---------- Agawam	4o	Slight	Slight	Slight	Slight	Eastern white pine-- Red pine---------- Northern red oak----	70 70 65	Eastern white pine, red pine, white spruce, Norway spruce.
CtB*, CtC*:								
Charlton----------	4o	Slight	Slight	Slight	Slight	Northern red oak---- Eastern white pine-- Red pine---------- Red spruce---------- Red maple----------	65 65 70 50 55	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.
Paxton----------	3o	Slight	Slight	Slight	Slight	Northern red oak---- Red pine---------- Eastern white pine--	65 67 66	Red pine, eastern white pine, Norway spruce, European larch.
CuC*, CuE*:								
Charlton----------	4x	Slight	Moderate	Slight	Slight	Northern red oak---- Eastern white pine-- Red pine---------- Red spruce---------- Red maple----------	65 65 70 50 55	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.
Rock outcrop.								
Paxton----------	3x	Slight	Moderate	Slight	Slight	Northern red oak---- Red pine---------- Eastern white pine--	65 67 66	Red pine, eastern white pine, Norway spruce, European larch.
DeA---------- Deerfield	4s	Slight	Slight	Moderate	Slight	Eastern white pine-- Northern red oak----	65 55	Eastern white pine, red pine, European larch.
Fm---------- Freetown	5w	Slight	Severe	Severe	Severe	Red maple---------- Atlantic white-cedar Eastern hemlock----- Green ash---------- American elm-------- Red spruce----------	50 60 55 35 55 50	White spruce, eastern hemlock, balsam fir.
GcB*:								
Gloucester--------	4s	Slight	Slight	Moderate	Slight	Northern red oak---- Eastern white pine-- Red pine----------	60 61 49	Eastern white pine, red pine, European larch.
Hinckley----------	5s	Slight	Slight	Severe	Slight	Northern red oak---- Eastern white pine-- Red pine----------	49 60 58	Eastern white pine, red pine, European larch.
GhB*, GhC*:								
Gloucester--------	4s	Slight	Slight	Moderate	Slight	Northern red oak---- Eastern white pine-- Red pine----------	60 61 49	Eastern white pine, red pine, European larch.
Hinckley----------	5s	Slight	Slight	Severe	Slight	Northern red oak---- Eastern white pine-- Red pine----------	49 60 58	Eastern white pine, red pine, European larch.

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	
HgA, HgB, HgC---- Hinckley	5s	Slight	Slight	Severe	Slight	Northern red oak----	49	Eastern white pine, red pine, European larch.
						Eastern white pine--	60	
						Red pine----------	58	
HgD---------- Hinckley	5s	Slight	Moderate	Severe	Slight	Northern red oak----	49	Eastern white pine, red pine, European larch.
						Eastern white pine--	60	
						Red pine----------	58	
MeA, MeB---------- Merrimac	4s	Slight	Slight	Moderate	Slight	Northern red oak----	51	Eastern white pine, red pine.
						Eastern white pine--	64	
NeB, NfC---------- Newport	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Eastern white pine, red pine.
						Eastern white pine--	75	
NgA---------- 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	
PfA, PfB, PfC, PgB, PgC---------- 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	
PgD---------- 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	
PhB, PhC, PhD------ 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	
PoA---------- Pipestone	3s	Slight	Slight	Moderate	Slight	Northern red oak----	70	Eastern white pine, European larch, red pine.
						Eastern white pine--	65	
						White ash----------	70	
PtB, PvB---------- Pittstown	3o	Slight	Slight	Slight	Slight	Northern red oak----	72	Eastern white pine, eastern hemlock, balsam fir, white spruce, Scotch pine.
						Eastern white pine--	80	
						Eastern hemlock-----	75	
						Red spruce----------	50	
RdA, RdB---------- Ridgebury	4w	Slight	Severe	Severe	Severe	Northern red oak----	57	Eastern white pine, white spruce.
						Red spruce----------	47	
						Eastern white pine--	63	
ReA, ReB---------- Ridgebury	4x	Slight	Severe	Severe	Severe	Northern red oak----	57	Eastern white pine, white spruce.
						Red spruce----------	47	
						Eastern white pine--	63	
Sc---------- Scarboro	5w	Slight	Severe	Severe	Severe	Eastern white pine--	55	Northern white-cedar.
						Red maple----------	55	
						Atlantic white-cedar	45	
SdA, SdB---------- Sudbury	4o	Slight	Slight	Slight	Slight	Eastern white pine--	60	Eastern white pine, red pine, European larch, white spruce, Norway spruce.
						Northern red oak----	45	
						Red spruce----------	47	
						Red pine----------	60	
Ss, Sw---------- Swansea	4w	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	

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	
WaA---------- Walpole	4w	Slight	Severe	Severe	Severe	Eastern white pine-- Red spruce---------- Red maple----------	68 43 75	Eastern white pine, white spruce, northern white-cedar, Norway spruce.
WcA---------- Wareham	4w	Slight	Severe	Severe	Severe	Eastern white pine-- Red maple---------- Red spruce----------	65 65 45	Eastern white pine.
WgA---------- Whitman	5w	Slight	Severe	Severe	Severe	Eastern white pine-- Red spruce---------- Red maple----------	56 44 55	
WhA---------- 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----------	57 52 61	Eastern white pine, red pine.
WrA, WrB---------- Woodbridge	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak---- Red pine---------- Red spruce----------	67 72 65 50	Eastern white pine, European larch.
WsB---------- Woodbridge	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak---- Red pine---------- Red spruce----------	67 72 65 50	Eastern white pine, red pine, European larch.
WtB---------- Woodbridge	3x	Slight	Moderate	Slight	Slight	Eastern white pine-- Northern red oak---- Red pine---------- Red spruce----------	67 72 65 50	Eastern white pine, red pine, European larch.

* 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
AgA Agawam	Slight	Slight	Slight	Slight	Slight.
AgB Agawam	Slight	Slight	Moderate: slope.	Slight	Slight.
Be*. Beaches					
CtB*: Charlton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight	Moderate: large stones.
Paxton	Moderate: percs slowly, large stones.	Moderate: large stones, percs slowly.	Severe: large stones.	Slight	Moderate: large stones.
CtC*: Charlton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight	Moderate: slope, large stones.
Paxton	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, percs slowly.	Severe: slope, large stones.	Slight	Moderate: slope, large stones.
CuC*: Charlton	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Slight	Moderate: slope, large stones.
Rock outcrop.					
Paxton	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Slight	Moderate: slope, large stones.
CuE*: Charlton	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
Paxton	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
DeA Deerfield	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Moderate: wetness.
Du*. Dumps					
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.

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
GcB*:					
Gloucester	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
Hinckley	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
GhB*:					
Gloucester	Moderate: large stones, small stones.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Slight	Moderate: small stones, droughty.
Hinckley	Moderate: large stones, small stones.	Moderate: small stones, large stones.	Severe: large stones, small stones.	Slight	Severe: small stones, droughty.
GhC*:					
Gloucester	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Slight	Moderate: slope, small stones, droughty.
Hinckley	Moderate: slope, large stones, small stones.	Moderate: slope, small stones, large stones.	Severe: slope, large stones, small stones.	Slight	Severe: small stones, droughty.
HgA, HgB Hinckley	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
HgC Hinckley	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
HgD Hinckley	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
MeA Merrimac	Slight	Slight	Moderate: small stones.	Slight	Slight.
MeB Merrimac	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
NeB Newport	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
NfC Newport	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, percs slowly.	Severe: slope, large stones.	Slight	Moderate: slope, small stones.
NgA Ninigret	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Pa*:					
Pawcatuck	Severe: ponding, floods, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: ponding, floods, excess humus.	Severe: ponding, excess humus.	Severe: ponding, floods, excess salt.
Ipswich	Severe: ponding, floods, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: ponding, floods, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess salt, floods.

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
PfA---------- Paxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, small stones, wetness.	Slight----------	Slight.
PfB---------- Paxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly, small stones.	Slight----------	Slight.
PfC---------- Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
PgB---------- Paxton	Moderate: percs slowly, large stones.	Moderate: large stones, percs slowly.	Severe: large stones.	Slight----------	Moderate: large stones.
PgC---------- Paxton	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, percs slowly.	Severe: slope, large stones.	Slight----------	Moderate: slope, large stones.
PgD---------- Paxton	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
PhB---------- Paxton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
PhC---------- Paxton	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Slight----------	Moderate: slope, large stones.
PhD---------- Paxton	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
PoA---------- Pipestone	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pr*. Pits					
Ps*: Pits.					
Udorthents.					
PtB---------- Pittstown	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, small stones.	Moderate: wetness.	Slight.
PvB---------- Pittstown	Moderate: large stones, wetness.	Moderate: large stones, wetness.	Severe: large stones, small stones.	Moderate: wetness.	Moderate: large stones.
RdA, RdB---------- Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
ReA, ReB---------- Ridgebury	Severe: large stones, wetness, percs slowly.	Severe: large stones, wetness, percs slowly.	Severe: wetness, large stones, small stones.	Severe: wetness.	Severe: wetness.

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
Sc Scarboro	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
SdA Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, small stones.	Slight	Slight.
SdB Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, small stones.	Slight	Slight.
Ss Swansea	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.
Sw Swansea	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
UaD*. Udipsamments					
Ud*. Udorthents					
Ur*. Urban land					
WaA Walpole	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WcA Wareham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WgA Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
WhA 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.
WrA Woodbridge	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
WrB Woodbridge	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: slope, percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
WsB Woodbridge	Moderate: wetness, large stones, percs slowly.	Moderate: wetness, large stones, percs slowly.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, wetness.

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
WtB---------- Woodbridge	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, wetness.

* 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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AgA---- Agawam	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AgB---- Agawam	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Be*. Beaches										
CtB*:										
Charlton----	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
Paxton----	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
CtC*:										
Charlton----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Paxton----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CuC*, CuE*:										
Charlton----	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
Paxton----	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
DeA---- Deerfield	Poor	Fair	Fair	Poor	Poor	Poor	Poor	Fair	Poor	Poor.
Du*. Dumps										
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.
GcB*:										
Gloucester----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hinckley----	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
GhB*, GhC*:										
Gloucester----	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hinckley----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HgA, HgB, HgC, HgD- Hinckley	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MeA, MeB---------- Merrimac	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
NeB---------- Newport	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NfC---------- Newport	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
NgA---------- Ninigret	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Pa*:										
Pawcatuck---------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Ipswich----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
PfA---------- Paxton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PfB---------- Paxton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PfC---------- Paxton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PgB---------- Paxton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
PgC, PgD---------- Paxton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
PhB---------- Paxton	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.
PhC, PhD---------- Paxton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
PoA---------- Pipestone	Fair	Poor	Fair	Poor	Poor	Poor	Fair	Poor	Poor	Poor.
Pr*. Pits										
Ps*: Pits.										
Udorthents.										
PtB---------- Pittstown	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
PvB---------- Pittstown	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
RdA---------- Ridgebury	Poor	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
RdB---------- Ridgebury	Poor	Poor	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
ReA---------- Ridgebury	Very poor.	Very poor.	Fair	Fair	Fair	Good	Fair	Poor	Fair	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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
ReB---- Ridgebury	Very poor.	Very poor.	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Sc---- Scarboro	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
SdA---- Sudbury	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SdB---- Sudbury	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ss---- Swansea	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
Sw---- Swansea	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
UaD*. Udipsamments										
Ud*. Udorthents										
Ur*. Urban land										
WaA---- Walpole	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
WcA---- Wareham	Poor	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
WgA---- Whitman	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WhA---- Whitman	Very poor.	Very poor.	Poor	Poor	Poor	Good	Fair	Very poor.	Poor	Fair.
WnA, WnB, WnC---- Windsor	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
WrA---- Woodbridge	Fair	Good	Good	Good	Fair	Poor	Poor	Good	Good	Poor.
WrB---- Woodbridge	Fair	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
WsB---- Woodbridge	Very poor.	Poor	Good	Good	Fair	Poor	Very poor.	Poor	Good	Very poor.
WtB---- Woodbridge	Very poor.	Very poor.	Good	Good	Fair	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
AgA---------- Agawam	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
AgB---------- Agawam	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
Be*. Beaches						
CtB*: Charlton---------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: large stones.
Paxton----------	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: large stones.
CtC*: Charlton---------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, large stones.
Paxton----------	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope, large stones.
CuC*: Charlton---------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, large stones.
Rock outcrop.						
Paxton----------	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope, large stones.
CuE*: Charlton---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
Paxton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DeA---------- Deerfield	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.
Du*. Dumps						
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.

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
GcB*:						
Gloucester	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: large stones.	Moderate: small stones, droughty.
Hinckley	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones.
GhB*:						
Gloucester	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones, slope.	Moderate: large stones.	Moderate: small stones, droughty.
Hinckley	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, droughty.
GhC*:						
Gloucester	Severe: cutbanks cave.	Moderate: large stones, slope.	Moderate: large stones, slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: slope, small stones, droughty.
Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
HgA---------- Hinckley	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: small stones.
HgB---------- Hinckley	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones.
HgC---------- Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
HgD---------- Hinckley	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
MeA---------- Merrimac	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
MeB---------- Merrimac	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Slight.
NeB---------- Newport	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Slight.
NfC---------- Newport	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope, small stones, large stones.
NgA---------- Ninigret	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.
Pa*:						
Pawcatuck	Severe: ponding, excess humus.	Severe: ponding, floods, low strength.	Severe: ponding, floods, low strength.	Severe: floods, ponding, low strength.	Severe: ponding, low strength, floods.	Severe: ponding, excess salt, excess sulfur.

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
Pa*: Ipswich	Severe: ponding, excess humus.	Severe: ponding, floods, low strength.	Severe: ponding, floods, low strength.	Severe: ponding, floods, low strength.	Severe: ponding, low strength, floods.	Severe: ponding, excess salt, excess sulfur.
PfA Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Slight.
PfB Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Slight.
PfC Paxton	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope.
PgB Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: large stones.
PgC Paxton	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope, large stones.
PgD Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PhB Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: large stones.
PhC Paxton	Moderate: slope, dense layer, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: slope, large stones.
PhD Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PoA Pipestone	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pr*. Pits						
Ps*: Pits. Udorthents.						
PtB Pittstown	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Slight.
PvB Pittstown	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: large stones.
RdA, RdB, ReA, ReB Ridgebury	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.

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
Sc---------- Scarboro	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
SdA---------- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Slight.
SdB---------- 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, too sandy.
Sw---------- 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.
UaD*. Udipsamments						
Ud*. Udorthents						
Ur*. Urban land						
WaA---------- Walpole	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
WcA---------- Wareham	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WgA---------- Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
WhA---------- 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.
WrA---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.
WrB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: wetness.
WsB, WtB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: large stones, wetness.

*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
AgA, AgB---------- Agawam	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Be*. Beaches					
CtB*: Charlton----------	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
Paxton----------	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
CtC*: Charlton----------	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope, small stones.
Paxton----------	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
CuC*: Charlton----------	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope, small stones.
Rock outcrop.					
Paxton----------	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
CuE*: Charlton----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Rock outcrop.					
Paxton----------	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
DeA---------- Deerfield	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
Du*. Dumps					
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.
GcB*: Gloucester	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
GhB*: Gloucester	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones, seepage.
Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
GhC*: Gloucester	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones, seepage.
Hinckley	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HgA, HgB Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HgC Hinckley	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HgD Hinckley	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, too sandy, seepage.
MeA, MeB Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
NeB Newport	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
NfC Newport	Severe: percs slowly.	Severe: slope.	Moderate: slope, wetness.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
NgA Ninigret	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, 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
Pa*:					
Pawcatuck	Severe: floods, ponding, poor filter.	Severe: seepage, floods, excess humus.	Severe: seepage, floods, ponding.	Severe: seepage, floods, ponding.	Poor: excess humus, ponding, excess salt.
Ipswich	Severe: ponding, floods.	Severe: seepage, floods, excess humus.	Severe: ponding, floods, seepage.	Severe: ponding, floods, seepage.	Poor: excess humus, ponding, excess salt.
PfA	Severe: percs slowly.	Slight	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PfB	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PfC	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
PgB	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PgC	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
PgD	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PhB	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PhC	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, small stones, wetness.
PhD	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PoA	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: too sandy, seepage, wetness.
Pr*.					
Pits					
Ps*:					
Pits.					
Udorthents.					
PtB	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: 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
PvB---------- Pittstown	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: small stones.
RdA---------- Ridgebury	Severe: percs slowly, wetness.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
RdB---------- Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
ReA---------- Ridgebury	Severe: percs slowly, wetness.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
ReB---------- Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Sc---------- Scarboro	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
SdA, SdB---------- Sudbury	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
Ss, Sw---------- Swansea	Severe: wetness, poor filter.	Severe: wetness, excess humus, seepage.	Severe: wetness, too sandy, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus, seepage.
UaD*. Udipsamments					
Ud*. Udorthents					
Ur*. Urban land					
WaA---------- Walpole	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: wetness, seepage, too sandy.
WcA---------- Wareham	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
WgA---------- Whitman	Severe: percs slowly, ponding.	Slight----------	Severe: ponding.	Severe: ponding.	Poor: ponding.
WhA---------- Whitman	Severe: percs slowly, ponding.	Slight----------	Severe: ponding.	Severe: ponding.	Poor: ponding.
WnA, WnB---------- Windsor	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: 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
WnC---------- Windsor	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
WrA---------- Woodbridge	Severe: percs slowly, wetness.	Slight----------	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WrB---------- Woodbridge	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WsB, WtB---------- Woodbridge	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AgA, AgB---------- Agawam	Good----------	Probable----------	Probable----------	Fair: small stones, area reclaim.
Be*. Beaches				
CtB*, CtC*: Charlton----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
Paxton----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
CuC*: Charlton----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
Rock outcrop.				
Paxton----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
CuE*: Charlton----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
Rock outcrop.				
Paxton----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
DeA---------- Deerfield	Fair: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy, thin layer.
Du*. Dumps				
Fm, Fp---------- Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
GcB*: Gloucester----------	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Hinckley----------	Good----------	Probable----------	Probable----------	Poor: too sandy, area reclaim, small stones.
GhB*, GhC*: Gloucester----------	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GhB*, GhC*: Hinckley	Good	Probable	Probable	Poor: small stones, too sandy, area reclaim.
HgA, HgB, HgC Hinckley	Good	Probable	Probable	Poor: too sandy, area reclaim, small stones.
HgD Hinckley	Fair: slope.	Probable	Probable	Poor: slope, too sandy, small stones.
MeA, MeB Merrimac	Good	Probable	Probable	Poor: small stones, area reclaim.
NeB Newport	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
NfC Newport	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
NgA Ninigret	Fair: wetness.	Probable	Probable	Poor: area reclaim.
Pa*: Pawcatuck	Poor: wetness.	Probable	Improbable: excess fines.	Poor: wetness, excess salt, excess humus.
Ipswich	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess salt, excess humus.
PfA, PfB Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
PfC Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, area reclaim.
PgB, PgC Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
PgD Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
PhB, PhC Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
PhD Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
PoA Pipestone	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Pr*. Pits				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ps*: Pits.				
Udorthents.				
PtB---------- Pittstown	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
PvB---------- Pittstown	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
RdA, RdB---------- Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
ReA, ReB---------- Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, large stones, area reclaim.
Sc---------- Scarboro	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy, ponding.
SdA, SdB---------- Sudbury	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, too sandy, area reclaim.
Ss---------- Swansea	Poor: wetness.	Probable----------	Improbable: excess fines.	Poor: too sandy, wetness.
Sw---------- Swansea	Poor: wetness.	Probable----------	Improbable: excess fines.	Poor: wetness, excess humus.
UaD*. Udipsamments				
Ud*. Udorthents				
Ur*. Urban land				
WaA---------- Walpole	Poor: wetness.	Probable----------	Probable----------	Poor: wetness, small stones.
WcA---------- Wareham	Poor: wetness.	Probable----------	Probable----------	Poor: wetness, too sandy, area reclaim.
WgA---------- Whitman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
WhA---------- 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.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
WrA, WrB---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
WsB, WtB---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: 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	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AgA---------- Agawam	Severe: seepage.	Severe: no water.	Deep to water	Favorable------	Too sandy------	Favorable.
AgB---------- Agawam	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Too sandy------	Favorable.
Be*. Beaches						
CtB*: Charlton---------	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
Paxton----------	Moderate: slope.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
CtC*: Charlton---------	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
Paxton----------	Severe: slope.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
CuC*, CuE*: Charlton---------	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
Rock outcrop.						
Paxton----------	Severe: slope.	Severe: no water.	Deep to water	Slope, percs slowly, rooting depth.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
DeA---------- Deerfield	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Fast intake, wetness, droughty.	Wetness, too sandy.	Droughty.
Du*. Dumps						
Fm---------- Freetown	Severe: seepage.	Slight---------	Frost action---	Wetness--------	Wetness--------	Wetness.
Fp---------- Freetown	Severe: seepage.	Slight---------	Frost action, ponding.	Ponding--------	Ponding--------	Wetness.
GcB*: Gloucester-------	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, large stones.	Large stones, too sandy.	Large stones, droughty.
Hinckley---------	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Large stones, too sandy.	Large stones, droughty.
GhB*: Gloucester-------	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Large stones, too sandy.	Large stones, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
GhB*:						
Hinckley	Severe: seepage.	Severe: no water.	Deep to water	Slope, fast intake, droughty.	Large stones, too sandy.	Large stones, droughty.
GhC*:						
Gloucester	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Slope, large stones, droughty.
Hinckley	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope, fast intake, droughty.	Slope, large stones, too sandy.	Slope, large stones, droughty.
HgA---------- Hinckley	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Large stones, too sandy.	Large stones, droughty.
HgB---------- Hinckley	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Large stones, too sandy.	Large stones, droughty.
HgC, HgD---------- Hinckley	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, large stones, too sandy.	Large stones, droughty, slope.
MeA---------- Merrimac	Severe: seepage.	Severe: no water.	Deep to water	Favorable------	Too sandy------	Favorable.
MeB---------- Merrimac	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Too sandy------	Favorable.
NeB---------- Newport	Moderate: slope.	Severe: no water.	Deep to water	Slope, percs slowly, rooting depth.	Percs slowly, rooting depth.	Percs slowly, rooting depth.
NfC---------- Newport	Severe: slope.	Severe: no water.	Deep to water	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.
NgA---------- Ninigret	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness--------	Wetness, too sandy.	Favorable.
Pa*:						
Pawcatuck	Severe: seepage.	Severe: salty water, cutbanks cave.	Floods, ponding, excess salt.	Floods, ponding, excess salt.	Ponding--------	Wetness, excess salt.
Ipswich----------	Severe: seepage.	Severe: salty water.	Floods, excess salt, ponding.	Ponding, floods, excess salt.	Ponding--------	Excess salt, wetness.
PfA---------- Paxton	Slight---------	Severe: no water.	Deep to water	Percs slowly, rooting depth.	Percs slowly, rooting depth.	Percs slowly, rooting depth.
PfB---------- Paxton	Moderate: slope.	Severe: no water.	Deep to water	Slope, percs slowly, rooting depth.	Percs slowly, rooting depth.	Percs slowly, rooting depth.
PfC---------- Paxton	Severe: slope.	Severe: no water.	Deep to water	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.	Slope, percs slowly, rooting depth.
PgB---------- Paxton	Moderate: slope.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
PgC, PgD---------- Paxton	Severe: slope.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.	Slope, 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	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
PhB---------- Paxton	Moderate: slope.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
PhC, PhD---------- Paxton	Severe: slope.	Severe: no water.	Deep to water	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
PoA---------- Pipestone	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Fast intake, wetness, droughty.	Too sandy, wetness.	Droughty, wetness.
Pr*. Pits						
Ps*: Pits.						
Udorthents.						
PtB---------- Pittstown	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly, wetness, rooting depth.	Percs slowly, wetness, rooting depth.
PvB---------- Pittstown	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly, wetness, rooting depth.	Percs slowly, rooting depth, wetness.
RdA---------- Ridgebury	Slight---------	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
RdB---------- Ridgebury	Moderate: slope.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, rooting depth, percs slowly.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
ReA---------- Ridgebury	Slight---------	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
ReB---------- Ridgebury	Moderate: slope.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
Sc---------- Scarboro	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Ponding, fast intake, droughty.	Ponding, too sandy.	Wetness, droughty.
SdA---------- Sudbury	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness---------	Too sandy, wetness.	Favorable.
SdB---------- Sudbury	Severe: seepage.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, slope.	Too sandy, wetness.	Favorable.
Ss---------- Swansea	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Wetness, fast intake.	Wetness, too sandy.	Wetness.
Sw---------- Swansea	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Wetness---------	Wetness, too sandy.	Wetness.
UaD*. Udipsamments						
Ud*. Udorthents						
Ur*. 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	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WaA---------- Walpole	Severe: seepage.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness--------	Wetness, too sandy.	Wetness.
WcA---------- Wareham	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
WgA---------- Whitman	Slight---------	Severe: slow refill.	Percs slowly, frost action.	Ponding, percs slowly, rooting depth.	Ponding, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
WhA---------- Whitman	Slight---------	Severe: slow refill.	Percs slowly, frost action.	Ponding, percs slowly, rooting depth.	Ponding, percs slowly, rooting depth.	Wetness, rooting depth, percs slowly.
WnA---------- Windsor	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy------	Droughty.
WnB---------- Windsor	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy------	Droughty.
WnC---------- Windsor	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy.	Slope, droughty.
WrA---------- Woodbridge	Slight---------	Severe: no water.	Percs slowly, frost action.	Wetness, rooting depth, percs slowly.	Percs slowly, wetness, rooting depth.	Percs slowly, rooting depth.
WrB---------- Woodbridge	Moderate: slope.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Percs slowly, wetness. rooting depth.	Percs slowly, rooting depth.
WsB, WtB---------- Woodbridge	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly. rooting depth.	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	
AgA, AgB--------- Agawam	0-1	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	65-95	40-65	<25	NP-3
	1-18	Fine sandy loam, very fine sandy loam, loam.	SM, ML	A-4	0	95-100	85-100	65-95	40-65	<25	NP-3
	18-28	Fine sand, loamy fine sand, loamy sand.	SM, SP-SM	A-2	0	90-100	85-100	40-90	5-35	---	NP
	28-60	Stratified fine sand to very gravelly loamy sand.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-3	0-5	50-100	30-100	15-80	5-35	---	NP
Be*. Beaches											
CtB*, CtC*: Charlton---------	0-2	Very stony fine sandy loam.	SM, ML	A-2, A-4	10-20	75-95	70-90	60-85	30-70	<25	NP-5
	2-23	Fine sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	5-15	65-90	60-90	50-80	20-65	<25	NP-3
	23-60	Fine sandy loam, gravelly fine sandy loam, sandy loam.	SM	A-2, A-4	5-15	60-90	60-85	40-75	20-50	---	NP
Paxton----------	0-8	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-10
	8-22	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	70-90	65-90	50-85	25-65	<30	NP-10
	22-60	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
CuC*, CuE*: Charlton---------	0-2	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	15-25	75-95	70-90	60-85	30-70	<25	NP-5
	2-23	Fine sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	5-15	65-90	60-90	50-80	20-65	<25	NP-3
	23-60	Fine sandy loam, gravelly fine sandy loam, sandy loam.	SM	A-2, A-4	5-15	60-90	60-85	40-75	20-50	---	NP
Rock outcrop.											
Paxton----------	0-8	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-10
	8-22	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	70-90	65-90	50-85	25-65	<30	NP-10
	22-60	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
DeA----------	0-7	Loamy sand-------	SP-SM, SM	A-1, A-2, A-3, A-4	0	95-100	80-100	40-75	5-40	---	NP
Deerfield	7-15	Loamy sand, sand, coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	80-100	40-75	5-30	---	NP
	15-60	Sand, fine sand, coarse sand.	SP, SM	A-1, A-2, A-3	0	95-100	65-100	30-75	3-30	---	NP

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	
Du*. Dumps											
Fm---------- Freetown	0-2	Hemic material---	Pt	A-8	0	---	---	---	---	---	---
	2-60	Sapric material, hemic material.	Pt	A-8	0	---	---	---	---	---	---
Fp---------- Freetown	0-60	Hemic material---	Pt	A-8	0	---	---	---	---	---	---
GcB*:											
Gloucester------	0-2	Fine sandy loam	SM	A-1, A-2, A-4	0-15	80-95	70-90	35-75	15-45	<20	NP
	2-18	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SW-SM	A-1, A-2, A-4	5-30	60-85	40-75	20-50	10-40	<10	NP
	18-60	Very gravelly loamy coarse sand, gravelly loamy sand, gravelly sandy loam.	SM, SW-SM, GM, GW-GM	A-1, A-2	15-40	40-70	20-60	10-40	5-25	<10	NP
Hinckley--------	0-9	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	<20	NP
	9-20	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	<20	NP
	20-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1, A-2	5-30	20-65	20-50	10-40	0-20	<10	NP
GhB*, GhC*:											
Gloucester------	0-2	Very stony fine sandy loam.	SM, SW-SM	A-1, A-2, A-4	10-20	70-95	60-90	30-75	10-45	<20	NP
	2-18	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SW-SM	A-1, A-2, A-4	5-30	60-75	40-75	20-50	10-40	<10	NP
	18-60	Very gravelly loamy coarse sand, gravelly loamy sand, gravelly sandy loam.	SM, SW-SM, GM, GW-GM	A-1, A-2, A-3	15-40	40-70	20-60	10-40	5-25	<10	NP
Hinckley--------	0-9	Very stony fine sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-3	5-20	50-90	35-85	25-70	5-35	<20	NP
	9-20	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-3	0-20	50-90	35-85	15-70	2-35	<20	NP
	20-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SM, SP-SM, GP, GP-GM	A-1, A-2	0-30	20-65	15-55	10-40	0-20	<20	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	
HgA, HgB, HgC, HgD---------- Hinckley	0-9	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	<20	NP
	9-20	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	<20	NP
	20-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1, A-2	5-30	20-65	20-50	10-40	0-20	<10	NP
MeA, MeB--------- Merrimac	0-11	Fine sandy loam	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	<20	NP
	11-23	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	<25	NP
	23-60	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
NeB---------- Newport	0-9	Loam----------	ML, SM	A-4, A-2	0-5	75-95	70-90	50-85	30-75	<25	NP-5
	9-28	Silt loam, channery loam, very fine sandy loam.	ML, SM	A-4, A-2	0-10	65-95	60-90	45-85	30-75	<25	NP-5
	28-60	Silt loam, channery fine sandy loam, channery very fine sandy loam.	SM, ML	A-2, A-4	5-15	60-90	55-85	45-80	25-70	<25	NP-5
NfC---------- Newport	0-9	Very stony loam	ML, SM	A-4, A-2	5-15	75-95	60-90	45-85	30-70	<25	NP-5
	9-28	Silt loam, channery loam, very fine sandy loam.	ML, SM	A-4, A-2	0-10	65-95	60-90	45-85	30-75	<25	NP-5
	28-60	Silt loam, channery loam, very fine sandy loam.	ML, SM	A-4, A-2	5-15	60-90	55-85	45-80	25-70	<25	NP-5
NgA---------- Ninigret	0-9	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	70-95	40-65	<25	NP-3
	9-26	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
	26-60	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
Pa*:											
Pawcatuck-------	0-31	Fibric material	Pt	A-8	0	---	---	---	---	---	NP
	31-60	Loamy sand, loamy fine sand, sand.	SM, SP	A-2, A-3, A-4	0	90-100	80-100	75-95	0-45	---	NP
Ipswich---------	0-14	Fibric material	Pt	A-8	0	---	---	---	---	---	NP
	14-22	Hemic material---	Pt	A-8	0	---	---	---	---	---	NP
	22-60	Sapric material, hemic material.	Pt	A-8	0	---	---	---	---	---	NP
PfA, PfB, PfC---- Paxton	0-8	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	80-95	75-90	60-85	30-65	<30	NP-10
	8-22	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-10
	22-60	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-10

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	
PgB, PgC, PgD---- Paxton	0-8	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-10
	8-22	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	70-90	65-90	50-85	25-65	<30	NP-10
	22-60	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
PhB, PhC, PhD---- Paxton	0-8	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-10
	8-22	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	70-90	65-90	50-85	25-65	<30	NP-10
	22-60	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
PoA---------- Pipestone	0-4	Loamy sand-------	SP, SM, SP-SM	A-2-4, A-3	0	95-100	90-100	60-80	0-20	---	NP
	4-24	Sand, loamy sand, fine sand.	SP-SM, SP, SM	A-2-4, A-3	0	95-100	90-100	60-80	0-15	---	NP
	24-60	Sand, fine sand	SP-SM, SP	A-3, A-2-4	0	95-100	90-100	50-80	0-10	---	NP
Pr*. Pits											
Ps*: Pits.											
Udorthents.											
PtB---------- Pittstown	0-10	Loam----------	ML, CL-ML	A-4, A-6, A-7	0-5	80-100	70-95	65-95	50-85	25-45	4-15
	10-29	Silt loam, channery loam, very fine sandy loam.	ML, SM, CL-ML, SM-SC	A-2, A-4	0-15	65-95	60-90	50-90	30-80	20-35	2-10
	29-60	Channery silt loam, channery loam, very fine sandy loam.	ML, SM, CL-ML, SM-SC	A-2, A-4	0-15	60-95	55-85	45-85	30-75	20-30	2-10
PvB---------- Pittstown	0-10	Very stony loam.	ML, SM, CL-ML, SM-SC	A-2, A-4, A-6, A-7	10-20	65-90	60-85	50-85	30-75	25-45	4-15
	10-29	Silt loam, very fine sandy loam, channery loam.	ML, SM, CL-ML, SM-SC	A-2, A-4	0-15	65-95	60-90	50-90	30-80	20-35	2-10
	29-60	Channery silt loam, channery very fine sandy loam, loam.	ML, SM, CL-ML, SM-SC	A-2, A-4	0-15	60-95	55-85	45-85	30-75	20-30	2-10
RdA, RdB---------- Ridgebury	0-13	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-5	80-100	75-90	40-90	20-70	<30	NP-10
	13-29	Sandy loam, gravelly loam.	SM, ML, SM-SC	A-2, A-4	0-15	65-95	55-90	40-80	20-60	<30	NP-10
	29-60	Sandy loam, gravelly loam.	SM, ML, SM-SC	A-2, A-4	0-15	65-95	55-90	35-80	20-60	<30	NP-10
ReA, ReB---------- Ridgebury	0-13	Extremely stony fine sandy loam.	SM, ML, SM-SC	A-2, A-4	10-30	70-100	50-85	30-80	15-65	<30	NP-10
	13-29	Sandy loam, gravelly loam.	SM, ML, SM-SC	A-2, A-4	0-15	65-95	55-90	40-80	20-60	<30	NP-10
	29-60	Sandy loam, gravelly loam.	SM, ML, SM-SC	A-2, A-4	0-15	65-95	55-90	35-80	20-60	<30	NP-10

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	
Sc	4-0	Muck	Pt	A-8	0	---	---	---	---	---	---
Scarboro	0-9	Mucky loamy sand, mucky sand, mucky fine sandy loam.	SM, SP-SM	A-1, A-2, A-3, A-4	0	95-100	85-100	45-85	5-50	---	NP
	9-28	Loamy sand, fine sand, sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	85-100	45-80	5-35	---	NP
	28-60	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
SdA, SdB	0-4	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	85-100	70-100	40-90	20-55	---	NP
Sudbury	4-18	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
	18-28	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
	28-60	Stratified sand and gravel.	SP, SP-SM, GP, GP-GM	A-1	10-40	35-70	25-65	15-45	0-10	---	NP
Ss	0-10	Coarse sand	SP, SM, SP-SM	A-1, A-2, A-3	0	100	95-100	30-70	0-15	---	NP
Swansea	10-26	Sapric material, hemic material.	Pt	A-8	0	---	---	---	---	---	---
	26-60	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
Sw	0-9	Sapric material	Pt	A-8	0	---	---	---	---	---	---
Swansea	9-26	Sapric material, hemic material.	Pt	A-8	0	---	---	---	---	---	---
	26-60	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
UaD*. Udipsamments											
Ud*. Udorthents											
Ur*. Urban land											
WaA	0-5	Fine sandy loam	SM	A-2, A-4	0-5	90-100	85-100	70-100	30-50	<25	NP-3
Walpole	5-19	Fine sandy loam, sandy loam, gravelly sandy loam.	SM	A-2, A-4	0-5	85-100	60-100	40-95	25-50	---	NP
	19-60	Gravelly loamy sand, gravelly sand, coarse sand.	SP, SM	A-1, A-2, A-3	0-20	55-100	50-100	25-90	0-25	---	NP
WcA	0-9	Loamy sand	SM, SP-SM	A-1, A-2	0	85-100	75-100	40-85	10-35	---	NP
Wareham	9-15	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
	15-60	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

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	
WgA---------- Whitman	0-6	Fine sandy loam	ML, SM, CL-ML	A-2, A-4	0-5	80-100	75-95	45-90	25-85	16-35	NP-10
	6-15	Sandy loam, gravelly fine sandy loam, gravelly silt loam.	ML, SM, CL-ML	A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-35	NP-10
	15-60	Sandy loam, gravelly fine sandy loam, silt loam.	ML, SM, CL-ML	A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-32	NP-8
WhA---------- Whitman	0-6	Extremely stony fine sandy loam.	ML, SM, CL-ML	A-2, A-4	10-40	65-80	60-75	35-70	20-65	16-35	NP-10
	6-15	Sandy loam, gravelly fine sandy loam, gravelly silt loam.	ML, SM, CL-ML	A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-35	NP-10
	15-60	Sandy loam, gravelly fine sandy loam, silt loam.	ML, SM, CL-ML	A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-32	NP-8
WnA, WnB, WnC---- Windsor	0-1	Loamy sand-------	SM	A-2, A-1	0	95-100	85-100	35-85	20-35	---	NP
	1-12	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
	12-60	Sand, fine sand	SP-SM, SM	A-2, A-3, A-1	0	90-100	75-100	40-95	5-20	---	NP
WrA, WrB--------- Woodbridge	0-9	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	85-95	70-90	60-85	30-65	<30	NP-10
	9-27	Fine sandy 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
	27-60	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
WsB---------- Woodbridge	0-9	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
	9-27	Fine sandy 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
	27-60	Fine sandy loam, gravelly, sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-90	50-75	25-60	<30	NP-10
WtB----------	0-9	Extremely stony fine sandy loam,	SM, ML, SM-SC	A-2, A-4	10-25	85-95	70-90	60-85	30-65	<30	NP-10
	9-27	Fine sandy loam, gravelly fine loam.	SM, ML, SM-SC	A-2, A-4	5-15	75-95	65-90	50-85	25-60	<30	NP-10
	27-60	Fine sandy loam, gravelly sandy 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. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Erosion factors		Organic matter
							K	T	
	In	Pct	G/cm³	In/hr	In/in	pH			Pct
AgA, AgB--------- Agawam	0-1 1-18 18-28 28-60	4-10 1-10 1-2 <1	1.10-1.20 1.20-1.40 1.30-1.40 1.30-1.50	2.0-6.0 2.0-6.0 6.0-20 6.0-20	0.13-0.25 0.11-0.21 0.01-0.09 0.01-0.09	5.1-6.0 5.1-6.0 5.1-6.0 5.1-6.0	0.28 0.37 0.17 0.10	3	1-5
Be*. Beaches									
CtB*, CtC*: Charlton-------- Paxton---------- CuC*, CuE*: Charlton-------- Rock outcrop. Paxton---------- DeA-------------- Deerfield	0-2 2-23 23-60 0-8 8-22 22-60 0-2 2-23 23-60 0-8 8-22 22-60 0-7 7-15 15-60	3-8 3-8 1-8 3-12 3-12 3-12 3-8 3-8 1-8 3-12 3-12 3-12 2-7 1-7 0-5	1.00-1.25 1.40-1.65 1.45-1.70 1.00-1.25 1.35-1.60 1.70-2.00 1.00-1.25 1.40-1.65 1.45-1.70 1.00-1.25 1.35-1.60 1.70-2.00 1.00-1.20 1.20-1.45 1.40-1.50	0.6-6.0 0.6-6.0 0.6-6.0 0.6-6.0 0.6-6.0 <0.2 0.6-6.0 0.6-6.0 0.6-6.0 0.6-6.0 0.6-6.0 <0.2 6.0-20 6.0-20 >6.0	0.08-0.23 0.05-0.20 0.05-0.16 0.08-0.23 0.06-0.20 0.05-0.12 0.05-0.15 0.05-0.20 0.05-0.16 0.05-0.15 0.06-0.20 0.05-0.12 0.07-0.13 0.01-0.13 0.01-0.08	4.5-6.0 4.5-6.0 4.5-6.0 4.5-6.5 4.5-6.5 4.5-6.5 4.5-6.0 4.5-6.0 4.5-6.0 4.5-6.5 4.5-6.5 4.5-6.5 4.5-6.5 4.5-6.5 4.5-6.5	0.20 0.32 0.24 0.20 0.32 0.24 0.20 0.32 0.24 0.20 0.32 0.24 0.17 0.15 0.15	3 3 3 3 5	2-5 2-5 2-5 2-5 1-4
Du*. Dumps									
Fm--------------- Freetown	0-2 2-60	--- ---	0.10-0.30 0.15-0.30	0.6-6.0 0.6-6.0	0.35-0.45 0.35-0.45	3.6-4.4 3.6-4.4	---- ----	5	>50
Fp--------------- Freetown	0-60	---	0.10-0.30	0.6-6.0	0.35-0.45	3.6-4.4	----	5	>50
GcB*: Gloucester------ Hinckley-------- GhB*, GhC*: Gloucester------ Hinckley-------- HgA, HgB, HgC, HgD------------- Hinckley	0-2 2-18 18-60 0-9 9-20 20-60 0-2 2-18 18-60 0-9 9-20 20-60 0-9 9-20 20-60	1-8 1-8 0-5 4-8 1-5 0-3 1-8 1-8 0-5 4-8 1-5 0-3 4-8 1-5 0-3	1.00-1.20 1.20-1.50 1.50-1.75 1.00-1.20 1.20-1.40 1.30-1.50 1.00-1.30 1.20-1.50 1.50-1.75 0.90-1.10 1.20-1.40 1.30-1.50 1.00-1.20 1.20-1.40 1.30-1.50	6.0-20 6.0-20 6.0-20 6.0-20 6.0-20 >20 6.0-20 6.0-20 6.0-20 6.0-20 6.0-20 >20 6.0-20 6.0-20 >20	0.08-0.16 0.06-0.10 0.03-0.09 0.03-0.18 0.01-0.10 0.01-0.06 0.07-0.16 0.06-0.10 0.03-0.08 0.03-0.14 0.01-0.10 0.01-0.06 0.03-0.18 0.01-0.10 0.01-0.06	3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0 3.6-6.0	0.24 0.17 0.17 0.17 0.17 0.10 0.17 0.17 0.17 0.17 0.17 0.10 0.17 0.17 0.10	3 3 3 3 3	7-2 2-7 --- --- 2-7

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Erosion factors		Organic matter
							K	T	
	In	Pct	G/cm³	In/hr	In/in	pH			Pct
MeA, MeB--------- Merrimac	0-11 11-23 23-60	3-7 1-3 0-3	1.10-1.20 1.20-1.40 1.30-1.50	2.0-6.0 2.0-20.0 6.0-20	0.14-0.19 0.03-0.12 0.01-0.06	4.5-5.5 4.5-5.5 4.5-5.5	0.24 0.17 0.10	3	1-5
NeB-------------- Newport	0-9 9-28 28-60	4-10 3-10 3-10	1.10-1.50 1.30-1.60 1.70-2.00	0.6-6.0 0.6-6.0 <0.2	0.11-0.28 0.08-0.24 0.05-0.12	4.5-6.0 4.5-6.0 4.5-6.0	0.28 0.37 0.24	3	2-6
NfC-------------- Newport	0-9 9-28 28-60	4-10 3-10 3-10	1.10-1.50 1.30-1.60 1.70-2.00	0.6-6.0 0.6-6.0 <0.2	0.09-0.28 0.08-0.24 0.05-0.12	4.5-6.0 4.5-6.0 4.5-6.0	0.20 0.37 0.24	3	2-6
NgA-------------- Ninigret	0-9 9-26 26-60	3-7 3-7 0-2	1.00-1.25 1.35-1.60 1.45-1.70	2.0-6.0 2.0-6.0 6.0-20	0.13-0.25 0.06-0.18 0.01-0.13	4.5-6.0 4.5-6.0 4.5-6.0	0.28 0.32 0.10	3	2-8
Pa*: Pawcatuck------- Ipswich--------- 	0-31 31-60 0-14 14-22 22-60	--- 0-2 --- --- ---	0.30-0.80 1.45-1.70 0.10-0.30 0.10-0.30 0.10-0.30	0.6-20 >20 0.6-20 0.6-20 0.6-20	0.18-0.35 0.02-0.13 0.18-0.35 0.18-0.35 0.18-0.35	5.6-7.8 5.6-7.8 6.1-7.8 6.1-7.8 6.1-7.8	---- 0.10 ---- ---- ----	5 5	--- ---
PfA, PfB, PfC---- Paxton	0-8 8-22 22-60	3-12 3-12 3-12	1.00-1.25 1.35-1.60 1.70-2.00	0.6-2.0 0.6-2.0 <0.2	0.08-0.23 0.06-0.20 0.05-0.12	4.5-6.0 4.5-6.0 4.5-6.0	0.24 0.32 0.24	3	2-5
PgB, PgC, PgD---- Paxton	0-8 8-22 22-60	3-12 3-12 3-12	1.00-1.25 1.35-1.60 1.70-2.00	0.6-6.0 0.6-6.0 <0.2	0.08-0.23 0.06-0.20 0.05-0.12	4.5-6.0 4.5-6.0 4.5-6.0	0.20 0.32 0.24	3	2-5
PhB, PhC, PhD---- Paxton	0-8 8-22 22-60	3-12 3-12 3-12	1.00-1.25 1.35-1.60 1.70-2.00	0.6-6.0 0.6-6.0 <0.2	0.05-0.15 0.06-0.20 0.05-0.12	4.5-6.0 4.5-6.0 4.5-6.0	0.20 0.32 0.24	3	2-5
PoA-------------- Pipestone	0-4 4-24 24-60	2-12 2-12 2-12	0.63-1.57 1.22-1.57 1.22-1.57	6.0-20 6.0-20 >20	0.07-0.10 0.06-0.09 0.05-0.07	3.6-6.0 3.6-6.0 3.6-6.0	0.17 0.17 0.17	5	3-4
Pr*. Pits									
Ps*: Pits. Udorthents.									
PtB-------------- Pittstown	0-10 10-29 29-60	2-12 2-12 2-12	1.00-1.30 1.30-1.60 1.70-2.00	0.6-2.0 0.6-2.0 <0.2	0.15-0.20 0.15-0.20 0.10-0.15	4.5-6.0 4.5-6.0 4.5-6.0	0.28 0.37 0.24	3	2-6
PvB-------------- Pittstown	0-10 10-29 29-60	2-12 2-12 2-12	1.00-1.30 1.30-1.60 1.70-2.00	0.6-2.0 0.6-2.0 <0.2	0.15-0.20 0.15-0.20 0.10-0.15	4.5-6.0 4.5-6.0 4.5-6.0	0.24 0.37 0.24	3	2-6
RdA, RdB--------- Ridgebury	0-13 13-29 29-60	3-10 2-8 2-8	1.00-1.30 1.60-1.90 1.80-2.00	0.6-6.0 0.6-6.0 <0.2	0.06-0.24 0.04-0.20 0.01-0.05	4.5-6.0 4.5-6.0 4.5-6.0	0.24 0.32 0.24	3	4-7
ReA, ReB--------- Ridgebury	0-13 13-29 29-60	3-10 2-8 2-8	1.00-1.30 1.60-1.90 1.80-2.00	0.6-6.0 0.6-6.0 <0.2	0.06-0.21 0.04-0.20 0.01-0.05	4.5-6.0 4.5-6.0 4.5-6.0	0.20 0.32 0.24	3	4-7
Sc--------------- Scarboro	4-0 0-9 9-28 28-60	--- 1-7 1-5 0-2	0.55-0.75 0.70-1.00 1.15-1.35 1.35-1.55	6.0-20.0 >6.0 >6.0 >6.0	0.20-0.45 0.10-0.23 0.04-0.13 0.01-0.13	4.5-6.0 4.5-6.0 4.5-6.0 4.5-6.0	---- 0.17 0.17 0.10	5	---

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Erosion factors		Organic matter
							K	T	
	In	Pct	G/cm3	In/hr	In/in	pH			Pct
SdA, SdB----------	0-4	2-6	1.10-1.40	2.0-6.0	0.10-0.25	3.6-6.0	0.24	3	2-6
Sudbury	4-18	2-7	1.15-1.45	2.0-6.0	0.07-0.18	3.6-6.0	0.24		
	18-28	0-4	1.25-1.45	2.0-20	0.01-0.15	3.6-6.0	0.17		
	28-60	0-3	1.30-1.45	6.0-20	0.01-0.06	3.6-6.0	0.10		
Ss----------	0-10	1-5	1.10-1.35	6.0-20	0.03-0.08	3.6-4.4	----	5	1-2
Swansea	10-26	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	----		
	26-60	1-5	1.15-1.40	>20	0.01-0.08	3.6-5.5	----		
Sw----------	0-9	---	0.10-0.30	0.6-6.0	0.35-0.45	3.6-4.4	----	5	>50
Swansea	9-26	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	----		
	26-60	1-5	1.15-1.40	>20	0.01-0.08	3.6-5.5	----		
UaD*.									
Udipsamments									
Ud*.									
Udorthents									
Ur*.									
Urban land									
WaA----------	0-5	2-6	1.00-1.25	2.0-6.0	0.10-0.23	4.5-6.0	0.20	3	2-8
Walpole	5-19	2-6	1.30-1.55	2.0-6.0	0.07-0.18	4.5-6.0	0.24		
	19-60	0-2	1.40-1.65	>6.0	0.01-0.13	4.5-6.0	0.10		
WcA----------	0-9	1-3	1.00-1.20	6.0-20	0.06-0.15	3.6-5.5	0.17	5	2-5
Wareham	9-15	0-3	1.30-1.50	6.0-20	0.03-0.13	3.6-5.5	0.17		
	15-60	0-2	1.40-1.60	6.0-20	0.01-0.10	3.6-5.5	0.10		
WgA----------	0-6	5-8	1.10-1.30	0.6-6.0	0.13-0.23	4.5-6.5	0.28	3	2-8
Whitman	6-15	2-4	1.60-1.80	0.6-6.0	0.10-0.17	4.5-6.5	0.32		
	15-60	1-3	1.80-2.00	<0.2	0.03-0.04	4.5-6.5	0.24		
WhA----------	0-6	5-8	1.10-1.30	0.6-6.0	0.12-0.26	4.5-6.5	0.20	3	---
Whitman	6-15	2-4	1.60-1.85	0.6-6.0	0.10-0.17	4.5-6.5	0.32		
	15-60	1-3	1.85-2.00	<0.2	0.03-0.04	4.5-6.5	0.24		
WnA, WnB, WnC----	0-1	1-3	1.00-1.20	>6.0	0.08-0.12	4.5-5.5	0.17	5	2-4
Windsor	1-12	0-3	1.30-1.55	>6.0	0.02-0.12	4.5-5.5	0.17		
	12-60	0-2	1.40-1.65	>6.0	0.01-0.08	4.5-5.5	0.17		
WrA, WrB----------	0-9	3-12	1.00-1.25	0.6-2.0	0.08-0.23	4.5-5.5	0.24	3	2-6
Woodbridge	9-27	3-12	1.35-1.60	0.6-2.0	0.06-0.20	4.5-5.5	0.32		
	27-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-5.5	0.24		
WsB, WtB----------	0-9	3-12	1.00-1.25	0.6-2.0	0.08-0.23	4.5-5.5	0.24	3	2-6
Woodbridge	9-27	3-12	1.35-1.60	0.6-2.0	0.06-0.20	4.5-5.5	0.32		
	27-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-5.5	0.24		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "rare," "brief," "apparent," and "perched." 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					
AgA, AgB---------- Agawam	B	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.
Be*. Beaches										
CtB*, CtC*: Charlton---------	B	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.
Paxton-----------	C	None---------	---	---	1.5-2.5	Perched	Feb-Mar	Moderate	Low-------	Moderate.
CuC*, CuE*: Charlton---------	B	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.
Rock outcrop.										
Paxton-----------	C	None---------	---	---	1.5-2.5	Perched	Feb-Mar	Moderate	Low-------	Moderate.
DeA--------------- Deerfield	B	None---------	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	Low-------	High.
Du*. Dumps										
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.
GcB*, GhB*, GhC*: Gloucester-------	A	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.
Hinckley---------	A	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.
HgA, HgB, HgC, HgD--------------- Hinckley	A	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.
MeA, MeB---------- Merrimac	A	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.
NeB, NfC---------- Newport	C	None---------	---	---	1.5-2.5	Perched	Feb-Mar	Moderate	Low-------	High.
NgA--------------- Ninigret	B	None---------	---	---	1.5-3.0	Apparent	Nov-Apr	Moderate	Low-------	High.
Pa*: Pawcatuck--------	D	Frequent----	Very brief	Jan-Dec	1-0	Apparent	Jan-Dec	---	High------	High.
Ipswich----------	D	Frequent----	Very brief	Jan-Dec	1-0	Apparent	Jan-Dec	---	High------	High.
PfA, PfB, PfC, PgB, PgC, PgD, PhB, PhC, PhD---- Paxton	C	None---------	---	---	1.5-2.5	Perched	Feb-Mar	Moderate	Low-------	Moderate.
PoA--------------- Pipestone	A	None---------	---	---	0.5-1.5	Apparent	Nov-May	Moderate	Low-------	Moderate.

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					
Pr*. Pits										
Ps*: Pits.										
Udorthents.										
PtB, PvB---------- Pittstown	C	None--------	---	---	1.5-3.0	Perched	Nov-Apr	Moderate	Moderate	High.
RdA, RdB, ReA, ReB---------- Ridgebury	C	None--------	---	---	0-1.5	Perched	Nov-May	High-----	High-----	High.
Sc---------- Scarboro	D	None--------	---	---	+1-1.0	Apparent	Jan-Dec	High-----	High-----	High.
SdA, SdB---------- Sudbury	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	Low------	High.
Ss, Sw---------- Swansea	D	None--------	---	---	0-1.0	Apparent	Jan-Dec	High-----	High-----	High.
UaD*. Udipsamments										
Ud*. Udorthents										
Ur*. Urban land										
WaA---------- Walpole	C	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	Low------	High.
WcA---------- Wareham	C	None--------	---	---	0-1.5	Apparent	Sep-Jun	Moderate	Moderate	High.
WgA, WhA---------- Whitman	D	None--------	---	---	+1-0.5	Perched	Sep-Jun	High-----	High-----	High.
WnA, WnB, WnC----- Windsor	A	None--------	---	---	>6.0	---	---	Low------	Low------	High.
WrA, WrB, WsB, WtB---------- 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

Soil name	Family or higher taxonomic class
Agawam	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
Charlton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Deerfield	Mixed, mesic Aquic Udipsamments
Freetown	Dysic, mesic Typic Medisaprists
Gloucester	Sandy-skeletal, mixed, mesic Typic Dystrochrepts
Hinckley	Sandy-skeletal, mixed, mesic Typic Udorthents
Ipswich	Euic, mesic Typic Sulfihemists
Merrimac	Sandy, mixed, mesic Typic Dystrochrepts
Newport	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Ninigret	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Dystrochrepts
Pawcatuck	Euic, mesic Typic Sulfihemists
Paxton	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Pipestone	Sandy, mixed, mesic Entic Haplaquods
Pittstown	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Ridgebury	Coarse-loamy, mixed, mesic Aeric Fragiaquepts
Scarboro	Sandy, mixed, mesic Histic Humaquepts
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
Whitman	Coarse-loamy, mixed, mesic Humic Fragiaquepts
Windsor	Mixed, mesic Typic Udipsamments
Woodbridge	Coarse-loamy, mixed, mesic Typic Fragiochrepts

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