SOIL SURVEY OF

Suffolk County, New York

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

Major fieldwork for this soil survey was done in the period 1965–70. Soil names and descriptions were approved in 1970. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1970. This survey was made cooperatively by the Soil Conservation Service and the Cornell Agricultural Experiment Station, with financial aid from the U.S. Department of Housing and Urban Development and the Suffolk County Board of Supervisors. It is part of the technical assistance furnished to the Suffolk County Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Suffolk County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the woodland suitability group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units.

Foresters and others can refer to the section "Use of the Soils as Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for nonindustrial buildings and for recreation areas in the section "Town and Country Planning."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Genesis, Morphology, and Classification of the Soils."

Newcomers to the county may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County."

Cover: **Montauk Point Lighthouse on eroding glacial till bluff. Large boulders on the beach in the right foreground help to control erosion from wave action.**

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SOIL SURVEY OF SUFFOLK COUNTY, NEW YORK

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH CORNELL AGRICULTURAL EXPERIMENT STATION

SUFFOLK COUNTY, in the extreme southeastern part of New York (fig. 1), occupies an area of approximately 590,080 acres or about 922 square miles. The county is approximately 86 miles long and 21 miles wide at its widest point, which is on its western boundary. It covers the eastern two-thirds of Long Island. The county seat, Riverhead, has a population of about 5,830.

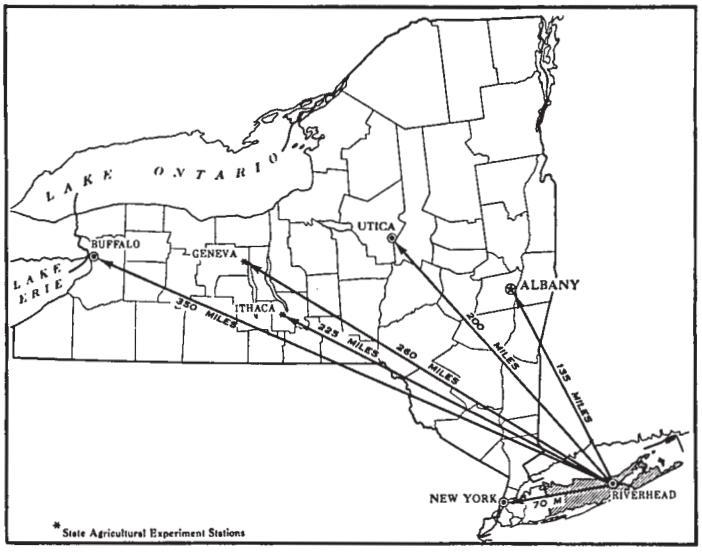

Figure 1.—Location of Suffolk County in New York.

The principal farm enterprise in the county is potato farming, in which the county ranks first in New York. It also ranks first in the production of flowers, nursery stock, ducks, and cauliflower. In addition, the county ranks second in production of strawberries and ninth in production of vegetables.

Only 13 percent of the county is in farms; however, about 80 percent of this acreage is in crops. The remainder of the farm acreage is in pasture or in small farm woodlots. About 34 percent of the county is classified as woodland, including that used for noncommercial purposes, and the remaining 53 percent is idle, supports no farm or wood crop, or is built up. The wooded acreage, both farm and nonfarm, is of little importance to the farm economy of the county. At the present time very little or no commercial use is made of the woodland crops.

The ever-increasing demand for land for housing developments is rapidly changing the land use patterns in the western part of the county. Most of the farmland and large tracts of woodland are being used as sites for houses or as sites for industrial parks.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Suffolk County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Montauk and Carver, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

[1] Others participating in the field survey, involving areas of less than 30,000 acres each, were W. W. BEVERAGE, E. O. BREWER, R. C. BRINLEE, M. BUREAU, J. F. CAMPBELL, A. R. FORD, C. E. FURBUSH, R. H. GILBERT, O. G. HENSON, N. R. KALLOCH, JR., J. M. KING, JR., J. W. LAWRENCE, L. MCDOWELL, K. S. OLSSON, T. E. SANDERS, W. J. SHEEHAN, O. G. SPROUSE, J. R. STEIGER, J. C. TRUE, W. R. WAITE, R. B. WILLEY, D. WILLIAMS, and H. J. WINKLEY.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Montauk silt loam, 0 to 3 percent slopes, is one of several phases within the Montauk series.

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

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit, the undifferentiated group, is shown on the soil map of Suffolk County.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Carver and Plymouth sands, 0 to 3 percent slopes, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so altered by man that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Dune land and Urban land are land types in Suffolk County.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Suffolk County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The 10 soil associations in Suffolk County are described in the following pages. The terms for texture used in the titles of the associations apply to the surface layer. For example, in the title of association 1, the words "coarse textured and moderately coarse textured" describe the surface layer.

1. Carver-Plymouth-Riverhead Association

Deep, rolling, excessively drained and well-drained, coarse textured and moderately coarse textured soils on moraines

This association is mainly along the north shore adjoining Long Island Sound. The eastern part of the area is about one-fourth mile wide, and the western part is about 4 miles wide. The association is characteristically rolling, but slopes range from nearly level to steep. In the western part of the association, broad upland flats on the moraines have been partly dissected, leaving steep-sided valleys that drain toward Long Island Sound and its embayments. In the eastern part a low ridge or a series of narrow parallel ridges is dominated by strongly sloping soils. The association also includes an area between Dix Hills and Brentwood and Plum and Fishers islands.

This association makes up 11 percent of the county. Carver and Plymouth soils make up about 30 percent of the association, and Riverhead soils, including those that have been graded, make up about 30 percent. Minor soils make up the remaining 40 percent.

Carver soils are deep and excessively drained. Their surface layer, subsurface layer, and subsoil are sand. The substratum is sand and gravel. Depth to the substratum ranges from 16 to 32 inches. Carver soils are similar to Plymouth soils, but they have a distinctive gray or

light-gray subsurface layer that is lacking in Plymouth soils.

Plymouth soils are deep and excessively drained. Their surface layer and subsoil are sand, and the substratum is sand and gravel. Depth to the substratum ranges from 20 to 36 inches. Carver and Plymouth soils are mainly on the steeper parts of ridges and in rolling areas.

Riverhead soils are deep and well drained. They have a surface layer and subsoil of sandy loam. In many places, however, the lower part of the subsoil is loamy sand. The substratum is sand and gravel. Depth to the substratum ranges from 22 to 36 inches. These soils mainly occupy upland flats or gently undulating areas.

Minor soils of this association are well-drained Haven soils, well drained to moderately well drained Montauk soils, Raynham and Wareham soils that have a high water table, and land that has been cut and filled. Steep bluffs and beaches along Long Island Sound are also in this association. Haven and Montauk soils are on upland flats near Riverhead soils. Raynham and Wareham soils are adjacent to ponds or to tidal marshes.

The rolling landscape, many wooded areas, and nearness to water make soils in this association highly desirable as sites for estates. Most of the association in the western part of the county that was originally farmed is now in housing developments. The eastern part is wooded, or the sites have summer homes on them. Plum Island, which is owned by the Government, is the site of the Plum Island Animal Disease Laboratory. Fishers Island is used almost exclusively for summer estates and has no operating farms. The general trend in land use is toward housing and recreation.

The sandy texture and steep slopes make the soils in much of this association poorly suited to farming. Slope is the dominant limitation to use of these soils as building sites. In some areas the soils are underlain by fine sand, silt, or compact glacial till. Careful onsite investigation is needed to determine the extent of such areas.

2. Haven-Riverhead Association

Deep, nearly level to gently sloping, well-drained, medium-textured and moderately coarse textured soils on outwash plains

This association is mainly in the northern part of the county. It extends eastward from St. James to Orient Point and ranges from 2 to 4 miles wide. A separate area extends westward from Brentwood to the Nassau County line. A narrow branch follows State Route 110 north to Huntington Station and then east to Commack. This association is on outwash plains. It is characteristically nearly level and has short gentle slopes along shallow drainageways (fig. 2). Some areas are pitted by steep-sided kettle holes. Slopes range from 1 to 12 percent.

This association makes up 26 percent of the county. Haven soils make up about 40 percent of the association, and Riverhead soils make up about 30 percent. Riverhead and Haven soils that have been graded make up a large segment in the western areas. Minor soils make up the remaining 30 percent.

Haven soils are deep, well drained, and medium textured. Their surface layer is loam, and their subsoil is loam or silt loam. The substratum is sand and gravel. Depth to the substratum ranges from about 18 to 36 inches. Riverhead soils are deep, well drained, and moderately coarse textured. Their surface layer and subsoil are sandy loam. In many places, however, the lower part of the subsoil is loamy sand. The substratum is sand and gravel. Depth to the substratum ranges from about 22 to 36 inches. Haven and Riverhead soils are together across most landforms; however, Haven soils are most extensive at slightly higher elevations and at greater distances from the drainageways.

Minor soils of this association are steeper Carver and Plymouth soils on the sides of drainageways and on the steep sides of kettle holes. Soils in the Haven series, thick surface layer, are in the bottom of shallow depressions. Also in this association are Canadice, Raynham, Scio, and Sudbury soils that have a high water table. Raynham, Scio, and Sudbury soils are in low-lying areas near ponds or marshes. The largest area is near Brookhaven Laboratory. Canadice soils are in low-lying wet areas west of the village of Greenport.

Most areas of this association have been cleared. From the Brookhaven-Riverhead town line eastward, the soils in this association make up the largest area of farmland in the county, and they are used extensively for potatoes and other vegetables. In the western part of the county, nearly all of these soils are in housing developments, and only a few scattered farms remain; but farming will continue for a time in the eastern part.

These soils are dominantly gently sloping to nearly level. They have moderate to high available moisture capacities. Crops respond well to applications of lime and fertilizer. These factors make this association one of the best farming areas in the county. Because drainage is good in these soils, and they can be excavated with ease, this association has excellent potential for housing developments and similar uses. In places where the soils have a high water table or are strongly sloping, limitations are more severe for most nonfarm uses.

3. Plymouth-Carver Association, Rolling and Hilly

Deep, excessively drained, coarse-textured soils on moraines

This association extends eastward through the center of the county from Hauppauge to the Shinnecock Canal. From the Shinnecock Canal, it is along the north shore of the south fork through Southhampton and East Hampton to Threemile Harbor. The association ranges from 1 to 5 miles in width. This area is on the Ronkonkoma moraine. These soils are characteristically strongly sloping to steep (fig. 3). Slopes range from 8 to 35 percent.

This association makes up 19 percent of the county. Plymouth loamy sand soils make up about 45 percent of the association, and Carver and Plymouth sands make up about 30 percent. Minor soils make up the remaining 25 percent.

Plymouth soils are deep and excessively drained. The substratum is sand and gravel. Depth to the substratum

Figure 2.—**Typical landscape in association 2. The low ridges in the background are in association 1. The crop growing is cauliflower.**

ranges from 20 to 36 inches. Plymouth soils have a surface layer and subsoil of sand or loamy sand. Carver soils are similar to Plymouth soils, but they have a distinctive gray or light-gray subsurface layer that is lacking in Plymouth soils. Carver soils are deep and excessively drained. Their surface layer and subsoil are sand. The substratum is sand and gravel. Depth to the substratum ranges from 16 to 32 inches. Carver and Plymouth sands generally are the steeper soils on ridgetops and the lower part of slopes. The more gently sloping Plymouth loamy sand soils are mainly on the intervening areas. Areas along the crests of some ridges have a large amount of gravel on the surface. These gravelly areas generally are very small, and they are scattered throughout the association.

Minor soils are Haven and Riverhead soils that are nearly level and are scattered throughout the association, Atsion and Berryland soils that have a high water table, and Muck. These soils and this land type are along streams and adjacent to ponds and marshes. The largest areas of these soils are along the Peconic River and nearby ponds. These areas extend eastward from the headwaters of the river to its mouth at Riverhead. In the western part of the association, Cut and fill land is extensive.

The soils of this association have a characteristically poor cover of scrub oak, white oak, and pitch pine. Only a small part of this association has ever been farmed, and many of these areas have been allowed to revert to brush. This association provides one of the better sources of gravel in the county. In the western part of the county, a large part of the association is in housing developments.

The soils of this association are coarse textured and droughty. Permeability is rapid. Natural fertility is low to very low. These factors make them very poorly suited or only fairly well suited to most crops commonly grown in the county. Steep slopes on much of the area and difficulty of establishing and maintaining lawns and landscape plantings severely limit these soils for housing developments or similar nonfarm uses. Areas of soils that have a high water table severely limit the use of some areas for sewage effluent disposal. Rapid movement of water and wastes from cesspools and septic tanks can contaminate ground water supplies beneath the rapidly permeable soils of the association.

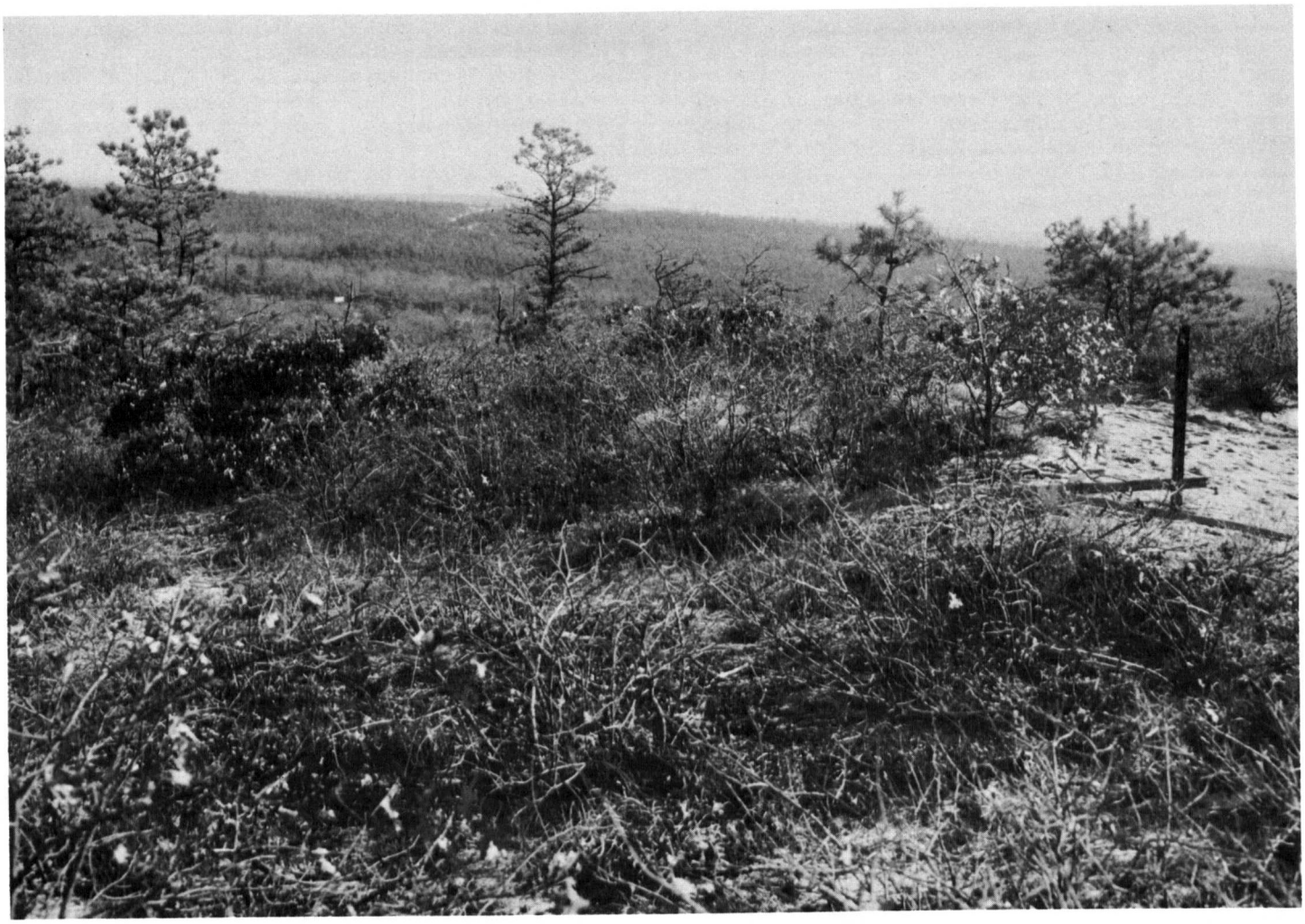

Figure 3.—**Typical landscape in association 3. The vegetation is a mixture of scrub oak and pitch pine.**

4. Riverhead-Plymouth-Carver Association

Deep, nearly level to gently sloping, well-drained and excessively drained, moderately coarse textured and coarse textured soils on the southern outwash plain

This association extends eastward from the Nassau County line near Amityville to Shinnecock Bay at Quogue. The association ranges from 1 to 7 miles in width. The wide areas are near Patchogue. This association is in broad areas on the southern outwash plain. It is characteristically nearly level, and slopes range mainly from 1 to 6 percent; but on the sides of drainage channels, slopes range from 8 to 35 percent. This plain has been laid down by outwash deposition beyond the limits of the glacier and is not pitted. The southern edge of the association that adjoins the Great South Bay and Moriches Bay is indented by many short tidal creeks.

This association makes up 21 percent of the county. Riverhead soils make up about 45 percent of the association, Plymouth loamy sand soils make up about 30 percent, and Carver and Plymouth sands make up about 10 percent of the association. Minor soils make up the remaining 15 percent.

Riverhead soils are deep and well drained. The surface layer and the subsoil are sandy loam. In many places, however, the lower part of the subsoil is loamy sand. The substratum is sand and gravel. Depth to the substratum ranges from 22 to 36 inches. Plymouth soils are deep and excessively drained. The surface layer and the subsoil are loamy sand or sand. The substratum is sand and gravel. Depth to the substratum ranges from 20 to 36 inches. The nearly level Riverhead and Plymouth soils are dominant on broad, flat areas between intermittent drainageways, but the Riverhead soils are at slightly higher elevations and at greater distances from the drainageways than the Plymouth soils. Carver soils are deep and excessively drained. The surface layer and the subsoil are sand. The substratum is sand and gravel. Depth to the substratum ranges from 16 to 32 inches. Steeper Carver soils are on the sides of intermittent drainageways. In a few areas Carver soils are on broad flats adjacent to the drainageways.

Among the minor soils in this association are Haven soils that are adjacent to Riverhead soils but at slightly higher elevations. Other minor soils are Berryland, Walpole, and Wareham soils, which have a high water table,

and the miscellaneous land type Tidal marsh. They are generally along the margins of tidal creeks or at the southern ends of drainageways that have elevations near that of the water table. Extensive areas of Riverhead and Haven soils that have been altered by grading operations are in built-up areas. Large areas of Cut and fill land are also in this association where housing tracts have been developed.

This association is mainly in woods or within areas of urban expansion. The largest wooded areas are the areas farthest from the water between Bohemia and Mastic. The part of the association near the shore is almost entirely built up. The trend is toward complete development of these soils for houses. Currently, development is mainly along the shore, but encroachment into inland areas is also taking place gradually.

The suitability of the soils of this association for farming is somewhat limited by the coarse-textured Plymouth and Carver soils; however, areas of Riverhead soils are suited to most locally grown crops. Level topography, ease of excavation, and good drainage generally make this association well suited to urban and suburban developments. Effluent from cesspools and septic tanks contributes to contamination of ground water in areas where the ground water is near the surface. The wet soils in the association have severe limitations for most nonfarm uses.

5. Dune land-Tidal marsh-Beaches Association

Sand dunes, tidal marshes, and beaches of the barrier beach and south shore

This association is on the barrier beach from the Nassau County line to Southhampton. From Southhampton, it is along the south shore to Hither Hills State Park. The small sand spit at Orient Point is also in the association. The topography of the association is typical of sand dunes and beaches. It has uneven dunes slightly inland from the beaches (fig. 4).

Figure 4.—Typical landscape of dunes and beaches in association 5.

This association makes up 4 percent of the county. Dune land makes up about 40 percent of the association, Tidal marsh makes up about 35 percent, and Beaches about 15 percent. Areas where dredgings have been placed on tidal marshes or dunes make up the remaining 10 percent.

Dune land is made up mainly of nearly even-sized sand grains that have been piled up by winds. Vegetation is sparse on most dunes except in the Sunken Forest and a portion of the area near Napeague. In places dunes have encroached on marshes, and the water table is within 2 or 3 feet of the surface. Tidal marsh has an organic surface layer that ranges from a few inches to several feet in thickness. The organic surface layer is underlain by white sand. The water level is at or near the surface throughout the year, but floods occur only during abnormally high tides. Tidal marsh has a heavy vegetative cover of salt-tolerant grasses and reeds. Tidal marsh islands west of Captree State Park are part of this association. Beaches are subject to continual wave action.

The area is mainly open. Summer cottages, bathing beaches, and other recreational facilities are scattered along the shoreline.

6. Bridgehampton-Haven Association

Deep, nearly level to gently sloping, well drained to moderately well drained, medium-textured soils on outwash plains

This association is on the south fork of the island, and it extends eastward from Southampton to Amagansett. The association is on outwash plains. It is characteristically level or gently sloping, but slopes are short and slightly steeper along intermittent drainageways (fig. 5). Slopes range mainly from 1 to 6 percent, but range from 8 to 15 percent along the drainageways. Some areas near the moraine are pitted by steep-sided kettle holes.

This association makes up 5 percent of the county. Bridgehampton soils make up about 35 percent of the association, and Haven soils make up about 25 percent. Minor soils make up the remaining 40 percent.

Bridgehampton soils are deep and well drained to moderately well drained. The surface layer and the subsoil are silt loam to very fine sandy loam, but it generally is silt loam. These soils generally are about 2 feet thicker over sand and gravel than the other major outwash soils in the county. The underlying material is sand and gravel. Depth to the underlying material ranges from 36 to 56 inches. Haven soils are deep and well drained. The surface layer is loam, and the subsoil is loam or silt loam. The substratum is sand and gravel. Depth to the substratum ranges from 18 to 36 inches. The nearly level to gently sloping Bridgehampton soils are mainly in the southern part of the association. The nearly level to moderately sloping Haven soils are on the sides of drainageways and on many of the broad, nearly level and gently sloping areas in the northern part of the association.

Minor soils of this association are the deep, excessively drained Carver and Plymouth soils, the well-drained Riverhead soils, the very poorly drained Berryland soils, and the somewhat poorly drained Raynham soils that have a high water table.

Figure 5.—**Typical landscape in association 6. The crop growing is potatoes.**

Steeper Carver, Plymouth, and Riverhead soils are on the sides of some drainageways. Nearly level Berryland and Raynham soils are around ponds and creeks and adjacent to tidal marshes. A soil similar to Plymouth soils that has a silty substratum generally is in wooded areas next to large areas of Bridgehampton soils. This soil generally is in areas from Georgica Pond to Amagansett.

Almost all areas of this association are cleared and are used extensively for the production of potatoes and other vegetables. Many acres are used for nonfarm purposes. The building sites around the villages of Southampton, East Hampton, and Bridgehampton are examples. These soils will continue to be used for farming for some time. The trend is toward development of areas near the shore for building sites.

Depth, good drainage, and moderate to high available moisture capacity make this association one of the best farming areas in the county. The soils in this association are well suited to all crops commonly grown in the county. Limitations are few for building or industrial sites. In this association are large, nearly level areas that have good internal drainage and that are easily excavated. Excavating to the underlying sand and gravel of the Bridgehampton soils necessitates the removal of the thick, less stable mantle of silty material. Bridgehampton soils tend to be slightly wet in some areas and therefore have minor limitations for septic tank drain fields and cesspools.

7. Montauk-Haven-Riverhead Association

Deep, nearly level to strongly sloping, well drained to moderately well drained, moderately coarse textured and medium-textured soils on moraines

This association, unlike most of the other associations in the county, is not in a continuous area. The largest area is in the vicinity of Manetto Hills and Dix Hills in Huntington. The other major areas are on Gardiners Island and Shelter Island, both of which are entirely within the association. Robins Island, a small area near Cow Neck, North Haven, and Jessups Neck are also in this association. The association has rolling hills and soils that are nearly level to strongly sloping. A few boulders dot the landscapes of these soils. The uplands in the western areas are more level than in the eastern areas. Also, the western area charactistically has many kettle holes that are wet or water filled most of the year.

This association makes up 5 percent of the county. Montauk soils make up about 50 percent of the association, Haven soils make up about 15 percent, and Riverhead soils make up about 15 percent. Soils of the Montauk-Haven-Riverhead association that have been graded are extensive in the western areas. Minor soils make up the remaining 20 percent.

Montauk soils are deep and well drained to moderately well drained. The surface layer is silt loam or fine sandy loam, and the subsoil is loam or fine sandy loam. A fragipan or compact layer is at depths of 20 to 30 inches. This fragipan or compact layer ranges from 2 to more than 20 feet in thickness. Poorly sorted or crudely stratified deposits of sand and gravel are under the fragipan. Haven soils are deep and well drained. The surface layer is loam, and the subsoil is loam or silt loam. The substratum is sand and gravel. Depth to the substratum ranges from about 18 to 36 inches. Riverhead soils are deep and well drained. The surface layer and subsoil are sandy loam. The lower part of the subsoil is loamy sand in many Riverhead soils. The substratum is coarse sand and gravel. Depth to the substratum ranges from about 22 to 36 inches. Montauk, Haven, and Riverhead soils are in a mixed pattern throughout the association and are not in any particular part of the landform with respect to the other soils.

Minor soils are the excessively drained Carver, Plymouth, and Montauk, sandy variant, soils, the somewhat poorly drained to poorly drained Walpole and Atsion soils, and the very poorly drained Berryland soils. Carver, Plymouth, and Montauk, sandy variants, are on hillsides; and Walpole, Atsion, and Berryland soils are around ponds and creeks.

Slightly more than half of this association, is cleared; however, most of the cleared areas in the western part of the county are in housing developments. The eastern areas are nearly all wooded, except the central and western parts of Shelter Island, where there are a few farms. Robins Island and Gardiners Island are privately owned and are used mainly as game preserves.

These soils are well suited to farming, but the more sloping areas are subject to severe erosion. Because these soils generally have a very deep root zone, the productive potential for trees on the soils in this association is one of the best in the county. Montauk soils have moderate to severe limitations for housing developments because of slow infiltration in the fragipan layer. Excavation is difficult in places where this layer is several feet thick.

8. Montauk, sandy variant-Plymouth Association

Deep, rolling and hilly, excessively drained, coarse-textured soils on moraines

This association is in four areas east of the Shinnecock Canal on the south fork. The largest area is north and east of East Hampton and is in the Springs area of the town. A smaller area extends from the vicinity of East Hampton to Northwest Harbor. Another area is on the south fork in the vicinity of Napeague and extends eastward to Montauk. The smallest area is in the Shinnecock Hills east of the canal. This association is on morainic deposits. The areas generally are very hilly or rolling, but areas near Springs are dominantly nearly level to gently sloping. The area north of Amagansett is very hilly, and it has many steep-sided ridges and deep kettle holes. Slopes range from 1 to 35 percent.

This association makes up 3 percent of the county. Montauk, sandy variant, soils make up about 35 percent of the association, and Plymouth soils about 25 percent. Minor soils make up the remaining 40 percent.

Montauk, sandy variant, soils are deep and excessively drained. The surface layer and the subsoil are loamy sand. The fragipan or compact till layer is generally at a depth of 20 to 30 inches. Plymouth soils are deep and excessively drained. The surface layer and the subsoil are loamy sand. The underlying material is coarse sand and gravel. Depth to the underlying material ranges from 20 to 36 inches. Included with Plymouth and Montauk, sandy variant, soils are small gravelly areas along the crests of ridges and on small hogbacks. Montauk, sandy variant, and Plymouth soils are in a mixed pattern throughout the association. Plymouth soils are mainly in less sloping areas between rolling or hilly to steep areas of Montauk, sandy variant, soils. Characteristically, the two soils are very similar where the fragipan in the Montauk soils is weak.

Minor soils are the excessively drained to well-drained Carver, Montauk, and Riverhead soils and the wetter Atsion, Berryland, and Deerfield soils. The Atsion, Berryland, Carver, Deerfield, Montauk, and Riverhead soils are scattered throughout the association east of Napeague. The wetter soils are around creeks and ponds and in low wet areas that are adjacent to tidal marshes.

Most of the association is wooded, except the less sloping areas in the vicinity of Springs. Most of the cleared areas in this section are idle or used for pasture. The sections near the water at Springs and to the north are being developed as homesites. For a time, this use of these soils will be stable. Large areas are used for recreation. Many of the less sloping areas will be used as homesites.

Because they are mainly coarse textured and droughty, less sloping areas are limited for farming. Elsewhere in the association, steep slopes severely limit farming. Soils on less sloping areas have few limitations for use as homesites or similar purposes; however, the fragipan or till layer in these soils restricts infiltration rates, which makes installation and maintenance of cesspools difficult. The high water table in the wetter soils severely limits the use of these areas for most nonfarm uses. Effluent from cesspools and septic tanks contributes to contamination of ground water in areas where the water table is near the surface.

9. Montauk-Montauk, sandy variant-Bridgehampton Association

Deep, rolling and hilly, excessively drained and moderately well drained to well drained, medium-textured to coarse-textured soils on moraines

This association is in a single tract at the eastern end of the south fork. It extends eastward from the village of Montauk to Montauk Point. It is on the Ronkonkoma moraine and has a rolling landform that is typical of moraines (fig. 6).

This association makes up only 1 percent of the county. Montauk soils make up about 30 percent of the association, Montauk, sandy variant, soils about 20 percent, and Bridgehampton soils about 15 percent. Minor soils make up the remaining 35 percent.

Montauk soils are deep and well drained to moderately well drained. The surface layer is brown to dark-brown silt loam or fine sandy loam, and the subsoil is loam or fine sandy loam. A fragipan or compact layer is at a depth of 20 to 30 inches. The till layer extends to a great depth throughout most of this area. Montauk, sandy variant, soils are deep and excessively drained. The surface layer and the subsoil are loamy sand. A fragipan or compact layer is at a depth of 20 to 30 inches. Bridgehampton soils are deep and well drained to moderately well drained. The surface layer and subsoil are silt loam. A compact glacial till is at a depth of about 48 inches. The Montauk and Montauk, sandy variant, soils are in a mixed pattern throughout the area but generally are on the higher elevations. The steeper Montauk, sandy variant, soils generally are on the lower part of the slopes. Bridgehampton soils generally are at lower elevations. They are mainly on the border of Montauk Harbor and on the lower slopes of the adjoining hills.

Minor soils are the very poorly drained Whitman soils, the moderately well drained Scio soils, and the somewhat poorly drained Wallington soils that have a till substratum. Scio, Wallington, and Whitman soils are in draws and around the foot slopes of hills and knobs.

Many small areas of this association have many boulders on the surface and throughout the soil. This entire association was cleared and used as open range shortly after the area was settled. For many years the area was under a cover of grass which helped to develop a thick, black surface horizon high in organic-matter content. After intensive grazing was stopped, brush and trees grew back in some areas. Grass and low-growing briars covered the remainder of the area. Now, most of the area is idle or wooded, and the area near Montauk is used as homesites.

Steep slopes, irregular topography, and wetness limit the potential of the soils in this association for farming. Only two or three operating farms are in this association. They are devoted almost entirely to growing grasses to provide grazing for horses. Much of the association is limited for disposal of effluent from cesspools

Figure 6.—Typical landscape in association 9.

or septic tanks. Steep slopes and a high water table severely limit the use of many soils as building sites and for many other nonfarm uses typical of the area.

10. Plymouth-Carver Association, Nearly Level and Undulating

Deep, excessively drained, coarse-textured soils on outwash plains

This association is in two areas. One area is about 2 miles wide and extends from the vicinity of Lake Grove eastward to Coram. The other area covers the broad sandy plain that extends eastward from near Eastport to Hampton Bays. This area is on outwash plains and characteristically is nearly level. Widely spaced drainageways are the only breaks in these flat areas. The western part of the association has a greater proportion of strongly sloping soils than the eastern part. The eastern area, laid down by proglacial outwash, is not pitted. Slopes generally range from 1 to 8 percent, but a few areas are steeper.

This association makes up 5 percent of the county. Plymouth loamy sands makes up about 50 percent of the association, and Carver and Plymouth sands make up about 25 percent. Minor soils make up the remaining 25 percent.

Plymouth soils are deep and excessively drained. The surface layer and the subsoil are sand or loamy sand. The substratum is sand and gravel. Depth to the substratum ranges from 20 to 36 inches. Carver soils are similar to Plymouth soils, but they have a distinctive gray or light-gray subsurface layer that is lacking in Plymouth soils. Carver soils are deep and excessively drained. The surface layer and the subsoil are sand. The underlying material is sand and gravel. Depth to the underlying material ranges from 16 to 32 inches. The major soils of the association are in large areas adjacent to each other. Plymouth soils are dominant on slightly higher elevations. Gently sloping and moderately sloping Carver soils are more common on areas of complex slopes.

Minor soils are Haven, Riverhead, Atsion, Berryland, and Wareham soils. Cut and fill land is extensive in the western part of the association. Riverhead and Haven

soils are well drained. Atsion, Berryland, and Wareham soils are more poorly drained, and they are in areas around creeks and ponds and adjacent to tidal marshes.

Only a very small part of this association has been cleared. Most cleared areas have been allowed to revert to woodland. The western part of the association has been used mainly for housing developments, particularly the areas near State Route 25, which runs through the association. The eastern part is wooded, except for the areas around Shinnecock Bay and the airfield at Westhampton Beach. The association characteristically has a poor cover of scrub oak, pitch pine, and white oak (fig. 7).

The major soils in this association are coarse textured, droughty, and low in fertility. They are poorly suited to most crops commonly grown in the county. Except for their coarse texture, these soils have few limitations for nonfarm uses. Because of their droughty nature, limitations are severe on these soils for use in establishing and maintaining lawns and foundation plantings. Waste from cesspools and septic tanks can contaminate groundwater supplies beneath the rapidly permeable soils. Minor soils that have a high water table have severe limitations for nonfarm use.

Use and Management of the Soils

The first part of this section discusses the use of soils for crops and pasture. The second part explains the capability classification system used by the Soil Conservation Service, describes the capability units used in Suffolk County, and makes suggestions for management. The third part estimates yields of the main crops under two levels of management. Following that part are discussions of the use of soils as woodland and as wildlife habitat. The last two sections concern soil properties significant in engineering and in town and country planning.

Use of the Soils for Crops and Pasture [2]

This section is designed to help farmers and those who advise farmers to choose combinations of management practices suitable for the wise and economic utilization of the soils on a farm and appropriate for conditions

[2] Prepared by the Soil Conservation Service from material furnished by E. L. McPherron, conservation agronomist. Unless otherwise noted, the material is based on the results of research studies performed by staff members and associates of the New York State College of Agriculture at Cornell University.

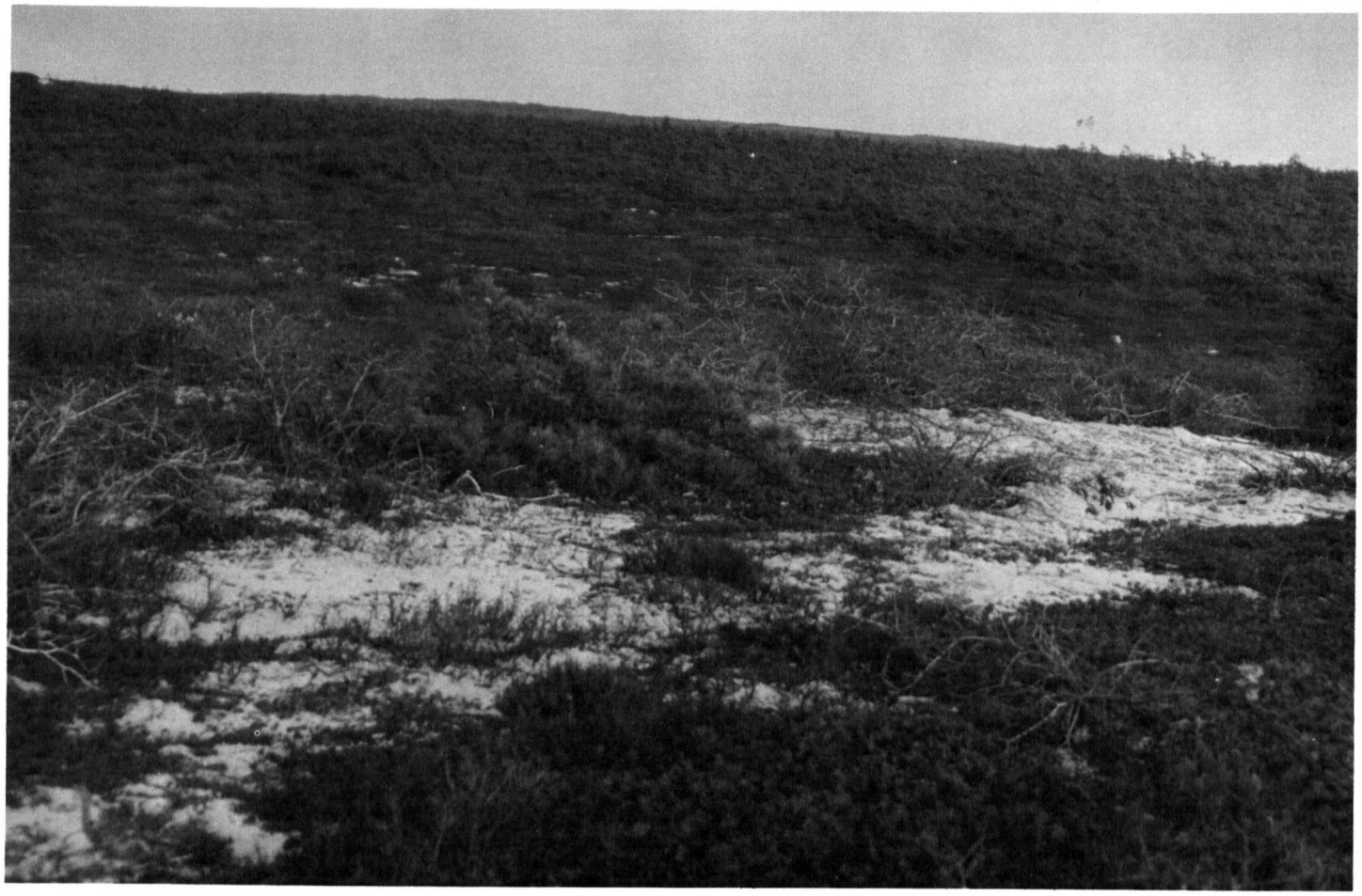

Figure 7.—Typical landscape in association 10. The white spots in the foreground are areas of Carver sand that have lost part of the surface layer.

prevailing at the time the choices are made. Before making his choices, the user of this report should consider the latest information on soil and crop management.[3]

All of the soils in Suffolk County require applications of lime and fertilizer for good growth of crops. The amounts of lime and fertilizer applied should be based on need indicated by complete soil tests. Soil tests can be used as a guide for matching applications of fertilizer to specific crops.

Most soils in Suffolk County have a moderate to rapid rate of permeability, which causes excessive leaching of plant nutrients from both irrigation and natural rainfall. Fertilizer should be applied when growing crops can use it most efficiently. Frequent small applications are needed to maintain plant growth for a full season.

Several soils in Suffolk County have low available moisture capacity, and irrigation is needed for good crop response. The amount of irrigation water applied at any one time should be based on crop needs and available moisture capacity of the soil. Excessive amounts of irrigation water applied at one time are lost to the crop and remove nutrients from the soil profile on these permeable soils.

Subsoil characteristics that affect root growth

In choosing a crop to be grown on a given soil, the characteristics of the subsoil or underlying material of that soil need to be considered. These characteristics are given for each soil in the section "Descriptions of the Soils."

In some soils, such as Riverhead and Haven, the subsoil is loose and easily penetrated by roots. In other soils, such as Montauk, a dense fragipan at a depth of 20 to 30 inches restricts root penetration and drainage. A plowpan has developed in some soils, such as Bridgehampton and Haven, which have been compacted by intensive cultivation. In areas where the movement of air and water is restricted by a plowpan, fragipan, or other dense material, the growth of roots is also restricted (fig. 8).

Acidity relationships of the soils

The natural lime content of the soils in Suffolk County ranges from low to very low. Figure 9 illustrates the relationship of the different lime levels to a depth of 60 inches in four different profiles.

Low-lime soils, such as the Bridgehampton and Riverhead, are strongly acid to a depth of more than 24 inches.

Lime moves downward in a silt loam at an average rate of half an inch each year. Crops absorb calcium (lime) from the soil, and fertilizers tend to counteract the effects of lime. Therefore, to maintain the desired pH in the plow layer, it is necessary to apply lime periodically.

[3] Research findings are reported in annually revised editions of "Cornell Recommends for Field Crops" and "Cornell Recommends for Vegetables," both prepared by the staff of New York State College of Agriculture at Cornell University. Up-to-date information is available upon request from the Soil Conservation Service and the Cooperative Extension Service.

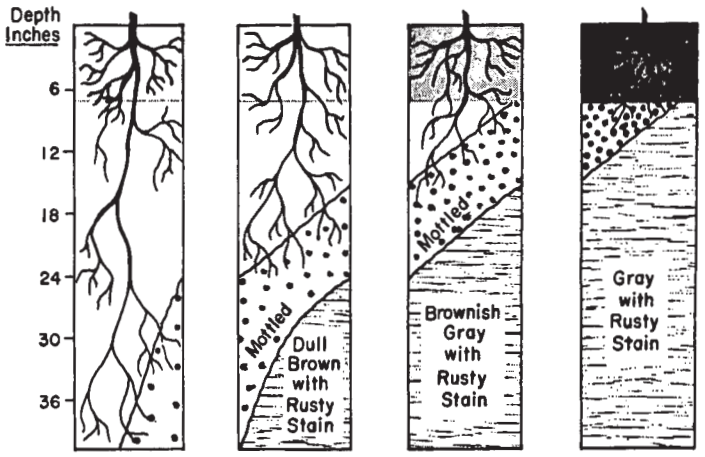

Figure 8.—**Root development in well drained soil (view 1), moderately well drained soil (view 2), somewhat poorly drained soil (view 3), and poorly drained soil (view 4).**

Nitrogen relationships of the soils

In Suffolk County, the plow layer of soils contains 1 to 2.5 percent organic matter. The release of nitrogen from this organic matter ranges from 40 to 100 pounds per acre per year. Much of this nitrogen is lost by leaching and must be replaced in timely applications for plant use. On well-managed soils, part of the nitrogen needs can be supplied by using sod crops and returning all plant residue to the soil.

Phosphorus relationships of the soils

Most soils in the county can supply only small quantities of phosphorus, generally less than 10 pounds of phosphate per acre each year. The addition of appropriate amounts of phosphate in the form of commercial fertilizer is essential for good growth of most crops.

Potassium relationships of the soils

The soils in Suffolk County generally are low in their ability to supply potassium. They generally supply less than 70 pounds per acre each year. Medium-textured soils, such as Haven and Bridgehampton, have a better ability to supply potassium than do the very sandy soils, such as Plymouth. Soil test information is helpful in assessing the need for potash fertilizers.

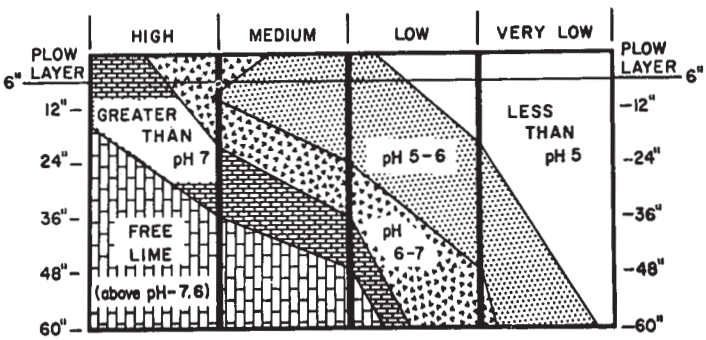

Figure 9.—**Lime level of different soil profiles.**

Crop adaptation relationships

The choice of an adapted crop variety depends largely on the climate, depth and character of the root zone, natural drainage class, or the degree of artificial drainage. The annually revised editions of "Cornell Recommends" provide information on new varieties. As new crop varieties are developed and results of new research and observations are put into use, changes are advocated.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for trees or engineering.

In the capability system, all kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed 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, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, 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 largely to pasture, woodland, or wildlife.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes.

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

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, woodland, wildlife, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–1 or IIIe–2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units[4]

In the following pages each of the capability units in Suffolk County is described, and suggestions for the use and management of the soils in each unit are given. The names of the soil series represented are mentioned in the description of each group, but this does not mean that all the soils of a given series are in the group. The "Guide to Mapping Units" shows the group in which each individual soil is found.

CAPABILITY UNIT I–1

This unit consists of deep, nearly level, well drained and moderately well drained, medium-textured soils of the Bridgehampton, Haven, and Montauk series. These soils are on outwash plains and ridgetops of moraines. The mantle of silt loam in the Bridgehampton soils is thicker than that in the Haven and Montauk soils.

Permeability is moderate in the root zone of all the soils in this unit. The available moisture capacity of the Haven and Montauk soils is moderate to high, and the available moisture capacity of Bridgehampton soils is high. Reaction is strongly acid to very strongly acid in soils of this unit. The content of organic matter and the natural supply of plant nutrients are low. If these soils are used continuously for row crops, they crust readily

[4] Prepared by E. L. McPherron, conservation agronomist, Soil Conservation Service.

after rain and develop a compact plowpan. Hazards of runoff and erosion are slight.

The soils in this unit are well suited to all crops commonly grown in the county. Hay and pasture, grains, and row crops (including vegetables and nursery stock) respond well to good management on these soils. Row crops can be grown year after year by growing cover crops and returning all crop residue to the soil to reduce the likelihood of crusting. Growing a deep-rooted crop occasionally and keeping traffic to a minimum helps to prevent the formation of a plowpan. In places, gravel in the surface layer of the Montauk soil interferes with the use of precision machinery needed for planting fine-seeded crops.

Light tillage can be used to break up surface crust. Irrigation water needs to be applied at a moderate rate.

CAPABILITY UNIT IIe–1

This unit consists of gently sloping, well drained to moderately well drained, medium-textured soils of the Bridgehampton, Haven, Montauk, and Scio series. These soils are on outwash plains and morainic ridgetops. The mantle of silt on the Bridgehampton soils is thicker than that of the Haven, Montauk, and Scio soils.

Permeability is moderate in the root zone of all the soils in this unit. Available moisture capacity is high to moderate in the Haven, Montauk, and Scio soils. Because of the thicker mantle of silt, the available moisture capacity of the Bridgehampton soils is high. Reaction is strongly acid to very strongly acid in soils of this unit. The content of organic matter and and the natural supply of plant nutrients generally are low. The content of organic matter is slightly higher in some areas of Bridgehampton soils. Soils of this unit crust readily after rain. If they are used continuously for row crops, they develop a compact plowpan. The hazard of erosion is slight to moderate.

Under good management, the soils in this unit are well suited to forage, grains, and vegetable crops. Suitability of these soils for nursery stock is good, except in areas where erosion is a hazard because of steepness of slope. The number of consecutive years these soils can be safely cultivated depends on practices used for erosion control and water management. These soils should not be cultivated intensively unless adequate measures are used to help to control erosion. Planting deep-rooted crops and a few sod crops helps to restore organic matter, to reduce crusting, and to break up a plowpan. These soils are well suited to crops that can be planted directly in surface residue, under a system of management that involves no plowing.

Irrigation water can be applied at a moderate rate; however, practices that help to control erosion greatly increase the effectiveness of natural rainfall.

CAPABILITY UNIT IIe–2

This unit consists of deep, gently sloping, well drained to moderately well drained, moderately coarse textured soils of the Riverhead and Montauk series. Riverhead soils are on moraines and on gently undulating outwash plains. Montauk soils are only on moraines and in gently undulating areas adjacent to steeper soils.

Permeability is moderately rapid in the surface layer and the upper part of the subsoil of Montauk soils, and it is moderately slow in the fragipan. Permeability is moderately rapid in the surface layer and subsoil of Riverhead soils, and it is very rapid in the substratum.

In places where these gently sloping Montauk soils are on toe slopes below steeper Montauk soils, the areas are waterlogged early in spring. The soils in this unit have moderate to high available moisture capacity. Reaction is strongly acid to very strongly acid. Natural fertility is low. The content of organic matter is low. The hazard of erosion generally is slight to moderate, but it is slightly higher on Montauk soils because of slow infiltration caused by the fragipan.

The soils in this unit are well suited to forage, grain, nursery stock, potatoes, and other vegetable crops if good management is used. They are not suited to continuous cultivation. Keeping cover crops on the areas in winter and returning crop residue to the soil help to protect exposed areas from erosion. Growing deep-rooted crops occasionally helps to break up plowpans and compact subsoils where they are present. Soil loss on bare slopes can be severe in winter. Diverting runoff water from higher areas also helps to reduce erosion damage (fig. 10). Good water management practices are needed to help to control erosion if these soils are used for nursery stock.

Irrigation water can be applied at a moderate rate. The rate and amount should be based on the available moisture capacity of the soils.

CAPABILITY UNIT IIw–1

This unit consists of deep, nearly level, moderately well drained, moderately coarse textured and medium textured soils of the Sudbury and Scio series. These soils are in the bottom of shallow depressions, on flat areas between wetter soils and well-drained soils on uplands, and on flat outwash plains where the water table is seasonally high.

Permeability is moderate in the Scio soils and moderate or moderately rapid in the Sudbury soils. These soils have a seasonally high water table that slows infiltration.

Figure 10.—**Gently sloping Riverhead soil damaged by erosion caused by runoff received from the nearly level soil in the right background.**

Available moisture capacity is high to moderate. Reaction is strongly acid to very strongly acid. Natural fertility is low. The content of organic matter is low, and the hazard of erosion is slight.

These soils are suited to all crops commonly grown in the county, including forage, grains, and vegetables. Wetness in spring briefly delays planting in some places. These soils are easy to work and can be cultivated intensively if good management is used. Keeping tillage to a minimum, returning all crop residue to the soil, and growing cover crops after each row crop help to reduce crusting. Artificial drainage generally is not needed, but small wet areas need drainage if they are intensively cultivated.

Irrigation water can be applied at a moderate to rapid rate on Sudbury soils and at a slow to moderate rate on Scio soils. In some years from midsummer to late in summer, shallow-rooted crops on these soils, especially Sudbury soils, need supplemental water.

CAPABILITY UNIT IIw-2

The only soil in this unit is Haven loam, thick surface layer. It is a deep, nearly level, well-drained, medium-textured soil. It is in the bottom of well-drained depressions and along the bottom of better defined intermittent drainageways where thick deposits of surface soil have accumulated from adjoining steeper areas. The surface soil deposited in these areas is the result of overwash from surrounding areas. It ranges in thickness from 12 to 30 inches.

Because of the low-lying position of this soil, it is ponded or flooded during periods of very heavy rain (fig. 11). Ponding or flooding is particularly likely late in winter and early in spring before the last frost. The duration of ponding ranges from several hours to several days. Permeability is moderate; however, water infiltration generally is slower in places where the silt deposits are very thick. Available moisture capacity is high. Reaction is strongly acid to very strongly acid. Natural fertility is low. The content of organic matter is moderate to high in the depositional part of this soil. The hazard of erosion is slight, but in places this soil receives large amounts of runoff from adjoining steeper soils.

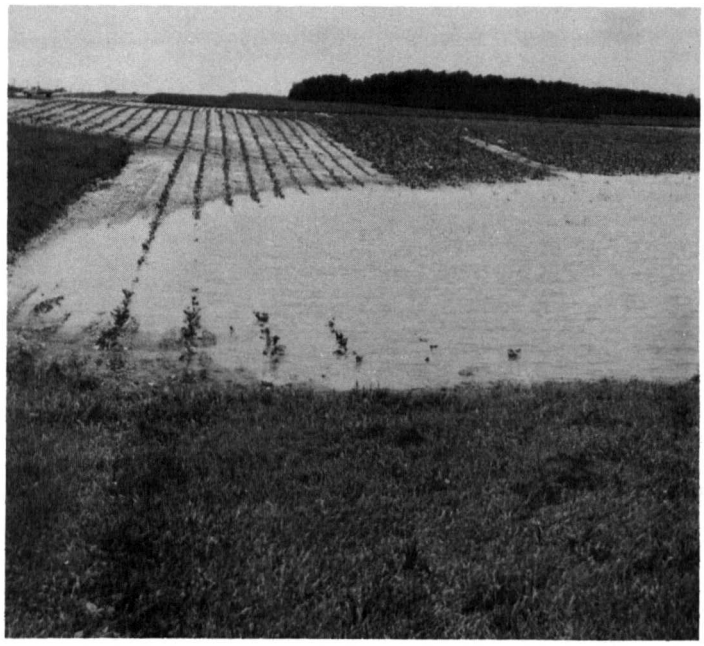

Figure 11.—Crop damaged by ponded water on Haven loam, thick surface layer, in a closed depression.

This soil is well suited to all crops. The response of crops to good management is good. This soil should not be used for nursery stock or winter crops unless the ponded water is removed or runoff water is diverted. Annual crops do well in most areas, except where occasional ponding occurs following heavy rains in summer. This soil supports a good grass cover for waterways and drainage channels. Returning crop residue to the soil and growing a temporary winter cover crop help to keep soil losses to a minimum in winter.

Irrigation water can be applied at a moderate rate, but it is needed less frequently on this soil than on sandier soils. Applying irrigation at a high rate causes wetness and ponding.

CAPABILITY UNIT IIs-1

This unit consists of deep, nearly level, moderately coarse textured and coarse textured soils of the Montauk, Riverhead, and Plymouth series. The moderately coarse textured Montauk soils are well drained to moderately well drained, the moderately coarse textured Riverhead soils are well drained, and the coarse textured Plymouth soils are excessively drained. Riverhead soils are on outwash plains and in level areas of moraines. Montauk soils are on level morainic ridgetops. Plymouth soils are on level outwash plains between Sagaponack and East Hampton.

Permeability is moderately rapid in the surface layer and the upper port of the subsoil of Montauk soils and is moderately slow in the fragipan. Permeability is moderately rapid in the surface layer and subsoil of Riverhead soils, and it is very rapid in the substratum. Permeability is rapid in the surface layer and subsoil of the Plymouth soil and moderate in the underlying silty layers. Available moisture capacity is moderate to high in Montauk and Riverhead soils and low to very low in Plymouth soils. Reaction is strongly acid to very strongly acid in the root zone of all these soils. The content of organic matter and the natural supply of plant nutrients are low. The hazard of erosion is slight.

The soils in this unit are well suited to all crops grown in the county; however, moderate droughtiness somewhat limits plant growth unless irrigation water is applied. Returning crop residue to the soil and growing winter cover crops help to protect the surface layer from wind and water damage and to improve the available moisture capacity of the surface layer. In places when these soils are frozen, runoff seriously damages adjoining sloping soils.

Applying irrigation water at a rapid rate helps to reduce droughtiness if shallow-rooted crops are grown.

CAPABILITY UNIT IIIe-1

This unit consists of deep, moderately sloping, well drained to moderately well drained, moderately coarse textured soils of the Montauk and Riverhead series. The Riverhead soil is along intermittent drainage channels

on outwash plains and on rolling areas of moraines. In most areas slopes are short or complex. The Montauk soil is on rolling moraines. Permeability is moderately rapid in the upper part of the surface layer and upper part of the subsoil of all of these soils. It is very rapid in the substratum of Riverhead soils and moderately slow in the fragipan of Montauk soils. Available moisture capacity is moderate to high in these soils. Reaction is strongly acid to very strongly acid. The content of organic matter and natural fertility are low. The hazard of erosion is moderately severe.

These soils are suited to common forage and grain crops and are well suited to crops that can be planted directly in residue left on the surface. A few row crops and vegetables can be included in the cropping sequence if a protective cover crop is maintained in winter. Also, row and nursery crops can be grown on the contour if a protective cover crop is maintained in winter. Keeping the areas in sod and growing a close cover crop help to control erosion.

Irrigation water must be applied carefully because of the hazard of erosion on these soils.

CAPABILITY UNIT IIIe–2

This unit consists of deep, moderately sloping, well-drained, medium-textured soils of the Bridgehampton, Haven, and Montauk series. The Bridgehampton and Montauk soils are on moraines. The Bridgehampton soil is mainly in areas east of Montauk. The Haven soil is on rolling moraines and the side slopes of some intermittent drainage channels on outwash plains. In most areas slopes are short or complex.

Permeability is moderate in the upper part of the surface layer and upper part of the subsoil of all the soils in this unit. It is very rapid in the substratum of the Haven soils and moderately slow in the substratum of the Bridgehampton and Montauk soils. Available moisture capacity is moderate to high in all these soils except in some small areas of Haven and Montauk soils that are moderately eroded. Reaction is strongly acid to very strongly acid. The content of organic matter is low in all of these soils except the Bridgehampton soils. It is high in the surface layer of the Bridgehampton soil. Natural fertility is low. Because of crusting and slope, the hazard of erosion is moderate to severe on these soils.

The soils in this unit are suited to crops commonly grown in the county. Cultivated crops cannot be grown safely unless erosion is controlled. These soils should be maintained in sod crops or other permanent vegetation. They are suited to row crops that can be planted into surface residue without plowing. Growing a cover crop and keeping crop residue on the surface reduces runoff and crusting. Deep-rooted crops can be grown on the soils that have short, complex slopes.

Unless irrigation water is applied carefully and at a moderate rate, further erosion is a hazard on the soils of this unit.

CAPABILITY UNIT IIIw–1

This unit consists of nearly level, somewhat poorly drained and poorly drained soils of the Walpole and Raynham series. The Walpole soil is moderately coarse textured, and the Raynham soil is deep and medium textured. These soils are on moraines and outwash plains, but they generally are on outwash plains. Generally, they adjoin wetter soils or form a transition between tidal marshes and creeks and well-drained uplands. The largest areas of the Raynham soil are on the grounds of the Brookhaven National Laboratory. Permeability is moderate in the surface layer and subsoil of the Raynham soil and moderately rapid in the Walpole soil. Internal water movement is restricted by a seasonal high water table. In addition, permeability is moderately slow in the upper part of the substratum of the Raynham soil. Available moisture capacity in drained areas of the Walpole soil is moderate, but it is moderate to high in the Raynham soil. Reaction is strongly acid to very strongly acid. The content of organic matter is high in the surface layer of these soils and low below. Natural fertility is low. The hazard of erosion is slight.

These soils are suited to general crops if the high water table is controlled. In places planting is delayed until the seasonal high water table drops. Shallow-rooted crops and crops that tolerate a fluctuating water table are better suited than other crops. These soils are not suited to nursery stock unless the seasonal high water table is controlled. Response to management is good, and these soils can be drained if outlets are available.

Where needed, irrigation water can be applied at a rapid rate.

CAPABILITY UNIT IIIw–2

The only soil in this unit is Wallington silt loam, till substratum. It is a deep, nearly level, somewhat poorly drained soil. It is on the moraine east of Montauk and occupies the wetter draws and lower slopes adjacent to steeper areas of well-drained soils.

Permeability in this soil is moderate in the surface layer and upper part of the subsoil. It is slow or moderately slow in the lower part of the subsoil, at a depth of 18 to 24 inches, because of a fragipan. Internal water movement is further restricted by a seasonal high water table. Available moisture capacity is moderate to high. Reaction is strongly acid to very strongly acid. The content of organic matter is high in the surface layer and low below. Natural fertility is low. The hazard of erosion is slight. This soil generally receives excessive water from adjoining higher soils, especially when water from higher sloping areas constantly flows across this soil for several weeks in spring.

This soil can be used for general crops if runoff water is diverted from higher elevations and internal drainage is provided. It is not suited to nursery stock because of the seasonal high water table. Shallow-rooted crops and water-tolerant crops are suited. In some years spring planting is delayed because of wetness; therefore midseason vegetables are better suited. This soil can be drained for intensive use, but a complete crop management program is needed. Onsite inspection of drainage is recommended.

Where needed, irrigation water can be applied at a moderate rate. Shallowness to the firm, compact subsoil restricts the amount of irrigation water that can be applied safely at one time.

CAPABILITY UNIT IIIw–3

The only soil in this unit is Deerfield sand. It is a deep, nearly level, coarse-textured, moderately well drained soil. This soil is on sandy outwash deposits in

areas of intermediate drainage between wetter soils and the well-drained soils on upland slopes.

Permeability is rapid throughout, but the water table restricts internal movement of water through the lower part of the subsoil and the substratum during seasons of wetness. Available moisture capacity is very low. Reaction is strongly acid to very strongly acid. The content of organic matter and the natural supply of plant nutrients are low. The hazard of erosion is slight.

This soil can be used for general crops and early vegetables. Droughtiness in the surface layer limits its use for shallow-rooted crops unless irrigation water is applied. Deeper rooted crops can obtain adequate moisture from the water table. The high water table limits the choice of crops. This soil generally is not suitable for nursery stock because of its coarse texture.

Irrigation water can be applied at a rapid rate, but excessive amounts waste nutrients and water because permeability is rapid in the soils of this unit.

CAPABILITY UNIT IIIs–1

This unit consists of nearly level and gently sloping, excessively drained, coarse-textured soils of the Montauk, sandy variant, and Plymouth series. The Plymouth soils are on moraines and outwash plains, and Montauk soils are only on moraines.

Permeability is moderate to rapid in the Plymouth soils and moderate to moderately slow in the Montauk soils. Available mositure capacity of all the soils in this unit is low to very low. Reaction is strongly acid to very strongly acid in the root zone of these soils. The content of organic matter and natural fertility are low or very low. These soils are droughty during periods of low rainfall. Maintenance of fertility is made difficult by the sandy texture. The hazard of erosion is slight.

These soils can be used for all crops grown in the county; but unless irrigation water is applied, deep-rooted crops are better suited. The sandy surface layer slightly reduces the suitability of these soils for nursery stock. A cover crop in winter is needed to protect the surface layer from erosion by wind and water. Runoff water from adjacent frozen areas causes severe gullies in places.

Irrigation can be applied at a rapid rate. Frequent applications of irrigation water and fertilizer should be made in small amounts to limit losses from rapid infiltration.

CAPABILITY UNIT IVw–1

This unit consists of deep, nearly level, somewhat poorly drained and poorly drained, coarse-textured soils of the Atsion and Wareham series. Almost all of these soils are on outwash plains in low-lying, wet areas near creeks, ponds, lakes, and marshes. Atsion soils are also in the southern part of the county where meltwater channels are cut down to nearly sea level.

Permeability is rapid, but internal water movement is restricted by the high water table. If these sandy soils are drained, available moisture capacity is low or very low. Reaction is strongly acid to very strongly acid. The content of organic matter is high in the surface layer, and the natural supply of plant nutrients is low throughout. Artificial drainage systems are difficult to install because of the lack of suitable outlets. The hazard of erosion is slight.

The soils in this unit are not well suited to general crops because of a high water table and sandy surface layer. Permanent cover crops that tolerate wetness can be grown if fertilizer is applied. An onsite investigation is needed, however, to determine the economic feasibility of using these soils for crops. In places a protective residue is needed on the surface to successfully establish new seedlings.

CAPABILITY UNIT IVw–2

The only soil in this unit is Canadice silt loam. It is a deep, nearly level, poorly drained, medium-textured soil that has a clayey subsoil. Most of this soil is in a low area near Greenport.

Permeability is moderate in the surface layer and slow in the subsoil. Free movement of water is restricted by a high water table and slow permeability. Available moisture capacity is high to a depth of 25 inches. This soil is strongly acid to medium acid in the surface layer and upper part of the subsoil and medium acid to slightly acid in the lower part of the subsoil. The content of organic matter is high in the surface layer and low in the subsoil. Natural fertility is medium. Artificial tile drainage is not practical on this clayey soil, and open drains are difficult to locate because of a lack of suitable outlets. The hazard of erosion is slight. Depressional areas are ponded during the wet seasons of the year.

This soil is difficult to manage, and it is poorly suited to general crops and to nursery stock. Sod crops that tolerate wetness can be grown if surface water is controlled and removed. Crops respond to management, but planting and harvesting are difficult in places.

CAPABILITY UNIT IVs–1

This unit consists of deep, moderately sloping, excessively drained soils of the Montauk, sandy variant, and Plymouth series. These soils are on rolling moraines, but the Plymouth soil is also on side slopes along intermittent drainageways on outwash plains.

Permeability is rapid in the surface layer and upper part of the subsoil of these soils. It is rapid in the lower part of the subsoil and the substratum of the Plymouth soil and moderate to moderately slow in the lower part of the subsoil and the substratum of the Montauk soil. Available moisture capacity is low to very low. Better moisture relationships exist in the Montauk soil because of the fragipan and the till substratum. Reaction is strongly acid to very strongly acid. The content of organic matter and the natural supply of plant nutrients are low. If areas of these soils are cleared and cultivated, the hazard of erosion is moderate to severe.

The soils in this unit are best suited to deep-rooted, close-growing crops. Row crops can be grown if erosion is controlled. These soils are not well suited to nursery stock, because of their steep slopes and sandy texture. Because of the fragipan and the till substratum, the Montauk soil is better suited to trees and similar deep-rooted crops than to other crops. A cover crop in winter is needed to reduce soil losses from wind and water. Farming on the contour and, where practical, diversions are practices that help control erosion. Where such practices are not used, these moderately sloping soils should be protected by permanent cover. Plantings for permanent cover require a surface mulch so seeds germinate and young plants get a good start.

Irrigation water must be applied carefully because runoff is a concern on these moderately sloping soils.

CAPABILITY UNIT Vw–1

This unit consists of deep, nearly level, very poorly drained soils of the Berryland and Whitman series. The Berryland soil is coarse textured, and the Whitman soil is moderately coarse textured. The Berryland soil commonly is along rivers and creeks, near tidal marshes, or around lakes and ponds on outwash plains. The Whitman soil is at Montauk Point in the wetter draws at the base of steeper slopes of moderately well drained or well drained soils.

Permeability is rapid in the Berryland soil, but a prolonged high water table restricts movement of water through the soil. In the Whitman soil, permeability is moderately rapid above the fragipan and slow or moderately slow within it. Available moisture capacity is very low in the Berryland soil and moderate in the Whitman soil. The content of organic matter is high in the surface layer of both soils. Natural fertility is low. Reaction is strongly acid or very strongly acid. A lack of suitable outlets because of the very low position of these soils makes artificial drainage systems very difficult or impossible to install. These soils are suitable for such specialty crops as blueberries and cranberries. They are not suited to general crops because of a high water table. These soils are better suited to wildlife habitat than to other uses. Onsite investigation is necessary to determine the economic feasibility of regulating the water table for specialty crops.

CAPABILITY UNIT VIs–1

The only soils in this unit are Riverhead very stony sandy loams. They are deep, well-drained, moderately coarse textured soils. These gently sloping to moderately sloping soils are on morainic ridges on Fishers Island and in a small area on Plum Island.

Permeability is moderately rapid, and available moisture capacity is moderate. Reaction is strongly acid to very strongly acid. Natural fertility and the content of organic matter are low. Many stones and a few boulders are on the surface of and in this soil. The hazard of erosion is moderate to severe if the native vegetation is removed.

This soil is best suited to permanent cover such as pasture or woods. A permanent cover should be maintained and restored in idle areas. Because of many stones and a few boulders on the surface of and in this soil, it is not suited to crops.

CAPABILITY UNIT VIIw–1

Only Muck is in this unit. This land type is very poorly drained and is made up of decomposed organic material over sand or sand and gravel. It is throughout the county along rivers, around creeks and ponds, and in wet depressions and kettle holes on moraines. The water table is at or near the surface most of the year. This land type must be drained before it can be considered for crops. Because the areas of Muck are small and shallow and because locating suitable outlets for drainage is very difficult, use of this land type for crops is impractical. The areas are suitable for use as habitat for some types of wildlife.

CAPABILITY UNIT VIIs–1

This unit consists of nearly level to steep, excessively drained, coarse textured and moderately coarse textured soils of the Carver, Montauk, sandy variant, Plymouth, and Riverhead series. Most of these soils are on steep moraines, but the Carver and Plymouth sands generally are on broad flat outwash plains. The eroded Plymouth soils generally are on short slopes along draws in areas that are farmed. The Riverhead and Plymouth very bouldery soils are only on moderately steep to steep, very bouldery breaks on hillsides on Fishers Island.

Permeability is rapid or very rapid throughout the profile of all these soils except Montauk, sandy variant, and the Riverhead soils. Permeability is moderately slow to moderate in the fragipan and underlying till in the Montauk soil and moderately rapid in the surface layer and subsoil of the Riverhead soils. Available moisture capacity is low to very low in all these soils except Riverhead soils. It is moderate to high in Riverhead soils. Reaction is strongly acid to very strongly acid in all these soils. Natural fertility and the content of organic matter are low. The hazard of erosion is severe on the steeper soils if the vegetation is removed. The hazard of erosion is slight or moderate on the level to moderately sloping soils.

These soils are too droughty, too steep, or too stony for crops or for pasture. They are not suitable for nursery stock or other crops, because of their sandy texture, coarse fragments, and steepness of slope. A permanent cover of plants should be maintained or restored on all the soils in this unit. Bare, eroded, and steep areas can be revegetated by using mulch and seeding them to suitable plant species.

CAPABILITY UNIT VIIIw–1

Only the land type Tidal marsh is in this unit. This land type consists of marshy areas around the borders of quieter embayments and tidal creeks. It has a surface mat of organic material that ranges from a few inches to several feet in thickness. The organic mat is underlain by pale-gray or white sand. These marshy areas are influenced by the tides, but they are not flooded unless the tides are abnormally high.

Tidal marsh supports a thick growth of salt-tolerant grasses and reeds. It has no value for commercial production of crops. The areas should be maintained in a natural vegetative cover. They serve as buffer zones between salt water and fresh water. They are suitable for use as habitat for certain types of wildlife.

CAPABILITY UNIT VIIIs–1

This unit consists of Beaches and of adjoining Dune land. These land types are along most of the coast line of the county. They consist of sandy or gravelly beaches that are subject to wave action or of sand dunes that have been piled up by the wind. The beaches are barren of vegetation, but most of the sand dunes support a few plants that can tolerate droughtiness and low fertility.

These land types have no value for growing plants for commercial purposes. They are suitable for use as protective barriers against ocean storms. Practices are needed to promote growth of plants on the sand dunes. The land types in this unit are suitable for use as natural barriers

to the sea. They also have limited value for use as recreational areas or as habitat for wildlife.

CAPABILITY UNIT VIIIs-2

Only the land type Escarpments is in this unit. It is on the north shore, at Montauk Point, along Peconic Bay, and on a part of the offshore islands. Very rapid geologic erosion is taking place on this land where vegetation is sparse or lacking. These areas are too steep and too droughty to have value for commercial purposes. They are more suitable for use as habitat for wildlife or as scenic overlooks. Measures are needed to reduce undercutting by waves, and to promote the growth of cover plants to help to control sheet and rill erosion caused by runoff. Existing vegetation should be protected. If they are seeded, mulch is needed to protect the surface from erosion until a permanent cover is established.

Estimated Yields [5]

Table 1 lists, for each soil in the county, the estimated yields per acre of potatoes, cauliflower, sweet corn, and cabbage under two levels of management. Several crops, such as strawberries, onions, melons, and small fruits, are grown for market. Good to excellent yields can be obtained by using irrigation and a high level of management on the same soils that are used for commercial crops. Estimated yields of these crops and of sod are not given in table 1. Current yields of these crops can be obtained from the local Cooperative Extension Office. The annually revised editions of "Cornell Recommends for Field Crops" and "Cornell Recommends for Vegetable Crops" can be used as a guide in improving management.

The figures in columns A represent the yields expected under average management. Under this level of management, the application of soil, water, and crop management practices is less than the amount suggested in "Cornell Recommends." Fertilizer applications are poorly timed and do not meet crop needs. Very little water management is used, and summer rainfall is often wasted because erosion-control practices are lacking, rotations are haphazard, and the best adapted crop varieties are only occasionally used. Field operations are often not performed on time. The control of weeds, insects, and plant diseases is not consistently carried out. The estimates shown in columns A are a little above the average yields obtained by farmers in the county in the late 1960's.

The figures in columns B represent yields that can be expected under improved management. Under this level of management, suitable crop rotations are used, lime

[5] Prepared by E. L. McPherron, conservation agronomist, and Jerome E. Arledge, district conservationist, Soil Conservation Service; and Daniel H. Fricke and H. D. Wells, Cooperative Extension Service.

TABLE 1.—*Estimated average acre yields of principal crops under two levels of management*

[Figures in columns A represent yields to be expected under average management; those in columns B represent yields to be expected under improved management. Absence of a figure indicates that the crop is not suitable for or is not commonly grown on the particular soil, or that no basis for an estimate was available]

Soil	Potatoes		Cauliflower		Sweet corn		Cabbage	
	A	B	A	B	A	B	A	B
	Cwt.	*Cwt.*	*Crates (12 heads)*	*Crates (12 heads)*	*Hundreds of ears*	*Hundreds of ears*	*Crates (50 lb.)*	*Crates (50 lb.)*
Atsion sand								
Beaches								
Berryland mucky sand								
Bridgehampton silt loam, 0 to 2 percent slopes	300	425	355	505	135	155	340	485
Bridgehampton silt loam, 2 to 6 percent slopes	275	425	330	505	125	155	315	485
Bridgehampton silt loam, till substratum, 2 to 6 percent slopes	275	425	330	505	125	155	315	485
Bridgehampton silt loam, till substratum, 6 to 12 percent slopes	225	375	270	445	100	140	255	425
Bridgehampton silt loam, graded								
Canadice silt loam								
Carver and Plymouth sands, 0 to 3 percent slopes								
Carver and Plymouth sands, 3 to 15 percent slopes								
Carver and Plymouth sands, 15 to 35 percent slopes								
Cut and fill land, gently sloping								
Cut and fill land, sloping								
Cut and fill land, steep								
Deerfield sand	175	300	180	315	70	100	175	305
Dune land								
Escarpments								
Fill land, dredged material								
Fill land, sandy								
Gravel pits								
Haven loam, 0 to 2 percent slopes	225	400	330	470	130	150	315	450
Haven loam, 2 to 6 percent slopes	200	400	300	470	120	150	290	450

TABLE 1.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Potatoes		Cauliflower		Sweet corn		Cabbage	
	A	B	A	B	A	B	A	B
	Cwt.	*Cwt.*	*Crates (12 heads)*	*Crates (12 heads)*	*Hundreds of ears*	*Hundreds of ears*	*Crates (50 lb.)*	*Crates (50 lb.)*
Haven loam, 6 to 12 percent slopes	160	340	240	400	95	130	235	385
Haven loam, thick surface layer	200	400	330	500	135	155	315	480
Made land								
Montauk fine sandy loam, 0 to 3 percent slopes	200	400	255	460	105	145	245	440
Montauk fine sandy loam, 3 to 8 percent slopes	175	400	225	460	95	145	215	440
Montauk fine sandy loam, 8 to 15 percent slopes	140	340	180	390	75	125	175	375
Montauk silt loam, 0 to 3 percent slopes	275	400	350	500	135	150	335	480
Montauk silt loam, 3 to 8 percent slopes	250	400	320	500	125	150	310	480
Montauk silt loam, 8 to 15 percent slopes	200	340	260	425	100	130	250	410
Montauk soils, graded, 0 to 8 percent slopes								
Montauk soils, graded, 8 to 15 percent slopes								
Montauk loamy sand, sandy variant, 0 to 3 percent slopes	175	300	205	330	80	105	195	315
Montauk loamy sand, sandy variant, 3 to 8 percent slopes	155	300	190	330	75	105	180	315
Montauk loamy sand, sandy variant, 8 to 15 percent slopes	125	265	145	280	50	90	140	270
Montauk loamy sand, sandy variant, 15 to 35 percent slopes								
Muck								
Plymouth loamy sand, 0 to 3 percent slopes	150	275	180	315	70	100	175	305
Plymouth loamy sand, 3 to 8 percent slopes	135	275	160	315	60	100	155	305
Plymouth loamy sand, 8 to 15 percent slopes	110	250	130	285	50	90	125	260
Plymouth gravelly loamy sand, 3 to 8 percent slopes, eroded								
Plymouth gravelly loamy sand, 8 to 15 percent slopes, eroded								
Plymouth loamy sand, silty substratum, 0 to 3 percent slopes	175	320	225	360	90	125	210	335
Plymouth loamy sand, silty substratum, 3 to 8 percent slopes	160	320	205	360	80	125	190	335
Raynham loam								
Recharge basin								
Riverhead sandy loam, 0 to 3 percent slopes	200	400	255	460	105	145	245	440
Riverhead sandy loam, 3 to 8 percent slopes	175	400	230	460	95	145	220	440
Riverhead sandy loam, 8 to 15 percent slopes	140	340	185	390	75	125	175	375
Riverhead very stony sandy loam, 3 to 8 percent slopes								
Riverhead very stony sandy loam, 8 to 15 percent slopes								
Riverhead and Haven soils, graded, 0 to 8 percent slopes								
Riverhead and Haven soils, graded, 8 to 15 percent slopes								
Riverhead and Plymouth very bouldery soils, 15 to 35 percent slopes								
Scio silt loam, till substratum, 2 to 6 percent slopes	200	400	300	470	120	150	290	450
Scio silt loam, sandy substratum, 0 to 2 percent slopes	175	375	295	460	120	140	285	440
Scio silt loam, sandy substratum, 2 to 6 percent slopes	200	400	300	470	120	150	290	450
Sudbury sandy loam	175	300	200	345	80	110	185	330
Tidal marsh								
Urban land								
Wallington silt loam, till substratum								
Walpole sandy loam								
Wareham loamy sand								
Whitman sandy loam								

and fertilizer are applied in kinds and amounts indicated by soil tests; adequate water and irrigation management are provided where needed; contour farming, winter cover crops, sodded waterways, or other measures to conserve soil and water are used; weeds and insects are controlled; and tillage is done at the right time and in the right way. Yields are now increasing at the rate of about 2 percent each year and can be expected to increase further as new varieties of crops are developed and as management is improved.

Use of the Soils as Woodland [6]

In 1968 commercial woodland occupied 28 percent of the land area, or 167,300 acres, in Suffolk County (*8*).[7] The area of commercial woodland-type groups are: white pine-red pine, 18,100 acres; other soft woods, including plantations, 7,700 acres; oak-pine, 7,700 acres; oak-hickory, 38,100 acres; elm-ash-red maple, 54,100 acres; maple-beech-birch, 28,400 acres; and birch, 13,200 acres.

Woodland resources contribute little to the economy of the county. In most parts of the county, the economic feasibility of timber operations is questionable. High land values and high transportation costs make timber operations impractical.

Before the turn of the century, Suffolk County was a major source of firewood, and the potential is still good. Woodlands are also used as green belt areas and parks in Suffolk County.

Woodland suitability groups

The soils of Suffolk County have been placed in nine woodland suitability groups to assist owners in planning the use of their soils for wood crops. Each group is made up of soils that are suited to the same kinds of trees; that need approximately the same kind of management when the vegetation on them is similar; and that have about the same potential productivity.

Each woodland group is identified by a three-part symbol, such as 3o1, 3w1, or 4s1. The first part of the symbol, always a number, indicates relative potential productivity of the soils in the group: 1 is very high, 2 is high, 3 is moderately high, 4 is moderate, and 5 is low. None of the soils in Suffolk County are in the very high group. These ratings are based on field determinations of average site index in several New York counties of the same soil series that are in Suffolk County or for similar soils. Site index is the height, in feet, that the dominant trees of a given species on a specified kind of soil reach in a natural, unmanaged stand in a stated number of years. For the merchantable hardwoods and softwoods in this county, the site index is the height reached in 50 years. Following are the productivity classes for important timber species for Suffolk County.

Forest species and productivity ratings	*Site index range*
Red and white pine:	
Very high	90+
High	80 to 90
Moderately high	70 to 80
Moderate	60 to 70
Low	50 to 60
Red maple:	
Very high	
High	80+
Moderately high	70 to 80
Moderate	60 to 70
Low	50 to 60
Oaks:	
Very high	85+
High	75 to 85
Moderately high	65 to 75
Moderate	55 to 65
Low	45 to 55
Sugar maple:	
Very high	73+
High	66 to 73
Moderately high	59 to 66
Moderate	52 to 59
Low	45 to 52

The five foregoing ratings are based on field determination of average site index of an indicator forest type or species. In Suffolk County, red maple was selected as the indicator species for the poorly drained and very poorly drained soils, sugar maple was selected as the indicator species for the better drained soils, and white pine was selected as the indicator species for the excessively drained soils. Site indexes are grouped into site quality classes, and the classes are used to arrive at approximate expected yields per acre in cords and board feet. On the basis of research studies, site index can be converted into an approximate expected growth and yield per acre in cords and board feet.

The second part of the symbol identifying a woodland group is a small letter. This letter indicates an important soils property that is a moderate or severe hazard or limitation in managing the soils of the group for wood crops. A letter *w* shows that water in or on the soil, either seasonally or year around, is the chief limitation; *s* shows a restriction or limitation for woodland use or management because of the amount of coarse-textured material in the profile; *r* shows that the main limitation is the steepness of slopes; and *o* shows that the soils have few limitations that restrict their use for trees.

In table 2 the woodland suitability groups of Suffolk County are described briefly, management limitations based on soil characteristics are given, and some of the preferred timber species for planting and those to favor in existing stands are indicated.

The third part of the symbol, always a number, shows the placement of each kind of soil into the woodland suitability classification system. In summary, the first part of the symbol, a number, indicates the productivity class; the second part of the symbol, a letter, identifies the soil property causing a hazard or limitation for use; and the third part of the symbol is simply a consecutive numbering of groups of soils having similar productivity, similar hazards or limitations, and similar suitability for the same kinds of trees.

Some soils and miscellaneous land types that generally are not suitable as commercial woodland sites have not been classified and placed in woodland suitability groups. Special-use plantings are successful in some

[6] By MEREDITH A. PETERS, woodland conservationist, Soil Conservation Service.

[7] Italic numbers in parentheses refer to Literature Cited, p. 99.

areas of these soils or land types if onsite examination indicates suitable conditions. The soils omitted from the groups are: Bridgehampton silt loam, graded; Montauk soils, graded, 0 to 8 percent slopes; Montauk soils, graded, 8 to 15 percent slopes; Riverhead and Haven soils graded, 0 to 8 percent slopes; and Riverhead and Haven soils graded, 8 to 15 percent slopes. The land types omitted are Beaches; Cut and fill land, gently sloping; Cut and fill land, sloping; Cut and fill land, steep; Dune land; Escarpments; Fill land, dredged material; Fill land, sandy; Gravel pits; Made land; Muck; Recharge basin; Tidal marsh; and Urban land.

Erosion hazard refers to the degree of potential soil losses in well-managed woodland. The hazard is *slight* if expected soil losses are small; *moderate* if some soil losses are expected and care is needed during logging and construction to reduce soil losses; and *severe* if special methods of operation are needed to prevent excessive soil losses.

Equipment limitation is rated on the basis of soil characteristics that restrict or prohibit the use of equipment generally used in tending and harvesting trees. In Suffolk County, soil characteristics having the most limiting effect are drainage, depth to water table, slope, and texture of the surface layer. *Slight* means that no restriction is present in the kind of equipment or in the time of the year it is used. *Moderate* means that use of equipment is restricted for less than 3 months of the year. *Severe* means that special equipment is needed and its use is restricted for more than 3 months of the year.

Seedling mortality refers to the expected degree of mortality of planted seedlings, as influenced by kinds of soil, when plant competition is not a limiting factor. Considered in the ratings are depth to water table, hazard of flooding, drainage, soil depth and structure. and degree of erosion. Normal rainfall, good planting stock, and proper planting are assumed. A rating of *slight* indicates an expected loss of less than 25 percent of the planted seedlings; *moderate* a loss of 25 to 50 percent of the seedlings; and *severe* a loss of more than 50 percent of the seedlings. Special preparation of the site is needed before planting for soils rated severe and for most soils rated moderate.

Plant competition is rated on the basis of the degree to which unwanted plants invade openings in the tree canopy. Considered in the ratings are available moisture capacity, fertility, drainage, and degree of erosion. A rating of *slight* means that competition from other plants is not a problem; *moderate*, that plant competition delays development of fully stocked stands of desirable trees; and *severe*, that plant competition prevents establishment of a desirable stand unless intensive site preparation and such practices as weeding are used to control undesirable plants.

Windthrow hazard measures the effect of the soils on root development and the ability of the soil to hold trees firmly. The hazard is *slight* when effective rooting is more than 20 inches and trees withstand most wind; *moderate* if effective rooting is from 10 to 20 inches and some trees are blown down during periods of excessive soil wetness and strong wind; and *severe* if effective rooting depth is 10 inches or less and trees will not stand alone in strong wind.

Wildlife [8]

Wildlife is an important resource in Suffolk County. The coastal wetlands of Long Island, particularly the south shore, are among the most valuable migration and wintering grounds for waterfowl on the Atlantic coast. In Suffolk County there are approximately 17,000 acres of high-value waterfowl wetlands and thousands of acres of less valuable, but significant, wetlands. In addition to providing habitat for the many species of waterfowl, they supply nutrients and food for marine life. The offshore waters abound with marine fish and shellfish for both commercial and sport fishing.

Upland wildlife consists of ring-necked pheasant, bobwhite quail, cottontailed rabbit, white-tailed deer, gray squirrel, woodcock, fox, raccoon, and a few ruffed grouse. In addition to these game species, songbirds are an important wildlife resource.

The kind and amount of wildlife that live in a given area are closely related to land use; to the kinds, amounts, and patterns of vegetation; and to the supply and distribution of water. These considerations generally are related to the type of soil.

In table 3 soils are rated for eight elements of wildlife habitat, including grain and seed crops, grasses and legumes, wild herbaceous upland plants, hardwoods, conifers, wetland food and cover plants, shallow diked impoundments, and shallow excavated impoundments and for three classes of wildlife, including openland, woodland, and wetland wildlife (*1*).

The rating system is based on the relative suitability of the soil for the development and management of each individual habitat element. The class rating is based on an evaluation of the potential for developing all habitat elements that are essential to the particular class of wildlife. A rating of 1 indicates that the soil is well suited and has few limitations; 2 indicates that the soil is suited but has moderate limitations; 3, that the soil is poorly suited because of severe limitations; and 4, that the soil is unsuitable.

Wildlife habitat elements

Each soil is rated in table 3 according to its suitability for various kinds of plants or developments that make up the wildlife habitat element. The habitat element ratings serve as a guide in selecting the best soils for creating, improving, or maintaining specific wildlife habitat elements; in determining the relative intensity of management required for individual habitat elements; and in avoiding sites that would be difficult or not feasible to manage.

Grain and seed crops.—These crops include such seed-producing annuals as corn, sorghum, wheat, barley, oats, millet, buckwheat, and sunflower. Soils that are rated well suited to these plants are deep, nearly level or very gently sloping, medium textured, well drained, and free or nearly free of stones. They also have high available moisture capacity and are not subject to frequent flooding. These soils can be safely planted to a wide variety of grain crops each year. Soils that are not so well suited

[8] Prepared by ROBERT E. MYERS, wildlife biologist, Soil Conservation Service.

TABLE 2.—*Woodland suitability groups*

[The following soils and land types generally are not suitable for use as commercial woodland; consequently, they have not been placed
use plantings on these mapping units may be successful, but onsite

Woodland suitability group, brief description of soils, and map symbols	Potential productivity		Factors affecting management	
	Indicator species	Site index	Erosion hazard	Equipment limitation
Group 3o1. Deep, well drained and moderately well drained, nearly level to moderately sloping, medium-textured and moderately coarse textured soils; some very stony. Formed in silt loam, loam, fine sandy loam, and sandy loam over stratified coarse sand and gravel or glacial till. Bridgehampton (BgA, BgB, BhB, BhC); Haven (HaA, HaB, HaC, He); Montauk (MfA, MfB, MfC, MkA, MkB, MkC); Riverhead (RdA, RdB, RdC, ReB, ReC); Scio (ScB, SdA, SdB); Sudbury (Su).	Sugar maple	60–65	Slight to moderate.	Slight
Group 4o1. Deep, moderately well drained, nearly level, coarse-textured soil. Formed in deep, very strongly acid and strongly acid sandy deposits. Deerfield (De).	White pine	60–70	Slight	Slight
Group 4s1. Deep, excessively drained, nearly level to moderately sloping, coarse-textured soils. Formed in sand or loamy sand over coarse sand and gravel, glacial till, or stratified silt loam and very fine sandy loam. Montauk, sandy variant (MnA, MnB, MnC); Plymouth (PlA, PlB, PlC, PsA, PsB).	White pine	60–70	Slight	Slight
Group 4s2. Deep, excessively drained, moderately steep to steep, coarse-textured soil. Formed in sandy material that contains a fragipan; over firm glacial till. Montauk, sandy variant (MnE).	White pine	60–70	Slight	Moderate
Group 4w1. Deep, somewhat poorly drained to very poorly drained, nearly level soils that are coarse textured, moderately coarse textured, and medium textured. Formed in sand, loamy sand, sandy loam, or silty material over stratified coarse sand and gravel, or in some places over glacial till. Wallington soil has a fragipan. Atsion (At); Raynham (Ra); Wallington (Wa); Walpole (Wd); Wareham (We).	Red maple	60–70	Slight	Severe
Group 5s1. Deep, excessively drained, nearly level to moderately sloping, coarse-textured soils. Formed in sand or gravelly loamy sand materials over coarse sand and gravel. Carver and Plymouth (CpA, CpC); Plymouth (PmB3, PmC3).	White pine	50–60	Slight	Slight
Group 5s2. Deep, moderately steep to steep soils; some very bouldery. All but the Riverhead soil in mapping unit (RpE) are excessively drained and sandy or sandy and gravelly throughout the solum and substratum. The Riverhead soil is well drained and has a moderately coarse textured upper solum. Where Riverhead soil occurs, the potential productivity will approach that of soils in Group 3o1; otherwise, the management problems are similar to the other soils in Group 5s2. Carver and Plymouth (CpE); Riverhead and Plymouth (RpE).	White pine	50–60	Slight	Moderate
Group 5w1. Deep, poorly drained, nearly level soil that has a medium-textured surface layer and a moderately fine textured to fine textured subsoil. Formed in clay and silt deposits. Canadice (Ca).	Red maple	50–60	Slight	Severe
Group 5w2. Deep, very poorly drained, nearly level, coarse textured and moderately coarse textured soils. Sandy or loamy throughout the solum and substratum but have an organic surface layer, 6 to 16 inches thick. Berryland (Bd); Whitman (Wh).	Red maple	50–60	Slight	Severe

[1] On selected sites.

and factors in woodland management

in a woodland suitability group: Bc, Bm, CuB, CuC, CuE, Du, Es, Fd, Fs, Gp, Ma, MIB, MIC, Mu, Rc, RhB, RhC, Tm, and Ur. Special-investigations should be made to ascertain if conditions are suitable]

Factors affecting management—Continued				Species suitability	
Seedling mortality	Plant competition		Windthrow hazard	For planting	To favor in existing stands
	Hardwoods	Conifers			
Slight	Slight	Moderate	Slight	White pine and pitch pine [1]	Sugar maple, white oak, red oak, pitch pine, beech, and basswood.
Slight	Slight	Moderate	Slight	White pine	White pine, oaks, pitch pine, and sugar maple.
Moderate	Slight	Moderate	Slight	White pine and pitch pine [1]	White pine, red maple, blackgum, white oak, and red oak.
Moderate	Slight	Moderate	Slight	White pine and pitch pine [1]	Sugar maple, white oak, red oak, pitch pine, beech, and hickory.
Severe	Severe	Severe	Severe	Generally not suited to planting.	Red maple, blackgum, white oak, red oak, and pitch pine.
Moderate	Slight	Slight	Slight	Pitch pine and white pine [1]	White pine, red oak, white oak, and pitch pine.
Moderate [2]	Slight	Slight	Slight	Pitch pine and white pine [1]	White pine, red oak, white oak, and pitch pine.
Severe	Severe	Severe	Severe	Generally not suited to planting.	Red maple, blackgum, and pitch pine.
Moderate	Severe	Severe	Severe	Generally not suited to planting.	Red maple, blackgum, and pitch pine.

[2] Severe on south-facing or west-facing slopes of more than 15 percent gradient.

TABLE 3.—*Rating of soils for elements of wildlife*

[A rating of 1 indicates that the soil is well suited; 2, the soil is suited; 3, poorly suited; and 4, unsuited. Not rated because they are too and Ur and the graded soils

Soil name	Elements of wildlife habitat	
	Grain and seed crops	Grasses and legumes
Atsion sand	4	3
Beaches		
Berryland mucky sand	4	3
Bridgehampton silt loam, 0 to 2 percent slopes	1	1
Bridgehampton silt loam, 2 to 6 percent slopes	2	1
Bridgehampton silt loam, till substratum, 2 to 6 percent slopes	2	1
Bridgehampton silt loam, till substratum, 6 to 12 percent slopes	2	1
Bridgehampton silt loam, graded		
Canadice silt loam	4	3
Carver and Plymouth sands, 0 to 3 percent slopes	4	3
Carver and Plymouth sands, 3 to 15 percent slopes	4	3
Carver and Plymouth sands, 15 to 35 percent slopes	4	3
Cut and fill land, gently sloping		
Cut and fill land, sloping		
Cut and fill land, steep		
Deerfield sand	3	2
Dune land		
Escarpments		
Fill land, dredged material		
Fill land, sandy		
Gravel pits		
Haven loam, 0 to 2 percent slopes	1	1
Haven loam, 2 to 6 percent slopes	2	1
Haven loam, 6 to 12 percent slopes	2	1
Haven loam, thick surface layer	2	1
Made land		
Montauk fine sandy loam, 0 to 3 percent slopes	1	1
Montauk fine sandy loam, 3 to 8 percent slopes	2	1
Montauk fine sandy loam, 8 to 15 percent slopes	2	1
Montauk silt loam, 0 to 3 percent slopes	1	1
Montauk silt loam, 3 to 8 percent slopes	2	1
Montauk silt loam, 8 to 15 percent slopes	2	1
Montauk soils, graded, 0 to 8 percent slopes		
Montauk soils, graded, 8 to 15 percent slopes		
Montauk loamy sand, sandy variant, 0 to 3 percent slopes	3	3
Montauk loamy sand, sandy variant, 3 to 8 percent slopes	3	3
Montauk loamy sand, sandy variant, 8 to 15 percent slopes	3	3
Montauk loamy sand, sandy variant, 15 to 35 percent slopes	3	3
Muck	4	3
Plymouth loamy sand, 0 to 3 percent slopes	3	3
Plymouth loamy sand, 3 to 8 percent slopes	3	3
Plymouth loamy sand, 8 to 15 percent slopes	3	3
Plymouth gravelly loamy sand, 3 to 8 percent slopes, eroded	4	3
Plymouth gravelly loamy sand, 8 to 15 percent slopes, eroded	4	3
Plymouth loamy sand, silty substratum, 0 to 3 percent slopes	3	2
Plymouth loamy sand, silty substratum, 3 to 8 percent slopes	3	2
Raynham loam	2	2
Recharge basin		
Riverhead sandy loam, 0 to 3 percent slopes	2	1
Riverhead sandy loam, 3 to 8 percent slopes	2	1
Riverhead sandy loam, 8 to 15 percent slopes	2	1
Riverhead very stony sandy loam, 3 to 8 percent slopes	3	2
Riverhead very stony sandy loam, 8 to 15 percent slopes	3	2
Riverhead and Haven soils, graded, 0 to 8 percent slopes		
Riverhead and Haven soils, graded, 8 to 15 percent slopes		
Riverhead and Plymouth very bouldery soils, 15 to 35 percent slopes	4	3
Scio silt loam, till substratum, 2 to 6 percent slopes	2	1
Scio silt loam, sandy substratum, 0 to 2 percent slopes	2	1
Scio silt loam, sandy substratum, 2 to 6 percent slopes	2	1
Sudbury sandy loam	2	1
Tidal marsh	4	4
Urban land		
Wallington silt loam, till substratum	2	2
Walpole sandy loam	3	2
Wareham loamy sand	4	3
Whitman sandy loam	4	3

habitat and classes of wildlife

variable and generally are unsuitable for wildlife use are the miscellaneous land types Bc, CuB, CuC, CuE, Du, Es, Fd, Fs, Gp, Ma, Rc, Bm, MlB, MlC, RhB, and RhC]

Elements of wildlife habitat—Continued			Wetland food and cover plants	Shallow diked impoundments	Shallow excavated impoundments	Classes of wildlife		
Wild herbaceous upland plants	Hardwoods	Conifers				Openland	Woodland	Wetland
3	2	2	2	4	2	3	2	2
3	2	3	1	4	2	3	3	2
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
3	2	2	2	2	1	3	2	2
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
2	2	3	4	4	3	2	2	3
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
3	2	3	1	4	2	3	3	2
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
3	3	3	4	4	4	3	3	4
2	2	2	4	4	4	2	2	4
2	2	2	4	4	4	2	2	4
1	1	2	3	2	2	2	1	2
1	2	2	4	4	4	1	2	4
1	2	2	4	4	4	1	2	4
1	2	2	4	4	4	1	2	4
1	2	2	4	4	4	2	2	4
1	2	2	4	4	4	2	2	4
3	3	2	4	4	4	3	3	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	1	1	4	4	4	1	1	4
1	2	2	4	4	3	1	2	3
4	4	4	1	4	1	4	4	2
1	2	2	3	4	4	2	2	4
2	2	2	3	4	3	2	2	3
3	2	2	3	4	3	3	2	3
3	2	3	1	2	2	3	2	2

require more intensive management and are suited to fewer crops.

Grasses and legumes.—In this group are domestic grasses and legumes that are established by planting. Among these are alfalfa, trefoil, clover, bluegrass, switchgrass, fescue, bromegrass, timothy, orchardgrass, and reed canarygrass. Soils that are rated well suited have slopes of 0 to 15 percent, are well drained or moderately well drained, and have moderate or high available moisture capacity. An adequate stand of many kinds of plants can be easily maintained on these soils for at least 10 years without renovation. Occasional flooding and surface stones are not a serious concern, because the soils are seldom tilled.

Wild herbaceous upland plants.—In this group are perennial grasses and weeds that generally are established naturally. They include bluestem, quackgrass, panicgrass, goldenrod, wild carrot, and dandelion. Soils that are rated well suited to these plants vary widely in texture, drainage, and slope. Drainage ranges between well drained and somewhat poorly drained. Slope is not a limiting factor. Stoniness and occasional flooding are not of serious concern.

Hardwoods.—These plants are nonconiferous trees, shrubs, and woody vines that produce nuts or other fruits, buds, catkins, twigs, or foliage that wildlife eat. They are generally established naturally but are planted in places. Among the native kinds are oak, beech, cherry, maple, birch, poplar, apple, hawthorn, dogwood, viburnum, grape, nightshade, and briers. Soils that are rated well suited to these plants are deep or moderately deep, medium textured or moderately fine textured, and well drained to somewhat poorly drained. Slopes and surface stoniness are of little significance.

Also in this group are several varieties of fruiting shrubs that are raised commercially for planting. Among the shrubs that can be grown on soils rated well suited are autumn-olive, Amur honeysuckle, Tatarian honeysuckle, crabapple, multiflora rose, highbush cranberry, and silky dogwood. In addition, highbush cranberry, silky dogwood, and other shrubs that have similar site requirements can be planted on soils that have a rating of suited. Hardwoods that are not available commercially commonly can be transplanted successfully.

Conifers.—This element consists of cone-bearing evergreen trees and shrubs that are used by wildlife primarily as cover, although some provide browse and seeds. Among these are Norway spruce, white pine, white cedar, and hemlock. It is important that living branches be maintained close to the ground so that food and cover are readily available to rabbits, pheasants, and other small animals. The lower branches die if trees form a dense canopy that shuts out the light.

Soils that are rated well suited are those on which conifers grow slowly. These soils either have an effective rooting depth of less than 10 inches or are very poorly drained or excessively drained. It may be difficult to establish a stand of conifers on these soils because seedling mortality is high. Once a stand is established, however, a pure conifer habitat is fairly easy to maintain because there is little competition from hardwoods. Soils that are rated poorly suited are those on which conifers grow at a faster rate. These are the deeper soils that are either well drained, moderately well drained, or somewhat poorly drained. If seedlings are planted, the spacing should be 14 feet or more. Maintaining a pure stand of conifers is difficult on these soils because hardwoods readily invade the site.

Wetland food and cover plants.—These are wild, herbaceous, annual and perennial plants that grow on moist to wet sites. They include smartweed, wild millet, rushes, spikerush, sedges, rice cutgrass, mannagrass, and cattails.

Soils that are rated well suited are nearly level and are very poorly drained. Soils that are rated suited are nearly level and are poorly drained. Depth, stoniness, and the texture of the surface layer are of little concern.

Shallow diked impoundments.—This habitat element is rated on the basis of the suitability of the soil for the construction of a low dike to impound a shallow body of water. Included are marshes, which receive surface runoff; flooded duck fields or "dry" shallow impoundments, in which domestic grains are grown and then flooded in fall with up to 18 inches of water from adjacent ponds or streams; and shallow ponds developed as watering facilities for wildlife. Fishponds are not included. Soils that are rated well suited are level or nearly level and poorly drained or very poorly drained. The subsoils must be very slowly or slowly permeable.

Detailed field investigations of soil and site are necessary to determine suitability for impoundments. Soil features listed in table 6, under the heading "Farm Ponds," are pertinent.

Shallow excavated impoundments.—These are level ditches and potholes constructed in soils that have a high water table to create areas of open water, primarily for waterfowl. Fish ponds are not included. Soils that are rated well suited are nearly level, are over 6 feet deep to bedrock, are poorly or very poorly drained, and have a seasonal water table within 6 inches of the surface.

Detailed field investigations of soil and site are necessary to determine suitability for impoundments. Soil features listed in table 6, under the heading "Farm Ponds," are pertinent.

Classes of wildlife

Each rating under openland, woodland, and wetland wildlife is based on the rating listed for selected essential habitat elements in the first part of the table in proportion to their significance for that class of wildlife. The rating for openland wildlife is based on the rating for grain and seed crops, grasses and legumes, wild herbaceous upland plants, hardwoods, and conifers. The rating for woodland wildlife is based on the rating listed for all the above elements except grain and seed crops. That for wetland wildlife is based on the rating shown for wetland food and cover plants, shallow diked impoundments, and shallow excavated impoundments. The ratings for classes of wildlife serve as a guide in planning the broad use of land for wildlife refuge, nature-study areas, or other developments for wildlife and in determining areas that are suitable for acquisition for wildlife development.

Openland wildlife.—Examples of openland wildlife are pheasant, quail, meadowlark, field sparrow, dove, cottontail rabbit, red fox, and woodchuck. These birds and mammals normally make their home in areas of cropland, pasture, meadow, and lawns and in areas overgrown with grasses, herbs, and shrubs.

Woodland wildlife.—Among the birds and mammals that prefer woodland are ruffed grouse, woodcock, thrush, vireo, scarlet tanager, gray and red squirrel, gray fox, white-tailed deer, and raccoon.

Wetland wildlife.—Duck, geese, rail, heron, shore birds, redwing blackbird, mink, muskrat, and beaver are familiar examples of birds and mammals that normally make their home around ponds, marshes, and swamps or in other wet areas.

Engineering Uses of the Soils [9]

This section is useful to those who need information about soils for use as structural material or as foundations upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering work are permeability, strength, compaction characteristics, drainage, shrink-swell potential, grain size, plasticity, and reaction. Also important are the slope and the depth to the water table. The depth to and the nature of the bedrock are important in many places, but since bedrock is more than 400 feet below the surface throughout Suffolk County (*6*, *10*), it has little significance so far as many engineering operations are concerned, and it has not been considered in the information presented in this section. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 4, 5, and 6, which show, respectively, results of engineering laboratory tests on soil samples, estimates of several of the soil properties significant to engineering, and interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 5 and 6; and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally 4 to 7 feet. Also, inspection of sites, especially small ones, is needed because many delineated areas of a given mapping unit may contain small areas of soils that have strongly contrasting properties and different suitabilities or limitations for engineering.

Some of the terms used in this survey have special meaning to soil scientists that are not known to all engineers. The Glossary defines many of these terms. Many of the engineering terms used in this section are explained in the discussions of tables 4, 5, and 6.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*14*) used by the SCS engineers, Department of Defense, and others, and the AASHO system (*2*) adopted by the American Association of State Highway Officials.

In the Unified system soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, SP–SM.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classification for tested soils, that have group index numbers in parentheses, is shown in table 4; the estimated classification, without group index numbers, is given in table 5 for all soils mapped in the survey area.

In the system used by soil scientists of the U.S. Department of Agriculture, the texture of the soil horizon depends on the proportional amounts of the different sized mineral particles. The percentage of soil material smaller than 2.0 millimeters (classified as clay, silt, and sand) determines the basic textural classification, such as sandy loam or loamy sand. Coarse fragments greater than 2.0 millimeters, such as gravel or stone, become part

[9] Prepared by John B. Fleckenstein, senior agronomist, and Donald L. Basinger, assistant state conservation engineer, Soil Conservation Service; and Edward A. Fernau, P. E., senior soils engineer, State of New York Department of Transportation, Bureau of Soil Mechanics.

TABLE 4.—*Engineering*

[Tests performed by the New York Department of Transportation, Bureau of Soil Mechanics, in accordance

Soil name, location of sample, and SCS report number	Parent material	Depth	Moisture-density data [1]		In-place moisture content [2]	In-place dry density [3]	Lineal Shrinkage	Reaction	Organic-matter content [4]
			Maximum dry density	Optimum moisture					
		In.	*Lb. per cu. ft.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*pH*	*Pct.*
Bridgehampton silt loam:									
Town of East Hampton, 0.3 mi. S. of Stephen Hands Path on Long Lane. (Modal) S67NY52, 4–1 through 4–6.	Thick silt deposit over sand and gravel outwash.	0–11	109	14	21	94	1.4	4.7	2.8
		11–19	112	15	20	97	1.6	4.6	1.1
		19–23	111	15	----	----	1.8	4.7	0.8
		23–34	106	17	24	84	1.6	5.0	0.6
		34–56	105	16	26	92	0.0	5.6	0.3
		56–80	140	7	----	----	0.2	5.6	----
Town of East Hampton, 0.2 mi. NE. of State Route 27 on Highway Behind Lots. (Less gravel in IIC horizon than Modal) S67NY52, 3–1 through 3–5.	Thick silt deposit over sand and gravel outwash.	0–10	103	8	----	----	3.0	4.6	4.0
		10–14	105	17	----	----	1.8	4.5	1.6
		14–26	107	16	26	83	2.0	5.0	1.2
		26–57	106	17	27	91	0.5	5.5	0.0
		57–68	115	10	5	109	0.0	5.9	----
Town of East Hampton, 50 yd. behind Town Office Building. (Shallower than modal) S67NY52, 5–1 through 5–5.	Moderately thick silt and very fine sand deposit over sand and gravel outwash.	0–10	111	14	21	91	1.6	5.2	2.5
		10–23	107	17	17	95	0.8	5.5	0.5
		23–31	104	15	26	96	0.0	5.7	0.2
		31–36	106	17	25	(11)	0.0	5.9	----
		36–60	114	11	4	111	0.0	6.1	----
Carver sand:									
Town of Southampton, 1,500 ft. E. of Speonk Rd.; ½ mi. S. of County Road 51, Bomarc site. (Modal) S67NY52, 8–1 through 8–5.	Thick glacial outwash deposit of medium and coarse sand and some pebbles.	0–4, 4–10	102	15	7	90	0.0	4.0	1.1
		10–22	119	10	9	106	0.0	4.6	1.0
		22–31	110	13	4	101	0.0	4.7	0.2
		31–70	114	12	3	110	0.0	4.8	----
Town of Southampton, Quoque Wildlife Refuge, ½ mile N. of Old Country Road. (More gravel in lower B horizon than modal) S67NY52, 7–1 through 7–6.	Thick glacial outwash deposit of medium and coarse sand and some pebbles.	0–3, 3–6	108	14	----	----	0.0	3.9	3.6
		6–16	112	12	7	101	0.0	4.7	1.5
		16–27	128	8	5	117	0.0	4.8	0.6
		27–48	115	11	3	111	0.0	4.9	----
		48–80	104	16	----	----	0.0	4.9	----
Town of Brookhaven, Whiskey Rd., 1.1 mi. E. of Rocky Point Rd., RCA property. (Profile not so well developed as modal) S67NY52, 10–1 through 10–5.	Thick glacial outwash deposit of medium and coarse sand and a few pebbles.	2–0	----	----	----	----	----	----	26.6
		0–2	----	----	----	----	----	3.9	7.9
		2–6	108	14	8	----	0.0	4.7	0.9
		6–36	111	12	6	93	0.0	4.7	0.5
		36–64	107	13	4	99	0.0	4.8	----
Haven loam:									
Town of Brookhaven, Rocky Point Rd., 1¼ mi. N. of State Route 25. (Modal) S67NY52, 13–2 through 13–6.	Moderately thick deposit of silt and very fine sand over sand and gravel outwash.	0–2	----	----	----	----	----	4.4	4.0
		2–23	115	16	30	----	3.2	4.8	0.9
		23–28	128	9	12	----	0.4	4.9	0.5
		28–35	119	11	12	96	0.0	4.8	----
		35–58	126	9	2	----	0.0	5.2	----
Town of Southold, Village of Cutchogue, 0.2 mi. S. of State Route 25. (More silt than modal) S67NY52, 1–1 through 1–6.	Moderately thick deposit of silt and very fine sand over sand and gravel outwash.	0–8	109	15	24	89	2.6	4.4	2.3
		8–21	111	16	25	95	2.0	5.0	0.8
		21–24	130	9	----	----	0.0	5.2	0.1
		24–34	133	7	4	117	0.0	5.6	----
		34–51	127	8	2	122	0.0	5.6	----
		51–62	110	12	4	110	0.0	5.6	----

See footnotes at end of table.

test data

with standard procedures of the American Association of State Highway Officials (AASHO)]

Percolation [5]	Mechanical analysis [6]											Liquid limit	Plasticity Index [8]	Classification	
	Percentage passing sieve [7]—							Percentage smaller than—							
	1½-in.	¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO	Unified [8]
Min./in.															
			100	100	96	90	67	53	20	8	4	18	0	A-4(6)	ML
			100	100	98	94	76	61	26	7	5	19	1	A-4(8)	ML
30				100	99	98	87	68	27	7	4	21	1	A-4(8)	ML
				100	100	99	93	68	39	10	5	22	2	A-4(8)	ML
			100	100	98	96	88	68	20	5	2		[9] NP	A-4(8)	ML
0. 2	94	76	45	37	19	13	8	([10])					NP	A-1-a(0)	GP-GM
			100	100	98	94	85	67	26	7	5	24		A-4(8)	ML
				100	99	96	88	69	24	6	4	22	2	A-4(8)	ML
27. 2				100	99	98	95	77	30	9	5	23	2	A-4(8)	ML
			100	100	98	96	91	71	24	6	4	22	1	A-4(8)	ML
0. 3		100	96	94	36	18	10	([10])					NP	A-1-b(0)	SW-SM
54. 0				100	92	79	59	45	16	6	3	17	0	A-4(5)	ML
12. 6				100	99	98	92	72	25	5	3	21	1	A-4(8)	ML
				100	100	97	87	63	12	3	2		NP	A-4(8)	ML
			100	100	96	94	84	63	14	4	3		NP	A-4(8)	ML
0. 2	[12]93	89	85	83	38	14	11	10	5	2	1		NP	A-1-b(0)	SW-SM
1. 0			100	99	63	26	5	([10])					NP	A-3(0)	SP-SM
	97	79	62	60	35	15	5	([10])					NP	A-1-b(0)	SP-SM
0. 8	100	99	93	91	55	25	4	([10])					NP	A-3(0)	SP
0. 3	100	96	88	85	55	22	2	([10])					NP	A-3(0)	SP
	100	99	98	96	43	17	6	([10])					NP	A-1-b(0)	SW-SM
0. 7	100	98	90	85	38	15	8	([10])					NP	A-1-b(0)	SW-SM
0. 4	95	83	55	50	22	8	3	([10])					NP	A-1-a(0)	SP
	100	97	89	85	35	8	0	([10])					NP	A-1-b(0)	SP
	100	99	94	91	47	13	1	([10])					NP	A-1-b(0)	SP
			100	100	45	16	6	([10])					NP	A-1-b(0)	SP-SM
0. 7			100	99	47	16	7	([10])					NP	A-1-b(0)	SP-SM
0. 2		100	93	87	40	9	1	([10])					NP	A-1-b(0)	SP
20. 9		100	99	99	81	69	59	51	32	12	6	20	4	A-4(5)	ML
		100	98	96	71	49	29	24	12	3	1		NP	A-2-4(0)	SM
	100	99	97	95	74	52	20	16	6	1	1		NP	A-2-4(0)	SM
0. 1	92	77	44	32	5	1	1	([10])					NP	A-1-a(0)	GP
		100	99	98	87	82	77	63	31	15	7	21	3	A-4(8)	ML
			100	100	93	88	83	68	33	14	8	22	2	A-4(8)	ML
2. 2		99	90	87	69	56	38	30	12	3	2		NP	A-4(1)	SM
	100	96	67	56	9	7	6	([10])					NP	A-1-b(0)	SP-SM
	100	98	64	53	15	5	4	([10])					NP	A-1-b(0)	SP
0. 3	100	99	92	85	31	8	0	([10])					NP	A-1-b(0)	SP

TABLE 4.—*Engineering*

Soil name, location of sample, and SCS report number	Parent material	Depth	Moisture-density data [1]		In-place moisture content [2]	In-place dry density [3]	Lineal Shrinkage	Reaction	Organic-matter content [4]
			Maximum dry density	Optimum moisture					
		In.	*Lb. per cu. ft.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*pH*	*Pct.*
Town of Brookhaven, on Whiskey Rd., 0.55 mi. W. of Rocky Point Rd. (More sand than modal) S67NY52, 12-1 through 12-5.	Moderately thick deposit of very fine sand and silt over sand and gravel outwash.	0-2						4.7	4.6
		2-12	117	14	23	81	2.1	4.8	1.5
		12-23	117	13			3.2	4.8	0.9
		23-28	125	9	5		0.0	5.1	0.4
		28-68	110	12	4	107	0.0	5.3	
Montauk fine sandy loam: Town of East Hampton, 0.3 mi. N. of Stephen Hands Path. (Modal) S67NY52, 2-2 through 2-5.	Morainic till deposit of granitic materials and sand.	2-17	123	9	11	98	0.8	4.9	0.9
		17-27	125	9	13	99	1.0	4.9	0.6
		27-40	126	9	14	108	1.0	5.0	0.4
		40-60	131	9	8	118	0.6	5.4	
Town of Brookhaven, Wm. Floyd Pkwy., ¼ mi. N. of Long Island railroad crossing. (Lacks B'x horizon of modal) S67NY52, 16-1 through 16-4.	Morainic till deposit of granitic materials and sand.	0-6	116	12	21		2.0	4.7	3.2
		6-25	128	9	15	92	1.6	4.8	0.6
		25-31	125	10	14		1.6	4.8	0.4
		31-57	123	9	10	111	0.0	5.0	
Montauk loamy sand, sandy variant: Town of East Hampton. Town borrow pit, 0.3 mi. SE. of Three Mile Harbor Rd. and 0.2 mi. NE. of Manor Lane (modal profile). S67NY52, 6-1 through 6-50.	Morainic till deposit of sand and some granitic material.	0-3			14		0.2	4.2	4.9
		3-19	123	9	9		0.0	4.7	1.2
		19-24	128	8	8		0.2	5.0	0.5
		24-34	132	6	9		0.0	5.0	0.4
		34-60	127	10	8	119	0.4	5.3	
Plymouth loamy sand: Town of Brookhaven, Carmans River Conservancy, 1.5 mi. N. of State Route 27. (Modal) S67NY52, 18-1 through 18-6.	Moderately thick outwash sand deposit over sand and gravel.	0-10	115	13	12	98	1.2	6.9	2.6
		10-12						7.0	0.6
		12-27	128	9	11	103	0.4	6.3	0.5
		27-35	132	8	7		0.0	6.8	0.2
		35-44	135	7	3	133	0.0	6.8	
		44-68	109	13	4	110	0.0	6.0	
Town of Brookhaven, Whiskey Rd., 1.1 mi. E. of Rocky Point Rd. (Deeper solum than modal) S67NY52, 11-1 through 11-6.	Thick glacial outwash sand deposit over sand and gravel.	0-1						4.5	8.3
		1-8	123	11	11		0.4	4.7	1.4
		8-26	129	10	10	100	1.2	4.7	0.6
		26-42	129	10	9	97	1.6	5.2	0.3
		42-48	117	11	4		0.0	5.3	0.2
		48-65	111	12	4	105	0.0	5.0	
Town of Brookhaven, Smith Rd., 0.2 mi. N. of Longwood Rd. (Bisequum profile) S67NY52, 15-1 through 15-6.	Thick morainic till deposit of sand and a few pebbles.	0-10	116	11	12	90	0.4	5.4	2.4
		10-14	126	9	9		0.3	5.5	0.9
		14-24	129	9	10	104	1.2	5.6	0.4
		24-29	112	12	5	102	0.0	5.9	0.1
		29-39	131	9	9	111	1.2	5.8	0.1
		39-64	113	11	7	100	0.0	6.0	
Town of Brookhaven, Carmans River Conservancy, 0.9 mi. N. of State Route 27. (More silt in the B horizon than modal) S67NY52, 17-1 through 17-6.	Moderately thick sand deposit over outwash sand and gravel.	2-0, 0-2						4.8	3.3
		2-9	124	10	12	89	0.4	4.8	1.3
		9-33	126	11	12	91	0.8	4.9	0.7
		33-44	129	8	4	124	0.0	5.8	0.1
		44-59	109	13	6	103	0.0	6.0	

See footnotes at end of table.

test data—Continued

Percolation [5]	Mechanical analysis [6]											Liquid limit	Plasticity Index [8]	Classification	
	Percentage passing sieve [7]—							Percentage smaller than—							
	1½-in.	¾-in.	No. 4 (4.7 mm).	No. 10 (2.0 mm).	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.005 mm.			AASHO	Unified [8]
Min./in.															
11.9	------	100	97	93	69	58	53	45	28	10	5	25	4	A-4(4)	ML-CL
24.2	------	100	97	94	71	61	56	49	30	10	5	22	4	A-4(4)	ML-CL
----------	------	100	87	73	27	14	11	9	4	1	1	--------	NP	A-1-b	SW-SM
0.2	------	100	94	82	23	6	2	(10)	------	------	------	--------	NP	A-1-b(0)	SP
7.6	99	98	95	93	77	56	23	22	9	4	2	--------	NP	A-2-4(0)	SM
76.4	100	99	94	91	72	59	41	32	13	5	3	--------	NP	A-4(1)	SM
----------	99	96	91	87	68	55	38	31	14	5	3	--------	NP	A-4(1)	SM
0.7	99	96	89	84	54	36	15	13	8	3	2	--------	NP	A-2-4(0)	SM
----------	100	98	94	93	80	65	36	30	15	5	3	--------	NP	A-4(0)	SM
10.2	94	85	77	75	65	55	27	23	14	5	4	--------	NP	A-2-4(0)	SM
----------	99	97	91	89	76	62	28	22	13	4	2	--------	NP	A-2-4(0)	SM
12.0	100	98	95	93	76	60	26	21	9	2	1	--------	NP	A-2-4(0)	SM
----------	100	99	96	95	71	45	14	11	3	1	1	--------	NP	A-2-4(0)	SM
----------	100	97	89	86	65	47	18	14	7	2	1	--------	NP	A-2-4(0)	SM
----------	97	91	84	80	60	43	16	13	7	4	2	--------	NP	A-2-4(0)	SM
7.1	100	96	90	86	61	43	20	17	9	5	4	--------	NP	A-2-4(0)	SM
----------	100	98	92	88	57	39	17	13	8	3	2	--------	NP	A-2-4(0)	SM
----------	------	------	100	99	57	28	16	13	7	1	0	--------	NP	A-2-4(0)	SM
5.9	------	100	97	96	59	33	20	18	9	5	3	--------	NP	A-2-4(0)	SM
----------	100	97	74	65	39	19	6	(10)	------	------	------	--------	NP	A-1-b(0)	SP-SM
----------	100	85	48	41	18	6	1	(10)	------	------	------	--------	NP	A-1-a(0)	GP
0.2	------	100	92	88	16	2	0	(10)	------	------	------	--------	NP	A-1-b(0)	SP
----------	------	------	100	100	64	36	26	23	14	6	3	--------	[2] NP	A-2-4(0)	SM
3.3	------	------	100	99	60	35	26	23	13	6	4	13	1	A-2-4(0)	SM
3.7	------	------	100	99	64	35	25	22	13	5	3	--------	NP	A-2-4(0)	SM
----------	96	84	65	59	28	13	6	(10)	------	------	------	--------	NP	A-1-b(0)	SP-SM
0.2	------	100	98	96	46	14	5	(10)	------	------	------	--------	NP	A-1-b(0)	SP-SM
----------	------	100	98	96	56	30	18	14	8	2	1	--------	NP	A-2-4(0)	SM
----------	100	99	97	95	56	30	19	16	10	3	2	--------	NP	A-2-4(0)	SM
0.6	100	93	82	78	44	22	14	12	6	3	3	--------	NP	A-1-b(0)	SM
----------	98	94	87	84	37	14	3	(10)	------	------	------	--------	NP	A-1-b(0)	SP
3.0	100	95	85	82	45	27	17	15	11	3	1	--------	NP	A-1-b(0)	SM
0.2	93	90	82	76	48	17	3	(10)	------	------	------	--------	NP	A-1-b(0)	SP
----------	------	------	100	100	65	38	24	19	10	4	1	--------	NP	A-2-4(0)	SM
17.2	------	100	99	99	63	37	25	21	13	5	4	--------	NP	A-2-4(0)	SM
----------	100	100	73	65	32	14	3	(10)	------	------	------	--------	NP	A-1-b(0)	SP
0.1	100	93	89	88	55	29	2	(10)	------	------	------	--------	NP	A-3(0)	SP

See footnotes at end of table.

TABLE 4.—*Engineering*

Soil name, location of sample, and SCS report number	Parent material	Depth	Moisture-density data [1]		In-place moisture content [2]	In-place dry density [3]	Lineal Shrinkage	Reaction	Organic-matter content [4]
			Maximum dry density	Optimum moisture					
		In.	*Lb. per cu. ft.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*pH*	*Pct.*
Riverhead sandy loam:									
Town of Brookhaven, Camp Wilderness (BSA), 0.9 mi. S. of State Route 25, 0.3 mi. N. of Junction of County Rd. 21 and Longwood Rd. (Modal) S67NY52, 14–1 through 14–6.	Moderately thick deposit of sand, silt, and clay over outwash gravel and sand.	0–12	122	10	19	95	0. 8	5. 0	2. 0
		12–27	127	10	15	97	1. 6	5. 2	0. 6
		27–32	136	8	11	----	0. 8	5. 1	0. 3
		32–35	138	7	4	----	0. 0	5. 2	0. 2
		35–40	115	11	5	----	0. 0	5. 3	0. 1
		40–65	113	12	3	111	0. 0	5. 3	----
Town of Brookhaven, Middle Island Game Farm, 250 yds. E. of Ridge Rd. (More silt in upper B horizon than modal) S67NY52, 9–1 through 9–6.	Moderately thick deposit of sand, silt, and clay over outwash sand and some pebbles.	2–0	----	----	----	----	----	3. 9	56. 0
		1–20	124	11	18	92	3. 4	4. 5	0. 8
		20–25	129	9	----	----	2. 2	4. 5	0. 4
		25–30	128	9	----	----	0. 2	4. 5	0. 3
		30–67	114	11	4	108	0. 0	4. 6	----

[1] Based on AASHO Designation: T99–57, Method A (*2*).
[2] In accordance with ASTM. Designation D2216–63T.
[3] Based on ASTM. Designation D1556–64.
[4] Wet combustion method, based on Cornell University agronomy test procedure modified by the Bureau of Soil Mechanics.
[5] New York State Department of Health, Bulletin No. 1, Standard Percolation Test.
[6] Mechanical analysis according to AASHO Designation: T 88. Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters

test data—Continued

Percolation [5]	Mechanical analysis [6]											Liquid limit	Plasticity Index [8]	Classification	
	Percentage passing sieve [7]—							Percentage smaller than							
	1½-in.	¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO	Unified [8]
Min./in.															
		100	99	98	74	55	39	33	21	8	4	17	2	A-4(1)	SM
29. 0	100	99	97	95	72	53	37	32	19	9	7	15	1	A-4(0)	SM
	98	94	81	77	56	38	21	17	9	3	2		NP	A-2-4(0)	SM
	94	70	44	40	24	10	5	[10]					NP	A-1-a(0)	GP-GM
	98	94	82	75	39	10	3	[10]					NP	A-1-b(0)	SP
0. 1	99	94	84	77	13	3	1	[10]					NP	A-1-b(0)	SP
6. 8	100	99	97	96	72	56	45	39	25	11	7	18	3	A-4(2)	SM
9. 4	96	89	83	81	57	40	30	25	15	6	3	14	2	A-2-4(0)	SM
	100	94	85	82	45	26	15	12	6	2	1		NP	A-1-b(0)	SM
0. 3	100	99	94	88	43	16	9	[10]					NP	A-1-b(0)	SW-SM

in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for textural classes for soils.

[7] Except as otherwise noted, 100 percent passed the 3-inch sieve.

[8] Soil Conservation Service and the Bureau of Public Roads have agreed to consider that all soils having plasticity indexes within two points from the A-line are to be given a borderline classification. SW-SM is an example of such a classification.

[9] Nonplastic.

[10] No hydrometer analysis performed on sand if less than 10 percent passed No. 200 sieve.

[11] The 13–31 and 31–36 inch layers were sampled as a composite for in-place density but were sampled individually for particle size.

[12] Only 93 percent passed the 3-inch sieve.

TABLE 5.—*Estimated engineering*

Not included in this table, because the characteristics are too variable to estimate, are the miscellaneous land types Bc, CuB, CuC, CuE, it is highly organic and is not suitable for engineering. An asterisk beside the series name in the first column indicates that at least and limitations, and for this reason it is necessary to follow carefully the instructions for referring to other series that appear in the

Soil series and map symbols	Depth to seasonal high water table	Depth from surface (typical profile)	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Atsion: At	½–1½	0–27	Sand and loamy sand	SM, SP–SM	A–2–4
		27–56	Stratified sand and gravel or sand.	SM, SP–SM, GP, GP–GM, SP	A–1, A–3
Berryland: Bd	0–½	0–30	Sand and loamy sand	SM, SP–SM	A–2–4
		30–52	Sand or gravelly sand	SP–SM, SM, SP	A–3, A–1
Bridgehampton:					
BgA, BgB	>3	0–56	Silt loam and very fine sandy loam.	ML	A–4
		56–80	Fine gravel and sand	GP–GM, GM, SP–SM, SM, SW–SM	A–1
BhB, BhC	>3	0–48	Silt loam and very fine sandy loam.	ML	A–4
		48–61	Sandy loam or fine sandy loam, gravelly sandy loam.	SM	A–2–4, A–4, A–1
		61–81	Loamy sand or gravelly loamy sand.	SM, SP–SM	A–1, A–2–4
Canadice: Ca	½–1½	0–18	Silt loam or loam	ML, ML–CL	A–4
		18–50	Silty clay, silty clay loam, clay loam.	CL	A–6, A–7
*Carver: CpA, CpC, CpE. For Plymouth part, see the Plymouth series.	>4	0–22	Fine sand to coarse sand	SP–SM, SW–SM	A–3, A–1
		22–60	Coarse sand to gravelly sand	SP, SP–SM	A–3, A–1
Deerfield: De	1½–2	0–25	Sand to fine sand or loamy sand.	SM, SP–SM	A–3, A–1
		25–53	Sand to stratified sand and gravel.	SP, SP–SM	A–1, A–3
Haven:[2] HaA, HaB, HaC, He	>4	0–19	Loam, silt loam, and very fine sandy loam.	ML, ML–CL	A–4
		19–28	Silt loam, very fine sandy loam, and gravelly loam.	ML, SM	A–4, A–2–4 or A–1
		28–55	Gravelly sand, loamy sand, sandy loam, or stratified sand and gravel.	SM, SP, SP–SM or GP	A–1 or A–2–4
Montauk: MfA, MfB, MfC, MkA, MkB, MkC.	>2	0–27	Fine sandy loam, silt loam, loam, or sandy loam.	SM, ML	A–4, A–2–4
		27–40	Sandy loam, fine sandy loam, and loamy sand.	SM, SW–SM	A–2–4, A–4, A–1
		40–60	Loamy sand, gravelly loamy sand, sandy loam, and fine sandy loam.	SM, SP–SM	A–1, A–2–4
Montauk, sandy variants: MnA, MnB, MnC, MnE.	>4	0–24	Loamy sand or sand	SM, SP–SM	A–2–4, A–1
		24–60	Loamy sand and sand	SM, SP–SM	A–2–4, A–1
Plymouth:					
PlA, PlB, PlC, PmB3, PmC3	>4	0–27	Loamy sand, loamy fine sand, gravelly loamy sand, and sand.	SM, SP–SM	A–2–4, A–1
		27–58	Sand and gravel, coarse sand, and gravelly coarse sand.	SP, GP, SP–SM, GP–GM	A–1, A–3
PsA, PsB	>3	0–38	Loamy sand	SM	A–2–4
		38–64	Silt loam	ML	A–4
		64–80	Fine gravel and sand	GP–GM, GM, SP–SM, SM	A–1

See footnotes at end of table.

properties of the soils

Du, Es, Fd, Fs, Gp, Ma, Rc, Tm, and Ur and the graded soils Bm, MIB, MIC, RhB, and RhC. Muck (Mu) also is not included, because one mapping unit in that series is made up of two or more kinds of soil. The soils in such mapping units may have different properties first column. Absence of data indicates that no estimate was made. >=greater than <=less than]

Coarse fraction more than 3 inches in diameter	Percentage less than 3 inches passing sieve—				Permeability	Available moisture capacity [1]	Reaction
	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm).	No. 200 (0.07 mm).			
Percent					*Inches per hour*	*Inches per inch of soil*	*pH value*
----------	95–100	90–100	50–75	10–30	>6. 3	0. 04–0. 08	4. 5–5. 5
----------	45–95	40–95	15–55	0–15	>6. 3	0. 02–0. 04	4. 5–5. 5
----------	85–100	80–100	50–75	10–30	>6. 3	0. 03–0. 08	4. 5–5. 5
----------	75–100	70–100	35–70	0–15	>6. 3	----------	4. 5–5. 5
----------	95–100	90–100	90–100	60–95	0. 63–2. 0	0. 15–0. 20	4. 5–5. 5
----------	45–95	35–95	20–40	5–15	>6. 3	----------	5. 1–6. 0
----------	95–100	90–100	90–100	60–95	0. 63–2. 0	0. 15–0. 20	4. 5–5. 5
0–5	70–95	60–95	40–75	20–40	< 0. 63	----------	4. 5–5. 5
0–5	65–95	60–90	35–70	10–30	>6. 3	----------	4. 5–5. 5
----------	100	100	85–100	65–85	0. 63–2. 0	0. 17–0. 20	5. 1–6. 0
----------	95–100	95–100	90–100	70–95	< 0. 20	0. 13–0. 17	5. 6–6. 5
----------	75–100	70–100	25–65	5–10	>6. 3	0. 03–0. 04	4. 5–5. 5
0–5	55–95	45–95	15–55	0–10	>6. 3	0. 02–0. 04	4. 5–5. 5
----------	95–100	90–100	45–70	5–25	>6. 3	0. 04–0. 06	4. 5–5. 5
0–5	55–90	50–90	25–65	0–10	>6. 3	0. 02–0. 04	4. 5–5. 5
----------	85–100	80–100	70–85	50–80	0. 63–2. 0	0. 14–0. 20	4. 5–5. 5
0–3	60–80	55–75	45–70	25–55	>2. 0	0. 03–0. 14	4. 5–5. 5
0–3	45–95	30–95	5–75	0–30	>6. 3	0. 01–0. 04	4. 5–5. 5
0–5	80–100	75–100	55–95	25–85	0. 63–6. 3	0. 11–0. 20	4. 5–5. 5
0–5	70–95	60–95	40–75	10–40	< 0. 63	0. 08–0. 12	4. 5–5. 5
0–5	65–95	60–90	35–70	10–30	< 0. 63	----------	4. 5–5. 5
0–5	80–95	75–95	40–70	10–25	6. 3	0. 03–0. 07	4. 5–5. 5
0–5	65–95	60–90	30–70	5–25	0. 20–2. 0	0. 02–0. 07	4. 5–5. 5
0–5	75–95	70–95	35–70	5–25	>6. 3	0. 04–0. 08	4. 5–5. 5
0–5	45–95	40–95	15–55	0–10	>6. 3	0. 02–0. 04	4. 5–5. 5
----------	90–100	85–100	50–75	15–30	>6. 3	0. 06–0. 08	4. 5–5. 5
----------	95–100	90–100	90–100	60–95	0. 63–2. 0	----------	4. 5–5. 5
----------	45–95	35–95	20–40	5–15	>6. 3	----------	5. 1–6. 0

TABLE 5.—*Estimated engineering*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface (typical profile)	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Raynham: Ra	½–1½	0–51	Silt loam to very fine sandy loam.	ML, ML–CL	A–4
*Riverhead:[3] RdA, RdB, RdC, ReB, ReC, RpE. For Plymouth part of RpE, see Plymouth series.	>4	0–32	Sandy loam and fine sandy loam.	SM	A–4, A–2–4
		32–65	Sand, loamy sand, gravelly sand, and gravelly loamy sand.	SP, SM, SW–SM, SP–SM, GP, GM, GP–GM	A–1
Scio:					
ScB	1½–2	0–38	Silt loam and very fine sandy loam.	ML, ML–CL	A–4
		38–61	Fine sandy loam and gravelly fine sandy loam.	SM, SM–SC, GM, GM–GC	A–4, A–2–4
SdA, SdB	1½–2	0–35	Silt loam and very fine sandy loam.	ML, ML–CL	A–4
		35–51	Gravelly sand and sand	SP, SM, SW–SM, SP–SM, GP, GM, GP–GM	A–1, A–3, A–2–4
Sudbury: Su	1½–2	0–24	Sandy loam and fine sandy loam.	SM	A–2–4, A–4
		24–51	Loamy sand, sand and gravel	SP, SM, SP–SM	A–1, A–3, A–2–4
Wallington: Wa	½–1½	0–18	Silt loam and very fine sandy loam.	ML, ML–CL	A–4
		18–38	Silt loam and very fine sandy loam.	ML, ML–CL	A–4
		38–47	Silt loam and very fine sandy loam.	ML, ML–CL	A–4
		47–60	Fine sandy loam, sandy loam, gravelly fine sandy loam; gravelly sandy loam, and loamy sand.	SM, GM, SM–SC, GM–GC, SW–SM	A–1, A–2–4, A–4
Walpole: Wd	½–1½	0–26	Sandy loam and fine sandy loam.	SM	A–2, A–4
		26–52	Sand and gravelly sand	SP, SP–SM, SM	A–1, A–3, A–2–4
Wareham: We	½–1½	0–29	Loamy sand to sand	SM	A–2, A–4
		26–52	Sand and gravelly sand	SP, SP–SM, SM	A–1, A–3, A–2–4
Whitman: Wh	0–½	0–14	Sandy loam and loam	ML, ML–CL, SM, SM–SC	A–4, A–2–4
		14–37	Sandy loam and loam	ML, ML–CL, SM, SM–SC	A–4, A–2–4
		37–50	Sandy loam, loamy sand, gravelly sandy loam, and gravelly loamy sand.	SM, SM–SC, GM, GM–GC	A–2–4, A–1

[1] Available moisture capacity is usually calculated to a depth of approximately 30 inches.
[2] Unit He has a surface layer of accumulated silty inwash material, 12 to 30 inches thick, that has a slightly higher content of organic

properties of the soils—Continued

Coarse fraction more than 3 inches in diameter	Percentage less than 3 inches passing sieve—				Permeability	Available moisture capacity [1]	Reaction
	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm).	No. 200 (0.07 mm).			
Percent					*Inches per hour*	*Inches per inch of soil*	*pH value*
----------	90–100	85–100	75–95	50–80	0. 20–2. 0	0. 14–0. 20	4. 5–5. 5
0–5	80–100	75–100	55–75	20–45	2. 0–6. 3	0. 11–0. 15	4. 5–5. 5
0–5	45–95	40–90	15–45	0–15	>6. 3	0. 02–0. 07	4. 5–5. 5
----------	90–100	85–100	75–95	50–80	0. 63–2. 0	0. 14–0. 20	4. 5–5. 5
0–5	45–90	45–85	35–70	20–45	0. 20–. 63	----------	4. 5–5. 5
----------	90–100	85–100	75–95	50–80	0. 63–2. 0	0. 14–0. 20	4. 5–5. 5
0–5	45–90	45–85	25–60	0–15	>6. 3	----------	4. 5–5. 5
----------	85–100	80–100	50–75	25–45	0. 63–6. 3	0. 12–0. 16	4. 5–5. 5
----------	60–90	50–85	25–60	0–15	>6. 3	0. 02–0. 06	4. 5–5. 5
----------	95–100	90–100	80–100	50–80	0. 63–2. 0	0. 15–0. 20	4. 5–5. 5
----------	95–100	90–100	80–100	50–80	<0. 63	0. 08–0. 12	4. 5–5. 5
----------	95–100	90–100	80–100	50–80	0. 63–2. 0	----------	4. 5–5. 5
0–5	55–90	50–85	30–70	10–40	0. 20–2. 0	----------	4. 5–5. 5
----------	85–100	80–100	55–80	25–50	2. 0–6. 3	0. 12–0. 15	4. 5–5. 5
----------	70–90	65–90	35–65	0–15	>6. 3	0. 03–0. 04	4. 5–5. 5
----------	85–100	80–100	55–80	25–50	2. 0–6. 3	0. 12–0. 15	4. 5–5. 5
----------	70–90	65–90	35–65	0–15	>6. 3	0. 03–0. 04	4. 5–5. 5
0–5	80–95	75–90	45–85	25–65	2. 0–6. 3	0. 12–0. 15	4. 5–5. 5
0–5	85–95	75–90	45–85	25–65	<0. 63	0. 08–0. 12	4. 5–5. 5
0–5	55–95	50–90	25–65	12–35	<0. 63	----------	4. 5–5. 5

matter to greater depths than the typical profile.

[3] Units ReB, ReC, and RpE contain 1.5 to 50 cubic yards of stones or boulders per acre foot.

TABLE 6.—*Interpretations of*

[Not included in this table, because their characteristics are too variable to estimate, are the miscellaneous land types Bc, CuB, CuC, CuE, it is highly organic and is not suitable for engineering. An asterisk beside the series name in the first column indicates that at least one tations, and for this reason it is necessary to follow carefully the instructions for referring to other series that appear in the

Soil series and map symbols	Suitability as source of—			Soil features affecting—		
	Topsoil	Granular material	Fill material	Highway location [1]	Embankment foundation	Foundations for low buildings
Atsion: At	Poor: seasonal high water table; coarse texture.	Fair: underwater excavation.	Fair: underwater excavation; needs binder in places.	Seasonal high water table.	Strength generally adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility; large settlements possible under vibratory loads.
Berryland: Bd	Poor: prolonged high water table; coarse texture.	Fair: underwater excavation.	Fair: underwater excavation; needs binder in places.	Prolonged high water table.	Strength generally adequate for high embankments; slight settlement.	Prolonged high water table; low compressibility.
Bridgehampton: BgA, BgB	Good	Good below a depth of 5 feet.	Fair to a depth of 56 inches; silty.[3] Good below 56 inches but needs binder in places.	Shallow cuts have nonuniform subgrade in places.	Strength generally adequate for high embankments; slight settlement.	Low compressibility; poor stability above 5 feet.
BhB, BhC	Good	Poor: excessive fines; contains boulders in places.	Fair to a depth of 48 inches; silty.[3] Good below 48 inches; substratum compact. Till layers generally contain sufficient binder.	Seepage at silt-till interface; shallow cuts have nonuniform subgrade in places; extensive cuts and fills likely in BhC.	Strength adequate for high embankments; slight settlement.	Low compressibility; poor stability above 4 feet; water may be perched above substratum.
Canadice: Ca	Poor: seasonal high water table; clayey below a depth of 24 inches.	Not suitable	Not suitable	Seasonal high water table; fine-textured materials; poor stability.	Low strength: large settlement.	Seasonal high water table; high compressibility; large settlement.
*Carver: CpA, CpC, CpE. For Plymouth part, see Plymouth series.	Poor: coarse texture.	Good	Good: needs binder in places.	Poor trafficability; extensive cuts and fills likely on units CpC and CpE.	Strength generally adequate for high embankments; slight settlement; moderately steep to steep slopes on unit CpE.	Low compressibility; large settlement possible under vibratory load; moderately steep to steep slopes on unit CpE.

See footnotes at end of table.

engineering properties

Du, Es, Fd, Fs, Gp, Ma, Rc, Tm, and Ur and the graded soils Bm, MlB, MlC, RhB, and RhC. Muck (Mu) also is not included, because mapping unit in that series is made up of two or more kinds of soil. The soils in such mapping units may have different properties and limi-
first column]

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Diversions	Waterways
Reservoir	Embankment [2]				
Seasonal high water table; rapid permeability.	Fair to poor resistance to piping; fair stability; moderate to high permeability.	Seasonal high water table; limited outlets; unstable cut slopes.	Very low available moisture capacity; seasonal high water table; rapid water intake.	Nearly level soils; low fertility; limited outlets.	Nearly level soils; seasonal high water table; low fertility; very low available moisture capacity.
Prolonged high water table; rapid permeability.	Poor resistance to piping; fair stability; moderate to high permeability.	Prolonged high water table; limited outlets; unstable cut slopes.	Prolonged high water table; very low available moisture capacity; rapid water intake.	Nearly level soils; no outlets; low fertility.	Nearly level soils; prolonged high water table; low fertility; very low available moisture capacity.
Rapid permeability in substratum.	Poor resistance to piping; moderate permeability; poor to fair compaction characteristics.	Well drained to moderatelly well drained; poor stability.	No unfavorable features.	Unstable embankments; susceptible to soil blowing and siltation.	Highly erodible; siltation of channels.
Rapid permeability in layers of substratum.	Poor resistance to piping; poor stability and compaction characteristics above a depth of 48 inches.	Well drained to moderately well drained; poor stability; slope of BhC unfavorable in some areas.	No unfavorable features except slope of BhC.	Unstable embankments; susceptible to soil blowing and siltation.	Highly erodible; siltation of channels.
Seasonal high water table; rapid permeability in material below depths of 5 or 6 feet in places.	Fair to poor stability; low to moderate permeability; poor workability.	Seasonal high water table; limited outlets; fair to poor stability in cut slopes.	Seasonal high water table; low water intake.	Nearly level soils; limited outlets.	Nearly level soils; seasonal high water table.
Rapid permeability; moderate and moderately steep to steep slopes on units CpC and CpE.	Fair to poor resistance to piping; fair stability; high permeability.	Excessively drained; not applicable.	Very low available moisture capacity; rapid water intake; moderate and moderately steep to steep slopes on CpC and CpE.	Sandy: rapid permeability; difficult to establish and maintain cover plants; steep slopes on portions of unit CpE.	Coarse-textured soil; difficult to establish and maintain cover plants: moderately steep to steep slopes on unit CpE; very low available moisture capacity.

TABLE 6.—*Interpretations of*

Soil series and map symbols	Suitability as source of—			Soil features affecting—		
	Topsoil	Granular material	Fill material	Highway location [1]	Embankment foundation	Foundations for low buildings
Deerfield: De	Poor: coarse texture.	Good for sand to a depth of 48 inches; sand and gravel below 48 inches; underwater excavation necessary in places.	Good: underwater excavation necessary in places; needs binder in places.	Seasonal high water table.	Strength generally adequate for high embankments; slight settlement.	Low compressibility; large settlements possible under vibratory load; seasonal high water table.
Haven: HaA, HaB, HaC, He.	Good	Good below a depth of 28 inches.	Fair to 28 inches; silty.[3] Good below a depth of 28 inches but needs binder in places.	Very shallow cuts have nonuniform subgrade in places; unit He subject to ponding; extensive cuts and fills likely on unit HaC.	Strength generally adequate for high embankments; slight settlement.	Low compressibility; unit He subject to ponding.
Montauk: MfA, MfB, MfC, MkA, MkB, MkC.	Good	Poor: excessive fines; contains boulders in places.	Good: generally till layers contain sufficient binder.	Possible seepage along top of till; extensive cuts and fills likely on MfC and MkC; nonuniform subgrade in places.	Strength adequate for high embankments.	Low compressibility; moderate slopes on units MfC and MkC.
Montauk, sandy variants: MnA, MnB, MnC, MnE.	Poor: coarse texture.	Poor to fair: excessive fines; contains boulders in places.	Good: till layers generally contain sufficient binder.	Extensive cuts and fills likely on units MnC and MnE.	Strength adequate for high embankments; moderately steep to steep slopes on unit MnE.	Low compressibility; moderate and moderately steep to steep slopes on MnC and MnE.
Plymouth: PlA, PlB, PlC, PmB3, PmC3.	Poor: coarse texture. PmB3 and PmC3 not suitable.	Good	Good: material below a depth of 27 inches needs binder in places.	Extensive cuts and fills likely on units PlC and PmC3.	Strength generally adequate for high embankments; slight settlement.	Low compressibility; moderate slopes on PlC and PmC3.

See footnotes at end of table.

engineering properties—Continued

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Diversions	Waterways
Reservoir	Embankment [2]				
Seasonal high water table; rapid permeability.	Fair to poor resistance to piping; fair stability; moderate to high permeability.	Seasonal high water table; limited outlets; unstable cut slopes.	Seasonal high water table; very low available moisture capacity; rapid water intake.	Nearly level soils; difficult to establish and maintain cover plants.	Nearly level soils; very low available moisture capacity; difficult to establish and maintain cover plants.
Rapid permeability in layers of substratum.	Fair to poor resistance to piping; fair to poor stability; moderate to high permeability; fair to poor compaction.	Well drained; not applicable.	No unfavorable features; unit He subject to ponding and has slow water intake.	Rapid permeability in sand and gravel at a depth of 18 to 36 inches; subject to soil blowing and siltation.	Moderately to highly erodible; siltation of channels.
Rapid permeability in layers of substratum; moderate slopes on units MfC and MkC.	Fair to poor resistance to piping; fair to poor stability; moderate to low permeability.	Well drained to moderately well drained; difficult to excavate below a depth of about 2 feet: moderate slopes on units MfC and MkC.	Moderate available moisture capacity in units MfA, MfB, MfC.	Irregular slopes in some places subject to soil blowing and siltation.	Moderately to highly erodible; siltation of channels; moderate available moisture capacity in MfA, MfB, and MfC.
Rapid permeability in surface layer and subsoil; rapid permeability in layers of substratum; moderate and moderately steep to steep slopes on units MnC and MnE.	Fair to poor resistance to piping; fair stability; moderate to high permeability.	Excessively drained; not applicable.	Very low available moisture capacity; rapid water intake.	Sandy: rapid permeability in surface layer and subsoil; difficult to establish and maintain cover plants; steep slopes on portions of unit MnE.	Coarse-textured soil; difficult to establish and maintain cover of plants; steep slopes on MnE in places; very low available moisture capacity.
Rapid permeability; moderate slopes on PlC and PmC3.	Fair to poor resistance to piping; fair to poor stability; high to moderate permeability.	Excessively drained; not applicable.	Very low available moisture capacity; rapid water intake, moderate slopes on PlC and PmC3.	Sandy substratum within a depth of 30 inches; rapid permeability; difficult to establish and maintain cover plants.	Sandy substratum within a depth of 30 inches; difficult to establish and maintain cover of plants; very low available moisture capacity.

TABLE 6.—*Interpretations of*

Soil series and map symbols	Suitability as source of—			Soil features affecting—		
	Topsoil	Granular material	Fill material	Highway location [1]	Embankment foundation	Foundations for low buildings
PsA, PsB	Poor: coarse texture.	Good below a depth of 72 inches.	Good: fair in silty substratum.	Shallow cuts have nonuniform subgrade in places; possible seepage along silt loam layer.	Strength generally adequate for high embankments; slight settlement.	Low compressibility; possible seepage on top of silt loam layer.
*Raynham: Ra	Fair: seasonal high water table.	Fair below a depth of 51 inches; underwater excavation necessary.	Fair below a depth of 51 inches; underwater excavation necessary.	Seasonal high water table.	Strength generally adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility; large settlement possible under vibratory load.
*Riverhead: RdA, RdB, RdC, ReB, ReC, RpE. For Plymouth part of unit RpE, see Plymouth series.	RdA, RdB, RdC good. ReB and ReC poor, very stony. RpE poor, very boulder.	Good below a depth of 27 inches; ReB, ReC, RpE contain many large stones and boulders.	Good: material below a depth of 27 inches needs binder in places. ReB, ReC, RpE contain many large stones and boulders.	RpE: boulders; extensive cuts and fills likely on units RdC, ReC, and RpE.	Strength generally adequate for high embankments; slight settlement. Moderately steep to steep slopes on RpE.	Low compressibility; moderate and moderately steep to steep slopes on RdC, ReC, and RpE.
Scio:						
ScB	Good: seasonal high water table.	Poor: excessive fines; contains boulders in places.	Fair to a depth of 38 inches; silty [3]. Good below; till layers generally contain sufficient binder.	Seasonal high water table; seepage along top of till.	Strength adequate for high embankments.	Seasonal high water table; low compressibility.
SdA, SdB	Good: seasonal high water table.	Good below a depth of 35 inches; underwater excavation necessary in places.	Fair to a depth of 35 inches; silty [3]. Good below a depth of 35 inches; underwater excavation necessary; material below a depth of 35 inches needs binder in places.	Seasonal high water table.	Strength generally adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility.

See footnotes at end of table.

engineering properties—Continued

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Diversions	Waterways
Reservoir	Embankment [2]				
Rapid permeability with moderate permeability in layer of substratum.	Fair to poor resistance to piping; fair to poor stability; moderately high permeability.	Excessively drained; not applicable.	Low available moisture capacity; rapid water intake.	Silty substratum at a depth of 36 to 40 inches; rapid permeability with moderate permeability below a depth of 36 to 40 inches in silty substratum; difficult to establish and maintain cover plants.	Silty substratum at a depth of 36 to 40 inches; difficult to establish and maintain cover of plants; low available moisture capacity.
Moderate permeability in surface layer and subsoil; rapid permeability in substratum below a depth of about 50 inches.	Fair to poor resistance to piping; fair to poor stability; moderate permeability.	Seasonal high water table; limited outlets; poor stability in cut slopes.	Seasonal high water table; moderate to slow water intake; moderate to high available moisture capacity.	Nearly level soils; limited outlets.	Nearly level soils; seasonal high water table.
Rapid permeability in substratum; moderate and moderately steep to steep slopes on RdC, ReC, and RpE.	Fair to poor resistance to piping; fair to poor stability; moderate to high permeability; stoniness on units ReB, ReC, and RpE.	Well drained; not applicable.	Moderate to rapid water intake; moderate available moisture capacity; stoniness on units ReB, ReC, and RpE; moderate and moderately steep slopes on units RdC, ReC, and RpE.	Rapid permeability in gravel at a depth of 22 to 36 inches; subject to siltation; stoniness on units ReB, ReC, and RpE; steep slopes on unit RpE.	Moderately erodible; siltation of channel; moderate available moisture capacity; steep slopes on unit RpE in places.
Seasonal high water table; rapid permeability in layers of substratum.	Fair to poor resistance to piping; fair to poor stability; moderate to low permeability.	Seasonal high water table; limited outlets; poor stability in cut slopes.	Seasonal high water table; moderate to slow water intake.	Firm till below a depth of 40 inches; subject to soil blowing and siltation; erodible.	Highly erodible; siltation of channel.
Rapid permeability in substratum.	Fair to poor resistance to piping; poor to fair stability; moderate to high permeability.	Seasonal high water table; limited outlets; poor stability in cut slopes.	Seasonal high water table; moderate to slow water intake.	Sandy substratum below a depth of 35 to 40 inches; rapid permeability; siltation of channel.	Highly erodible; siltation of channel.

TABLE 6.—*Interpretations of*

Soil series and map symbols	Suitability as source of—			Soil features affecting—		
	Topsoil	Granular material	Fill material	Highway location [1]	Embankment foundation	Foundations for low buildings
Sudbury: Su	Good: seasonal high water table.	Good below a depth of 24 inches; underwater excavation necessary in places.	Good: underwater excavation necessary in places; material below a depth of 24 inches needs binder in places.	Seasonal high water table.	Strength generally adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility.
Wallington: Wa	Good: seasonal high water table.	Poor: excessive fines; underwater excavation necessary in places.	Good below a depth of 40 inches; underwater excavation necessary in places; till layers generally contain sufficient binder.	Seasonal high water table; seepage along top of till.	Strength adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility.
Walpole: Wd	Good: seasonal high water table.	Good below a depth of 26 inches; underwater excavation necessary.	Good: underwater excavation necessary; material below a depth of 26 inches needs binder in places.	Seasonal high water table.	Strength generally adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility.
Wareham: We	Poor: coarse texture; seasonal high water table.	Good: underwater excavation necessary.	Fair: underwater excavation necessary; material below a depth of 29 inches needs binder in places.	Seasonal high water table.	Strength generally adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility.
Whitman: Wh	Good: seasonal high water table.	Poor: excessive fines; underwater excavation necessary in places.	Fair: underwater excavation necessary; till layers generally contain sufficient binder.	Seasonal high water table; seepage along top of till.	Strength adequate for high embankments; slight settlement.	Seasonal high water table; low compressibility.

[1] The effect of frost action usually presents few problems in this survey area; consequently, it is not considered in the table. See text for discussion.

engineering properties—Continued

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Diversions	Waterways
Reservoir	Embankment [2]				
Seasonal high water table; rapid permeability in substratum.	Fair to poor resistance to piping; fair to poor stability; moderate to high permeability.	Seasonal high water table; limited outlets; poor stability in cut slopes.	Seasonal high water table; moderate to rapid water intake; moderate available moisture capacity.	Nearly level soils; gravel at a depth of 22 to 36 inches; subject to siltation.	Nearly level soils; siltation of channels; moderate available moisture capacity.
Seasonal high water table; moderate permeability in layers of substratum.	Fair to poor resistance to piping; fair to poor stability; moderate to low permeability.	Seasonal high water table; poor stability in cut slopes.	Seasonal high water table; moderate to slow water intake; moderate available moisture capacity; fragipan at a depth of 18 to 24 inches.	Nearly level soils; moderately slow or slow permeability; erodible; subject to siltation.	Nearly level soils; siltation of channels; seasonal high water table; highly erodible; moderate available moisture capacity.
Seasonal high water table; rapid permeability in substratum.	Fair to poor resistance to piping; fair to poor stability; moderate to high permeability.	Seasonal high water table; limited outlets; fair to poor stability in cut slopes.	Seasonal high water table; moderate to rapid water intake; moderate available moisture capacity.	Nearly level soils; permeable sand and gravel at a depth of 22 to 36 inches; subject to siltation.	Nearly level soils; moderately erodible; seasonal high water table; moderate available moisture capacity.
Seasonal high water table; rapid permeability.	Fair to poor resistance to piping; fair to poor stability; high to moderate permeability.	Seasonal high water table; limited outlets; poor stability in cut slopes.	Seasonal high water table; rapid water intake; very low available moisture capacity.	Nearly level soils; low fertility; limited outlets.	Nearly level soils; seasonal high water table; very low available moisture capacity; low fertility.
Seasonal high water table; moderate permeability in thin layers of substratum in places.	Fair to poor resistance to piping; fair to poor stability; moderate permeability.	Seasonal high water table; fragipan at a depth of 10 to 20 inches; fair to poor stability of cut slopes.	Seasonal high water table; moderate water intake, fragipan at a depth of 10 to 20 inches; moderate available moisture capacity.	Nearly level soils; moderately slow or slow permeability; subject to siltation.	Nearly level soils; seasonal high water table; moderately erodible; moderate available moisture capacity.

[2] Unless otherwise noted, features shown pertain to compacted materials.
[3] Possible source of binder material when needed for A–3 (AASHO) type materials.

of the textural class when they occupy more than 15 percent, by volume, of the soil mass (*12*). In some ways this system is comparable to the two systems generally used by engineers. The differences involve particle-size terminology and concepts of silt and clay behavior. A major difference is that the U.S. Department of Agriculture system uses the No. 270 sieve to separate sand and silt, while the engineering systems use the No. 200 sieve.

Engineering test data

Table 4 contains the results of engineering tests performed by the State of New York Department of Transportation, Bureau of Soil Mechanics, on soils of six important series in Suffolk County. The combined area of the Carver, Haven, Plymouth, and Riverhead soils is approximately 66 percent of the county. The soils sampled formed in water-deposited material and glacial till. They vary greatly in texture. Thus, the engineering soil classification given in table 4 may not apply to all parts of the mapping unit. It does, however, apply to the soil as it occurs throughout most of its acreage in the county. In establishing the engineering soil classification, particles larger than 3 inches in diameter were not considered.

Estimated engineering properties of the soils

Table 5 provides estimates of soil properties important to engineering. Estimates in this table are based on test data for the soils sampled in the county in table 6, and tests on similar or the same soils elsewhere; on the descriptions of the soils mapped; on experience of those who made the survey; and on knowledge gained through experience in using the soils for engineering construction.

The following paragraphs briefly describe the columns shown in table 5:

Depth to seasonal high water table.—The shallowest depth is given at which the soil is saturated with water during frost-free periods. It is either a perched or other ground water table. Soil conditions immediately after heavy precipitation are not considered.

Depth from surface.—The depth given in this column for each soil corresponds to significant changes in texture or other features in the representative soil described for the series.

USDA texture.—Textures indicated correspond to the textures given in the technical description of each soil.

Classification.—The estimated classifications are based on test data for a particular soil or for similar soils from this county and other survey areas. See "Soil Classification Systems" for explanation of these headings.

Percentage passing sieve.—These columns show estimated particle-size distribution according to standard size sieves.

Permeability.—Permeability values are estimates of the range in rates that water moves through the major soil horizons. These values are expressed in inches per hour. They are estimates based on soil texture, soil structure, porosity, permeability and infiltration tests, and drainage observations of the hydraulic conductivity of the soils.

Available moisture capacity.—Available moisture capacity is 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 capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Reaction.—The pH ranges given in this column represent a summary of the many field pH determinations taken during the survey on each of the soils in the county. See "Reaction" in the Glossary for definition.

Interpretations of engineering properties

In table 6, soils are given suitability ratings as a source of topsoil, sand, gravel, fill material, and features of soils that affect stated engineering practices. The interpretations given in table 6 are intended to provide guidelines for the use of soils in engineering and to indicate potential hazards that require unusual procedures or special precautions in planning engineering works.

As a source of topsoil, granular material, and fill material, the soils are rated in table 6 as good, fair, poor, or not suitable.

Topsoil.—The texture, depth, and organic-matter content of the soil were used mainly in determining the suitability ratings for topsoil. For example, a soil is rated good if it has a silt loam, sandy loam, or loam texture, is free of cobbles or boulders, and is high in organic-matter content. In contrast, a sandy soil or one that contains cobbles or boulders is rated poor. Silt loam soils are generally most suitable as sources for topsoil in Suffolk County. In many areas the more silty B horizon is utilized for topsoil or as an amendment to coarser soils.

Granular material.—The suitability of soils for granular materials (sand and gravel) depends mainly on the texture and arrangement of the material in the substratum. Well-sorted glacial outwash is the best source of granular material in Suffolk County.

Fill Material.—Fill material is used mainly in highway embankments and also to bring low-lying areas up to grade. The soils of Suffolk County are good for most fill uses; however, most soils are too permeable to be used in water-retaining structures.

Highway location.—The more important features that influence the location of highways in Suffolk County are slope, drainage, and organic-matter content. Some soils have developed in a solum with a different texture from that of the substratum. Shallow cuts in these soils may have nonuniform subgrades.

Embankment foundations.—Among the important soil features that determine the use of soils as embankment foundations are texture, strength, settlement, and drainage.

Foundations for low buildings.—Among the important soil features that determine the use of soils as building foundations are texture, compressibility, and drainage. On-site investigation, in-place testing, and laboratory tests of samples from the specific location considered for a foundation are necessary to determine the parameters to be used in the actual design.

Farm ponds.—Under the subheading "Reservoir," consideration is given primarily to the soil properties of undisturbed soils that affect the seepage rate. Under the subheading "Embankment Materials," the soils are rated according to the stability and permeability of the materials when used in the construction of pond embankment. The permeability noted in this column is for the soil material when compacted at optimum moisture. The

information in this column is also pertinent for dikes and levees.

Agricultural drainage.—The factors considered for drainage are those features and qualities of the soil which affect the installation and performance of surface and subsurface drainage practices.

Irrigation.—The factors considered are those features and qualities of soils that affect their suitability for irrigation.

Diversions.—Factors considered for diversions and terraces are those features and qualities of soils that affect their stability or hinder layout and construction; also, hazards of sedimentation in channels and difficulty of establishment and maintenance of cover on diversions.

Waterways.—The factors considered for waterways are those features and qualities of soils that affect the establishment, growth, and maintenance of plants and factors that hinder layout and construction.

Engineering properties of the geologic deposits

In other parts of this survey, the geology, physiography, and drainage of the county are described. For engineering purposes the following geologic units occur in Suffolk County: glacial moraine, glacial outwash, lacustrine sediment, muck, beaches, dune land, and tidal marsh. In most of New York State, the engineering significance of these geologic units generally differs. In Suffolk County the glacial moraine and glacial outwash behave very similarly for engineering purposes. Both of these units are composed of sand or sand- and gravel-sized particles at some depth; however, finer textured surface and subsurface material overlies the sand and gravel in places. The lacustrine deposits differ from the moraine and outwash in that they are composed of fine-grained particles, mostly of silt and clay size. Muck is composed of organic matter in varying states of decomposition. Beaches are found along the shores of Long Island, and they vary in particle size from cobblestones to fine sand. Dune land is associated with beaches, but it is mostly fine sand piled into mounds by wind action. Tidal marsh consists of varying proportions of organic material and sand.

GLACIAL MORAINE

For engineering purposes glacial moraine consists of soils formed over sandy glacial till and generally of the steeper soils formed over water-sorted sand and gravel. Glacial moraine is as much a landform designation as a geologic designation. The moraines are the hilly parts of Suffolk County, and the topography is characteristically that of many hills and depressions. Since the engineering properties of the coarse-grained sand and gravel are not very different, regardless of geologic origin, their engineering characteristics are determined to a large degree by the topographic differences.

Soils formed in contrasting material over sandy glacial till are found exclusively on the moraines. These sandy till deposits range in thickness from as little as 2 feet to about 65 feet over water-deposited sand and gravel. These soils are: Bridgehampton, till substratum; Scio, till substratum; Wallington, till substratum; Montauk; Montauk, sandy variant; and Whitman soils. These soils make up about 5 percent of Suffolk County. Montauk soils, graded, are also formed over glacial till, but they have been reworked extensively by grading operations.

Some steeper soils that formed over loose, water-sorted sand and gravel are also found on the moraines. Slopes generally are more than 6 percent, although small, irregular, flatter areas are in some places. These soils, which are on moraines as well as on glacial outwash plains, are: Haven, Raynham, Riverhead, Plymouth, and Carver soils. Riverhead very stony sandy loam and Riverhead and Plymouth very bouldery soils are on the moraine on the islands in Long Island Sound and Block Island Sound.

Among the differences between the till and the outwash is the amount of fines in the soil. The glacial till contains more silt-size and clay-size particles than the water-sorted glacial outwash. This generally decreases permeability, decreases compressibility, and increases the strength of the soils. Boulders and cobblestones are also scattered throughout the soil. The wider range in gradation results in smaller voids and a more compact soil. In addition, a relatively compact layer called a fragipan is in the Montauk, Wallington, and Whitman soils that formed in contrasting material over glacial till.

The topography of the moraines is perhaps the most severe limitation for engineering works. Because of its hummocky nature, cuts and fills are necessary for almost any engineering project. The relative compactness of the glacial till makes excavation more difficult than in water-sorted materials. The coarse-grained soils have adequate strength for high embakments. Settlement is by rearrangement of the particles rather than by the removal of water, and it generally occurs during construction. Subgrades in road cuts are not uniform in places because of the variable nature of the soils.

Depressions, or kettleholes, are within the moraines. These depressions contain organic matter, silty inwash from the surrounding knobs, or water. The organic matter should be removed if it is not possible to bypass the depression.

Drainage of surface water on the moraines is almost exclusively by infiltration. Where the fragipan occurs and where the underlying till is reached, infiltration is retarded. Poorly drained areas are in the low places.

Many of the soils that formed over glacial till are good sources of topsoil because of their large content of silt. They have not been exploited to any degree for granular materials. Extensive water-sorted deposits are in the moraines, and such areas provide large quantities of sand and gravel. Fill material from the moraine is good because the additional content of silt allows greater compaction. This is particularly true in areas that are underlain by thick layers of till. Many large areas of till are now used or have been used as a source of fill material because of the favorable compaction characteristics.

GLACIAL OUTWASH

Glacial outwash occurs south of the moraines as broad, relatively flat plains. Soils formed in glacial outwash or in contrasting materials over stratified sand and gravel are on outwash plains. Slopes generally are less than 3 percent, except for soils along drainageways. In Suffolk County these soils are the Bridgehampton; Haven; Scio, sandy substratum; Raynham; Riverhead; Sudbury; Walpole; Plymouth; Deerfield; Wareham; Berryland;

Carver; and Atsion soils. Extensive areas that occupy water-sorted sand and gravel deposits have been graded and reworked by man. These are mapped as: Bridgehampton silt loam, graded; Riverhead and Haven soils, graded; Montauk soils, graded; Cut and fill land, gently sloping; Cut and fill land, sloping; and Cut and fill land, steep.

A great amount of sorting and stratification generally is evident in outwash deposits. The grains are almost all sand-size and gravel-size, and they are rounded, which is the result of water transport. In general, the sandy or sandy and gravelly outwash materials are loose in consistency.

The topography of outwash plains is such that most engineering works can be accomplished without extensive earthmoving operations. Embankments for roads are generally constructed without difficulty. The soils support high fills without excessive settlement. As with glacial tills the settlement is through particle rearrangement and occurs quickly. Highway gradelines are generally at or near the existing ground surface on the outwash plains. Because of the uniformity and roundness of the particles, trafficability for wheeled vehicles is often limited. Compaction of highway subgrades and building subgrades is sometimes difficult to obtain because of the clean sand and gravel. Large quantities of water must be used to obtain optimum moisture conditions. In many instances the more silty B horizon is bladed or disked into the soil after topsoil stripping. This forms the silty binder necessary to obtain compaction. The deep, silty Bridgehampton soils are an exception to this because they have enough binder throughout the solum. If no silty material is available, a bituminous or other filler material is used to obtain stabilization of subgrades.

In some areas outwash soil erodes if it is placed on embankments and in cut sections. Soils of the Bridgehampton and Haven series cause nonuniformity of cut subgrades because of the silty or loamy soil over the sand and gravel.

The steeper soils that formed in outwash are along drainageways of outwash plains, as well as on moraines. In places the lower slopes are more poorly drained, and Haxen loam, thick surface layer, is in the bottom of drainageways. As the shores of Long Island are approached; the internal drainage of the soils becomes poorer. Internal drainage of the soils is also poor along the Peconic River basin. Excavations in these areas must be dewatered.

Drainage of surface water on outwash plains is mostly by infiltration. The porous soils readily soak up precipitation. The silty Bridgehampton soils and the nearly level Plymouth, silty substratum, soils retain water near the surface during heavy precipitation. Glacial meltwater channel are now slight depressions in outwash plains.

Plymouth and Carver soils formed in sand, and they are too droughty to be used as topsoil. Bridgehampton and Haven soils formed in silty or loamy deposits over outwash sand and gravel, and they are good sources of topsoil. Granular materials are removed in great quantities from the outwash deposits, especially from areas of the Haven, Plymouth, Carver, and Riverhead soils. Fill material from outwash is good, but in places it lacks the fines needed to obtain the desired compaction.

LACUSTRINE SEDIMENT

In Suffolk County lacustrine sediment is mapped only in the Canadice series. Most of these soils are located in one nearly level area north and west of Greenport. Isolated areas are on Gardiners Island and near Sag Harbor.

Canadice soils formed over silt and clay, and they have a water table close to the surface most of the year. Because they are fine grained, these soils have relatively low strength and relatively high settlement characteristics. Their topographic position causes highway gradelines to be kept above the original ground surface, and onsite investigation is needed if high embankments are planned. Cuts should be avoided because the seasonal high water table prevents excavations in these soils. Trafficability is poor in these soils because of their plastic nature and the seasonal high water table.

Buildings constructed on these soils settle excessively in places because of the high compressibility of these fine-grained soils. This settlement is relatively slow. The water table makes basement excavation difficult. Dewatering of excavations is necessary.

Canadice soils are poor sources of topsoil because of wetness and their high clay content. They are not suitable for granular materials, and they are too wet to be used economically as fill material.

MUCK

Muck consists of soils formed in partly or almost completely decomposed remains of woody or herbaceous plants. It is throughout the county in closed depressions on glacial moraines or along the larger rivers. The water table is at or above the surface throughout the year.

These soils are not suitable for engineering purposes because of their highly compressible nature and almost complete lack of strength. As a rule, if areas of these organic soils cannot be bypassed, all of the highly organic material should be removed and replaced with a suitable mineral soil. The muck is used as an amendment to mineral soils in places to make suitable topsoil.

Highway gradelines should be above high water, and the organic material should be replaced with a suitable granular material. Buildings generally are not constructed on these soils.

BEACHES, DUNE LAND, AND TIDAL MARSH

Beaches, Dune land, and Tidal marsh generally are together in some combination. Along the north shore of Long Island, Beaches are coarser in texture than elsewhere on the island. The areas generally are narrow and terminate inland by an escarpment or a bluff. Along the south shore the beaches are sandy and are on the barrier beach islands. On these islands the normal sequence of deposits from the ocean inland is beach, dune land, and tidal marsh.

Beaches and Tidal marsh generally are not used for engineering purposes because of the high water levels and the organic material in the marshes. Dune land, which represents sand piled into mounds by wind action, generally is used for highway and building locations, because it is the highest land on the islands. Beaches and

Dunes generally consist of uniform, sand-sized particles. They have adequate strength for embankments and settlement is slight. In places between dunes, the water table is high. Erosion by wind and water is the major problem on Beaches and Dune land. Because of the nearly uniform particle size of the dune sand, trafficability is difficult.

None of these units is suitable as a source of topsoil or granular materials. Beaches and Dune land can be used for fill, but a high water table exists, and the single grain size makes the fills difficult to compact.

Two mapping units, Fill land, dredged material; and Fill land, sandy, represent reclaimed land. Fill land, dredged material, is a pumped fill over Tidal marsh. Fill land, sandy, is over tidal marsh or somewhat poorly to very poorly drained glacial outwash. The dredged material generally is fine sand and it is highly susceptible to soil blowing when it dries. Any construction on reclaimed land is subject to the hazards of differential or excessive settlement.

Frost heave

Limitations resulting from frost heave are few on the soils in Suffolk County for use as sites for highways. Most of the major soils have a uniform texture to a depth of maximum frost penetration, which is about 20 inches. This feature provides for uniform heave where it occurs, and therefore, damage to pavements is not so great as damage that is caused by differential heave. Differential frost heave is a limitation where nonuniform subgrades are exposed in cuts in such soils as Bridgehampton, Haven, and Montauk. It is also a potential limitation where the water table fluctuates and is close to the surface for extended periods. Such soils as Atsion, Berryland, Canadice, Raynham, Wallington, Walpole, Wareham, and Whitman have such water table conditions. Proper roadbed preparation to obtain uniform conditions is necessary to minimize the hazard of differential heave in these areas.

Town and Country Planning

Table 7 shows the degree and nature of the limitations of the soils of Suffolk County for use as athletic fields, camp areas, homesites, lawns, golf fairways, paths and trails, picnic grounds, extensive play areas, pipeline locations, sanitary landfill, sewage disposal fields, streets, and parking lots.

A rating of slight in table 7 indicates that the soil has few or no limitations for a particular use or that any limitations that are present can be overcome at little cost. A rating of moderate indicates the limitation is harder to correct or that it is not possible in some areas to correct entirely. A rating of severe indicates that use of the soil is severely limited by some soil characteristic that is difficult to overcome or that the costs of overcoming the limitation are excessive. It does not mean that a soil cannot be used for the specific use, but points out the limitations that are encountered. Also, where extensive cuts and fills have been made, the remaining soil material has been so altered in some areas that the ratings given for the normal areas no longer apply.

A single property of the soil does not affect all uses of the soils equally. An example of this is a soil that has a seasonal high water table, which is severely limiting for sewage effluent disposal but which is only moderately limiting when the soil is used for lawns or golf fairways.

The ratings contained in table 7 are for the dominant soil condition in a mapping unit; however, each mapping unit contains inclusions of unlike soils. Because of these inclusions, it is necessary to make onsite investigations for final determinations concerning the use of any specific small tract of land. Following are explanations of the various uses together with the major soil characteristics considered in assigning soil limitations for each use.

Sewage disposal fields.—The ratings in table 7 are for limitations of soils used as sites for adequately designed and installed onsite sewage effluent disposal systems. Throughout most of the survey area, cesspools generally are in use. The source or supply of water is not considered in assigning the ratings; however, the possibility of polluting nearby lakes, streams, or wells should be a major consideration in selecting a site. The most suitable soils are deep, well drained, nearly level or gently sloping, moderately to rapidly permeable, and almost free of stones. Because of differences in soil permeability within short distances, careful onsite investigation is needed before a specific site is selected. Soil characteristics considered in assigning these ratings are depth to seasonal high water table, permeability, slope, and surface stoniness.

Homesites.—These sites are for homes or for buildings of three stories or less. These structures include service buildings for recreational areas. The limitations assigned in table 7 are for buildings that have basements at least 5 feet below the original surface of the soil. Such soil limitations as depth of the seasonal high water table and stoniness are not so restrictive for buildings without basements as they are for buildings with basements. Sewage disposal, water supply, and access roads or driveways are not considered in the ratings. The most suitable soils are well drained and nearly level or gently sloping. The main soil characteristics considered in assigning limitations for use as homesites are depth to seasonal high water table, slope, and surface stoniness.

Streets and parking lots.—Limitations are based on the suitability of the soils for hard-surfaced streets and parking lots in subdivisions or for hard-surfaced roads similar to town or county roads. Such limitations as slope are more restrictive for the layout of streets in subdivisions than for single town or county roads. Specific layouts require onsite investigation. More detailed information on the suitability of soils for highways is given in the subsection "Engineering Uses of the Soils," provided elsewhere in this survey. Nearly level, well-drained soils that are not subject to ponding and flooding are the most suitable for this use. The main soil characteristics considered in rating the soils for this use are depth to seasonal high water table, slope, and hazard of temporary ponding or flooding.

Lawns, landscaping, and golf fairways.—The ratings of the soils in this section are based mainly on the suitability of soils for growing grass to provide lawns for homesites and for golf fairways. The ratings also apply to landscaping and foundation plantings around buildings. The ratings are based on the use of the soil in places with no importation of fill or topsoil. Nearly level or

TABLE 7.—*Limitations of the soils*

Soil	Sewage disposal fields	Homesites [1]	Streets and parking lots	Lawns, landscaping, and golf fairways
Atsion sand	Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: sandy surface layer; seasonal high water table at depth of ½ to 1½ feet.
Beaches	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.
Berryland mucky sand	Severe: prolonged high water table above a depth of ½ foot.	Severe: prolonged high water table above a depth of ½ foot.	Severe: prolonged high water table above a depth of ½ foot.	Severe: sandy surface layer; high water table above a depth of ½ foot.
Bridgehampton silt loam, 0 to 2 percent slopes.	Slight [3]	Slight	Slight	Slight
Bridgehampton silt loam, 2 to 6 percent slopes.	Slight [3]	Slight	Moderate: slopes [4]	Slight
Bridgehampton silt loam, till substratum, 2 to 6 percent slopes.	Severe: moderately slow permeability in substratum.	Slight	Moderate: slopes [4]	Slight
Bridgehampton silt loam, till substratum, 6 to 12 percent slopes.	Severe: moderately slow permeability in substratum.	Moderate: slopes	Severe: slopes [5]	Moderate: slopes
Bridgehampton silt loam, graded [6]	Slight [3]	Slight	Moderate: slopes [4]	Slight
Canadice silt loam	Severe: slow permeability; seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.
Carver and Plymouth sands, 0 to 3 percent slopes.	Slight [7]	Slight	Slight	Severe: sandy surface layer.
Carver and Plymouth sands, 3 to 15 percent slopes.	Slight to moderate: [7] slopes in places.	Slight to moderate: slopes in places.	Moderate to severe: slopes.	Severe: sandy surface layer.
Carver and Plymouth sands, 15 to 35 percent slopes.	Severe: slopes [7]	Severe: slopes	Severe: slopes	Severe: slopes; sandy surface layer.
Cut and fill land, gently sloping [6]	Slight	Slight	Moderate: slopes [4]	Severe: sandy surface layer.
Cut and fill land, sloping [6]	Moderate: slopes	Moderate: slopes	Severe: slopes [5]	Severe: sandy surface layer.

See footnotes at end of table.

for town and country planning

Pipeline locations[2]	Sanitary landfill	Camp areas	Paths and trails	Picnic grounds and extensive play areas	Athletic fields and intensive play areas
Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: hazard of water pollution; seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.
Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.
Severe: prolonged high water table above a depth of ½ foot.	Severe: prolonged high water table above a depth of ½ foot.	Severe: prolonged high water table above a depth of ½ foot.	Severe: prolonged high water table above a depth of ½ foot.	Severe: prolonged high water table above a depth of ½ foot.	Severe: prolonged high water table above a depth of ½ foot.
Slight	Severe: rapid permeability; hazard of water pollution.	Slight	Slight	Slight	Slight.
Slight	Severe: rapid permeability; hazard of water pollution.	Moderate for trailers: slopes. Slight for tents.	Slight	Slight	Moderate: slopes.
Slight	Slight	Moderate for trailers: slopes. Slight for tents.	Slight	Slight	Moderate: slopes.
Slight	Slight	Severe for trailers: slopes. Moderate for tents: slopes.	Slight	Moderate: slopes.	Severe: slopes.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Slight	Slight	Slight	Slight.
Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet; hazard of water pollution; texture.	Severe: slow permeability; seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.
Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Severe: sandy surface layer; slopes.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Severe: sandy surface layer; slopes.	Severe: sandy surface layer; slopes.	Severe: sandy surface layer; slopes.	Severe: sandy surface layer; slopes.
Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes; sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Severe: slopes.

TABLE 7.—*Limitations of the soils*

Soil	Sewage disposal fields	Homesites [1]	Streets and parking lots	Lawns, landscaping, and golf fairways
Cut and fill land, steep [6]	Severe: slopes	Severe: slopes	Severe: slopes	Severe: slopes; sandy surface layer.
Deerfield sand	Moderate: seasonal high water table at depth of 1½ to 2 feet.[7]	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Severe: sandy surface layer.
Dune land	Moderate: water table within 4 feet of surface in places.	Variable	Variable	Severe: sandy surface layer.
Escarpments. Variable; no interpretations made.				
Fill land, dredged material	Moderate: water table within a depth of 4 feet of surface in places.	Variable	Variable	Severe: sandy surface layer.
Fill land, sandy	Severe: high water table.	Severe: high water table.	Moderate: high water table.	Severe: sandy surface layer.
Gravel pits. Variable; no interpretations made.				
Haven loam, 0 to 2 percent slopes	Slight [7]	Slight	Slight	Slight
Haven loam, 2 to 6 percent slopes	Slight [7]	Slight	Moderate: slopes [4]	Slight
Haven loam, 6 to 12 percent slopes	Moderate: slopes [7]	Moderate: slopes	Severe: slopes [5]	Moderate: slopes
Haven loam, thick surface layer	Severe: flooded during prolonged wet periods in places.	Severe: flooded during prolonged wet periods in places.	Severe: flooded during prolonged wet periods in places.	Slight
Made land. Variable; no interpretations made.				
Montauk fine sandy loam, 0 to 3 percent slopes.	Severe: moderately slow permeability.	Slight	Slight	Slight
Montauk fine sandy loam, 3 to 8 percent slopes.	Severe: moderately slow permeability.	Slight	Moderate: slopes [1]	Slight
Montauk fine sandy loam, 8 to 15 percent slopes.	Severe: moderately slow permeability.	Moderate: slopes	Severe: slopes	Moderate: slopes
Montauk silt loam, 0 to 3 percent slopes	Severe: moderately slow permeability.	Slight	Slight	Slight
Montauk silt loam, 3 to 8 percent slopes	Severe: moderately slow permeability.	Slight	Moderate: slopes [4]	Slight

for town and country planning—Continued

Pipeline locations[2]	Sanitary landfill	Camp areas	Paths and trails	Picnic grounds and extensive play areas	Athletic fields and intensive play areas
Severe: stability	Severe: rapid permeability; hazard of water pollution.	Severe: slopes	Moderate to severe: slopes.	Severe: slopes	Severe: slopes.
Severe: stability	Severe: rapid permeability; hazard of water pollution.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Severe: stability	Severe: hazard of water pollution.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Severe: stability	Severe: hazard of water pollution.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Severe: stability	Severe: hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
Moderate: stability	Severe: rapid permeability; hazard of water pollution.	Slight	Slight	Slight	Slight.
Moderate: stability	Severe: rapid permeability; hazard of water pollution.	Moderate for trailers: slopes. Slight for tents.	Slight	Slight	Moderate: slopes.
Moderate: stability	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes.	Slight	Moderate: slopes	Severe: slopes.
Moderate: stability	Severe: rapid permeability; hazard of water pollution.	Severe: flooded during prolonged wet periods in places.	Slight	Moderate: flooding in places during season of use.	Moderate: flooding in places during season of use.
Slight	Slight [8]	Moderate: moderately slow permeability.	Slight	Slight	Moderate: moderately slow permeability.
Slight [9]	Slight [8]	Moderate: moderately slow permeability.	Slight	Slight	Moderate: slopes; moderately slow permeability.
Slight [9]	Slight [8]	Severe for trailers: slopes. Moderate for tents: slopes.	Slight	Moderate: slopes	Severe: slopes.
Slight [9]	Slight [8]	Moderate: moderately slow permeability.	Slight	Slight	Moderate: moderately slow permeability.
Slight [9]	Slight [8]	Moderate: moderately slow permeability.	Slight	Slight	Moderate: moderately slow permeability.

TABLE 7.—*Limitations of the soils*

Soil	Sewage disposal fields	Homesites [1]	Streets and parking lots	Lawns, landscaping, and golf fairways
Montauk silt loam, 8 to 15 percent slopes	Severe: moderately slow permeability.	Moderate: slopes	Severe: slopes [5]	Moderate: slopes
Montauk soils, graded, 0 to 8 percent slopes. [6]	Severe: moderately slow permeability of fragipan.	Slight	Moderate: slopes [4]	Slight
Montauk soils, graded, 8 to 15 percent slopes. [6]	Severe: slopes; moderately slow permeability of fragipan.	Moderate: slopes	Severe: slopes [5]	Moderate: slopes
Montauk loamy sand, sandy variant, 0 to 3 percent slopes.	Severe: moderately slow permeability of fragipan.	Slight	Slight	Severe: sandy surface layer.
Montauk loamy sand, sandy variant, 3 to 8 percent slopes.	Severe: moderately slow permeability of fragipan.	Slight	Moderate: slopes [4]	Severe: sandy surface layer.
Montauk loamy sand, sandy variant, 8 to 15 percent slopes.	Severe: moderately slow permeability of fragipan.	Moderate: slopes	Severe: slopes [5]	Severe: sandy surface layer.
Montauk loamy sand, sandy variant, 15 to 35 percent slopes.	Severe: slopes; moderately slow permeability of fragipan.	Severe: slopes	Severe: slopes	Severe: sandy surface layer; slopes.
Muck	Severe: prolonged high water table above depth of ½ foot.	Severe: prolonged high water table above depth of ½ foot; poor stability.	Severe: prolonged high water table above depth of ½ foot with some ponding.	Severe: prolonged high water table above depth of ½ foot with some ponding.
Plymouth loamy sand, 0 to 3 percent slopes	Slight [7]	Slight	Slight	Severe: sandy surface layer.
Plymouth loamy sand, 3 to 8 percent slopes	Slight [7]	Slight	Moderate: slopes [4]	Severe: sandy surface layer.
Plymouth loamy sand, 8 to 15 percent slopes.	Moderate: slopes [7]	Moderate: slopes	Severe: slopes [5]	Severe: sandy surface layer.
Plymouth gravelly loamy sand, 3 to 8 percent slopes, eroded.	Slight [7]	Slight	Moderate: slopes [4]	Severe: sandy surface layer; gravel; erosion.
Plymouth gravelly loamy sand, 8 to 15 percent slopes, eroded.	Moderate: slopes [7]	Moderate: slopes	Severe: slopes [5]	Severe: sandy surface layer; gravel; erosion.

See footnotes at end of table.

for town and country planning—Continued

Pipeline locations[3]	Sanitary landfill	Camp areas	Paths and trails	Picnic grounds and extensive play areas	Athletic fields and intensive play areas
Slight [9]	Slight [8]	Severe for trailers: slopes. Moderate for tents: slopes; moderately slow permeability.	Slight	Moderate: slopes	Severe: slopes.
Slight	Slight [8]	Moderate: moderately slow permeability.	Slight	Slight	Moderate: moderately slow permeability.
Slight	Slight [8]	Severe for trailers: slopes. Moderate for tents: slopes; moderately slow permeability.	Slight	Moderate: slopes	Severe: slopes.
Slight [9]	Severe: rapid permeability; moderate hazard of water pollution.	Moderate: sandy surface layer; moderately slow permeability.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer; moderately slow permeability.
Slight [9]	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer; moderately slow permeability.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer; moderately slow permeability; slopes.
Slight [9]	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes; moderately slow permeability.	Moderate: sandy surface layer.	Moderate: sandy surface layer; slopes.	Severe: slopes.
Moderate to severe: slopes.	Severe: slopes; rapid permeability.	Severe: slopes	Moderate to severe: slopes.	Severe: slopes	Severe: slopes.
Severe: prolonged high water table above depth of ½ foot.	Severe: prolonged high water table above depth of ½ foot; hazard of water pollution.	Severe: prolonged high water table above depth of ½ foot.	Severe: prolonged high water table above depth of ½ foot.	Severe: prolonged high water table above depth of ½ foot.	Severe: prolonged high water table above depth of ½ foot.
Moderate: stability	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
Moderate: stability	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer; slopes.
Moderate: stability	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes; sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Severe: slopes.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: slopes; sandy surface layer.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes; sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Severe: slopes.

TABLE 7.—*Limitations of the soils*

Soil	Sewage disposal fields	Homesites [1]	Streets and parking lots	Lawns, landscaping, and golf fairways
Plymouth loamy sand, silty substratum, 0 to 3 percent slopes.	Slight [10]	Slight	Slight	Severe: sandy surface layer.
Plymouth loamy sand, silty substratum, 3 to 8 percent slopes.	Slight [10]	Slight	Moderate: slopes	Severe: sandy surface layer.
Raynham loam	Severe: moderately slow permeability; seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.
Recharge basin. Variable; no interpretations made.				
Riverhead sandy loam, 0 to 3 percent slopes.	Slight [7]	Slight	Slight	Slight
Riverhead sandy loam, 3 to 8 percent slopes.	Slight [7]	Slight	Moderate: slopes [4]	Slight
Riverhead sandy loam, 8 to 15 percent slopes.	Moderate: slopes [7]	Moderate: slopes	Severe: slopes [5]	Moderate: slopes
Riverhead very stony sandy loam, 3 to 8 percent slopes.	Slight [7]	Slight	Moderate: slopes [4]	Severe: very stony.
Riverhead very stony sandy loam, 8 to 15 percent slopes.	Moderate: slopes [7]	Moderate: slopes	Severe: slopes [5]	Severe: very stony.
Riverhead and Haven soils, graded, 0 to 8 percent slopes.[6]	Slight [7]	Slight	Moderate: slopes [4]	Slight
Riverhead and Haven soils, graded, 8 to 15 percent slopes.[6]	Moderate: slopes	Moderate: slopes	Severe: slopes [5]	Moderate: slopes
Riverhead and Plymouth very bouldery soils, 15 to 35 percent slopes.	Severe: slopes	Severe: slopes	Severe: slopes	Severe: slopes; stoniness.
Scio silt loam, till substratum, 2 to 6 percent slopes.	Severe: moderately slow permeability in substratum.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Slight
Scio silt loam, sandy substratum, 0 to 2 percent slopes.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Slight
Scio silt loam, sandy substratum, 2 to 6 percent slopes.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate slopes; seasonal high water table at depth of 1½ to 2 feet.	Slight

See footnotes at end of table.

for town and country planning—Continued

Pipeline locations[2]	Sanitary landfill	Camp areas	Paths and trails	Picnic grounds and extensive play areas	Athletic fields and intensive play areas
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer; slopes.
Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: hazard of water pollution; seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Slight	Slight	Slight	Slight.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Moderate for trailers: slopes. Slight for tents.	Slight	Slight	Moderate: slopes.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes.	Slight	Moderate: slopes	Severe: slopes.
Moderate: stoniness; stability.	Severe: rapid permeability; hazard of water pollution.	Moderate: stoniness.	Moderate: stoniness.	Slight	Moderate: stoniness; slopes.
Moderate: stoniness; stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes; stoniness.	Moderate: stoniness.	Moderate: slopes	Severe: slopes.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Slight	Slight	Slight	Slight.
Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents; slopes.	Slight	Moderate: slopes	Severe: slopes.
Severe: slopes	Severe: slopes	Severe: slopes	Moderate to severe: slopes.	Severe: slopes	Severe: slopes.
Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate:[8] seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Slight	Slight	Moderate: slopes; moderately slow permeability in substratum.
Moderate: seasonal high water table at depth of 1½ to 2 feet.	Severe: rapid permeability.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Slight	Slight	Slight.
Moderate: seasonal high water table at depth of 1½ to 2 feet.	Severe: rapid permeability.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Slight	Slight	Moderate: slopes.

TABLE 7.—*Limitations of the soils*

Soil	Sewage disposal fields	Homesites [1]	Street and parking lots	Lawns, landscaping, and golf fairways
Sudbury sandy loam	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Slight
Tidal marsh	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.
Urban land. Variable; no interpretations made.				
Wallington silt loam, till substratum	Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.
Walpole sandy loam	Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.
Wareham loamy sand	Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: sandy surface layer.
Whitman sandy loam	Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.

[1] High water table is less restrictive for houses without basements.
[2] Stability, as used here, refers to the tendency of the soils to slough on a ditch 6 feet deep; limitations are less restrictive for shallower ditches.
[3] In some areas, the water table is 1½ to 4 feet below the surface of these parts. Downward movement of water is impeded by silt and sand.
[4] Slight for town or county roads.
[5] Moderate for town or county roads.

for town and country planning—Continued

Pipeline locations [2]	Sanitary landfill	Camp areas	Paths and trails	Picnic grounds and extensive play areas	Athletic fields and intensive play areas
Moderate: seasonal high water table at depth of 1½ to 2 feet.	Severe: rapid permeability.	Moderate: seasonal high water table at depth of 1½ to 2 feet.	Slight	Slight	Slight.
Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.
Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.
Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: rapid permeability; hazard of water pollution; seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.
Severe: seasonal high water table at depth of ½ to 1½ feet.	Severe: rapid permeability; seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Moderate: seasonal high water table at depth of ½ to 1½ feet.	Severe: seasonal high water table at depth of ½ to 1½ feet.
Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.	Severe: seasonal high water table at depth of 0 to ½ foot.

[6] These units are mainly in built-up areas, and they are not well suited to uses other than present use. Interpretations in the table apply to small ungraded areas.

[7] Possible pollution hazard to lakes, springs, or shallow wells in these rapidly permeable soils.

[8] If the till layer is less than 3 feet thick in these soils, the limitation is severe.

[9] The till substratum of these soils is more difficult to excavate than the substratum of other soils in the county; however, the till does not appreciably reduce workability.

[10] Water infiltration rates are slightly impeded by silty subsoil in places.

gently sloping, well drained or moderately well drained soils that are not excessively sandy or stony are the most suitable. The main soil characteristics considered in assigning limitations for these uses are depth to seasonal high water table, slope, surface stoniness, and surface soil texture.

Pipeline locations.—Limitations are based on the ease with which the soils can be excavated for installing utility pipelines. The ratings apply to pipelines in subdivisions as well as cross-country pipelines used for water, gas, oil, or other uses. The corrosion potential of pipes laid in different kinds of soil is not considered in the ratings in table 7. Deep, nearly level soils that are stable and contain few large stones or boulders are the most suitable for this use. Ditch flooding because of a high water table hinders installation during wet periods. The main soil features that affect this use are depth to seasonal high water table, slope, stability, and presence of large stones on the surface and in the soil.

Sanitary landfill.—These areas are used for disposal of trash and garbage by landfill operations. In this operation a large hole or trench is dug and trash and garbage are dumped into it. The layers of trash are alternately covered by thin layers of soil until the hole is completely filled. The last layer is 2 to 4 feet thick. No importation of fill or cover material is considered in the rating. In general, soils that are deep, nearly level or gently sloping, well drained, not excessively stony, not too permeable, and not too sticky are most suitable for sanitary landfills. Rapidly permeable gravelly and sandy soils or those soils that overlie loose sand and gravel are easy to excavate; but there is a severe hazard of pollution of wells, lakes, and streams that are nearby. Most of the soils in the survey area are underlain by rapidly permeable sand and gravel. Permeability ratings in the table refer to the most permeable layer between a depth of 1 and 5 feet. The major soil characteristics affecting this use are depth to seasonal high water table, presence of rapidly permeable soil material within 5 feet of the surface, dominant texture of soil, and surface stoniness.

Camp areas.—Limitations apply to the suitability of soils as sites for tent or trailer camping. It is assumed that such areas will be used intensively during the camping season and will be subject to heavy vehicular and foot traffic. Sewage disposal, water supply, and access roads are not considered in making these ratings. The most suitable soils are well drained, nearly level or gently sloping, and are not excessively sandy or clayey. Limitations of slope are more restrictive for trailer camping than for tent camping. The main soil characteristics considered in assigning limitations for this use are depth to seasonal high water table, permeability, slope, surface stoniness, and texture of the surface layer.

Paths and trails.—Limitations apply to the suitability of soils for local and cross-country footpaths and trails and for bridle paths. It is assumed that these areas will be used as they occur in nature and that little or no soil will be moved (excavated or filled). Well drained or moderately well drained, nearly level to moderately sloping soils that are not excessively clayey or sandy and that have large stones covering less than 3 percent of the surface are the most suitable. The main soil characteristics considered in assigning soil limitations for paths and trails are depth to seasonal high water table, slope, texture of surface layer, and surface stoniness.

Picnic grounds and extensive play areas.—Limitations are based on suitability of the soils for areas that will be used for extensive play, walking, and running, mainly by children. These areas have picnic tables, fireplaces, and open tracts for use by groups. Small roadside picnic areas are not considered. Sewage disposal and water supply are not considered in making these ratings. Nearly level to gently sloping, well drained or moderately well drained soils that are not excessively sandy or clayey and that have large stones covering less than three percent of the surface are the most suitable for this use. The main soil features affecting this use are seasonal high water table, slope, texture of the surface layer, and surface stoniness.

Athletic fields and intensive play areas.—Limitations are based on the suitability of soils for use as areas for such sports as football, baseball, soccer, tennis, or similar organized games where the areas will be subjected to intensive use. These uses require nearly level areas, thereby necessitating deep cuts and fills on sloping soils. Importation of fill material or topsoil is not considered in the rating. The most suitable soils are those that are nearly level, well drained, and free of gravel or stones. The major soil characteristics considered in assigning limitations for this use are depth to seasonal high water table, permeability, slope, surface stoniness, and texture of the surface layer.

Descriptions of the Soils

This section describes the soil series and mapping units in Suffolk County. Each soil series is described in considerable detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familar to the layman. The second, detailed and in technical terms, is for scientists, engineers, and others who need to make thorough and precise studies of soils. (Unless it is otherwise stated, the colors given in the descriptions are those of moist soil).

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Dune land, for example, does not belong to a soil series, but nevertheless is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit are the capability unit and

woodland suitability group in which the mapping unit has been placed. The page for the description of each capability unit and woodland suitability group can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 8. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*12*).

Because of rapid suburban expansion in the county, many areas of soils that were classified and mapped as phases of soil series during fieldwork have been altered by grading or other construction work. The soil map at the back of this publication was prepared from aerial photographs taken after fieldwork was completed. Many of the areas that were altered since fieldwork was completed can be identified on the photobase of the soil map. These areas are particularly extensive in the town of Brookhaven. They have the characteristics of graded soils, cut and fill land, or fill land.

Atsion Series

The Atsion series consists of deep, nearly level, somewhat poorly drained to poorly drained, coarse-textured soils that formed in deep sandy outwash deposits. These soils are on plains adjacent to ponds, creeks, and tidal inlets. They are also along the bottom of old glacial channels that are cut down close to the water table. These soils are throughout the county, but they generally are along the south shore and along the Peconic River. The native vegetation is red maple, pitch pine, and white oak and highbush blueberries.

TABLE 8.—*Approximate acreage and proportionate extent of the soils* [1]

Soil	Acres	Percent	Soil	Acres	Percent
Atsion sand	2, 280	0. 4	Montauk loamy sand, sandy variant, 15 to 35 percent slopes	2, 010	. 3
Beaches	6, 890	1. 2	Muck	2, 850	. 5
Berryland mucky sand	3, 540	. 6	Plymouth loamy sand, 0 to 3 percent slopes	39, 950	6. 9
Bridgehampton silt loam, 0 to 2 percent slopes	8, 670	1. 5	Plymouth loamy sand, 3 to 8 percent slopes	28, 540	4. 8
Bridgehampton silt loam, 2 to 6 percent slopes	2, 250	. 4	Plymouth loamy sand, 8 to 15 percent slopes	13, 180	2. 2
Bridgehampton silt loam, till substratum, 2 to 6 percent slopes	640	. 1	Plymouth gravelly loamy sand, 3 to 8 percent slopes, eroded	1, 030	. 2
Bridgehampton silt loam, till substratum, 6 to 12 percent slopes	550	. 1	Plymouth gravelly loamy sand, 8 to 15 percent slopes, eroded	1, 160	. 2
Bridgehampton silt loam, graded	220	(2)	Plymouth loamy sand, silty substratum, 0 to 3 percent slopes	1, 750	. 3
Canadice silt loam	460	(2)	Plymouth loamy sand, silty substratum, 3 to 8 percent slopes	840	. 1
Carver and Plymouth sands, 0 to 3 percent slopes	25, 570	4. 3	Raynham loam	1, 050	. 2
Carver and Pymouth sands, 3 to 15 percent slopes	43, 160	7. 4	Recharge basin	600	. 1
Carver and Plymouth sands, 15 to 35 percent slopes	34, 120	5. 9	Riverhead sandy loam, 0 to 3 percent slopes	71, 210	12. 1
Cut and fill land, gently sloping	29, 140	4. 9	Riverhead sandy loam, 3 to 8 percent slopes	33, 185	5. 7
Cut and fill land, sloping	2, 300	. 4	Riverhead sandy loam, 8 to 15 percent slopes	7, 705	1. 3
Cut and fill land, steep	1, 140	. 2	Riverhead very stony sandy loam, 3 to 8 percent slopes	130	(2)
Deerfield sand	2, 510	. 4	Riverhead very stony sandy loam, 8 to 15 percent slopes	360	(2)
Dune land	9, 970	1. 7	Riverhead and Haven soils, graded, 0 to 8 percent slopes	57, 990	9. 9
Escarpments	1, 650	. 3	Riverhead and Haven soils, graded, 8 to 15 percent slopes	1, 345	. 2
Fill land, dredged material	6, 170	1. 0	Riverhead and Plymouth very bouldery soils, 15 to 35 percent slopes	560	. 1
Fill land, sandy	2, 240	. 4	Scio silt loam, till substratum, 2 to 6 percent slopes	240	(2)
Gravel pits	2, 000	. 3	Scio silt loam, sandy substratum, 0 to 2 percent slopes	1, 080	. 2
Haven loam, 0 to 2 percent slopes	60, 970	10. 4	Scio silt loam, sandy substratum, 2 to 6 percent slopes	260	(2)
Haven loam, 2 to 6 percent slopes	15, 440	2. 6	Sudbury sandy loam	1, 460	. 2
Haven loam, 6 to 12 percent slopes	1, 510	. 3	Tidal marsh	16, 020	2. 7
Haven loam, thick surface layer	1, 370	. 2	Urban land	4, 410	. 8
Made land	710	. 1	Wallington silt loam, till substratum	350	(2)
Montauk fine sandy loam, 0 to 3 percent slopes	370	(2)	Walpole sandy loam	2, 540	. 4
Montauk fine sandy loam, 3 to 8 percent slopes	4, 285	. 7	Wareham loamy sand	5, 210	. 9
Montauk fine sandy loam, 8 to 15 percent slopes	3, 225	. 5	Whitman sandy loam	570	. 1
Montauk silt loam, 0 to 3 percent slopes	510	. 1	Water (less than 40 acres in each body)	2, 810	. 5
Montauk silt loam, 3 to 8 percent slopes	5, 210	. 9	Total	590, 080	100. 0
Montauk silt loam, 8 to 15 percent slopes	2, 270	. 4			
Montauk soils, graded, 0 to 8 percent slopes	2, 240	. 4			
Montauk soils, graded, 8 to 15 percent slopes	505	(2)			
Montauk loamy sand, sandy variant, 0 to 3 percent slopes	1, 520	. 3			
Montauk loamy sand, sandy variant, 3 to 8 percent slopes	2, 370	. 4			
Montauk loamy sand, sandy variant, 8 to 15 percent slopes	1, 710	. 3			

[1] As a result of the rapid suburban expansion the acreage of many phases of soil series will decrease and the acreage of phases of graded soils, cut and fill land, and fill land will increase.

[2] Less than 0.1 percent.

In a representative profile about 4 inches of organic matter is on the surface. The upper 2 inches is leaves and partly decomposed organic matter, and the lower 2 inches is dark reddish-brown decomposed organic matter. Below this mat is a surface layer of very dark gray sand, 1 inch thick, that contains a large proportion of organic matter. It is underlain by a subsurface layer of gray, loose sand that extends to a depth of 10 inches. The upper part of the subsoil, to a depth of 15 inches, consists of dark reddish-brown, firm loamy sand. The lower part, to a depth of about 27 inches, is dark-brown, very friable sand. The substratum, to a depth of 56 inches, is brown to dark-brown, very friable to loose sand that contains a few pebbles.

These soils have a seasonal high water table. Depth to the water table ranges from about 6 to 18 inches. Permeability is rapid in these sandy soils. Available moisture capacity is very low. Reaction is strongly acid to very strongly acid throughout. Natural fertility is low. The response of crops to lime and fertilizer is fair to poor. The root zone is 15 to 20 inches thick. Available moisture generally is more than adequate for most plants, but in areas that are drained, little moisture is available to plants that have shallow roots.

Representative profile of Atsion sand, in a wooded area, 1 mile north of Manorville near the south end of Linus Pond:

O1—4 to 2 inches, loose hardwood leaves and partly decomposed organic matter that contains very many roots.

O2—2 inches to 0, dark reddish-brown (5YR 2/2) decomposed organic matter; very friable; many medium and coarse roots.

A1—0 to 1 inch, very dark gray (10YR 3/1) sand; massive; very friable; many fine and medium roots; many, clean, white sand grains; very strongly acid; abrupt, wavy boundary.

A2—1 to 10 inches, light-gray to gray (5YR 6/1) sand; single grain; loose; a few medium roots; very strongly acid; abrupt, irregular boundary.

B21h—10 to 15 inches, dark reddish-brown (5YR 2/2) loamy sand; massive; firm; a few roots; a few fine pores; very strongly acid; clear, irregular boundary.

B22—15 to 27 inches, dark-brown (10YR 3/3) sand; single grain, very friable; no roots; no coarse fragments; very strongly acid; gradual, wavy boundary.

C1—27 to 48 inches, brown to dark-brown (10YR 4/3) sand; massive; very friable; no roots; less than 2 percent coarse fragments; very strongly acid; clear, smooth boundary.

C2—48 to 56 inches, brown to dark-brown (10YR 4/3) coarse sand; single grain; loose; 2 to 5 percent coarse fragments; very strongly acid.

The solum ranges from 18 to 36 inches in thickness. The content of coarse fragments in the solum generally is less than 10 percent but is as much as 30 or 40 percent in the substratum. Reaction ranges from strongly acid to very strongly acid. Texture throughout the solum ranges from sand to loamy sand. The O horizons range from 1 to 7 inches in thickness.

The A1 horizon dominantly has 10YR hues, but it ranges from black (N 2/0) to very dark gray (10YR 3/1). This horizon is massive or structure is weak granular. Consistence ranges from very friable to loose.

The upper part of the B horizon ranges from dark reddish brown (5YR 2/2) to dark brown (7.5YR 3/2). Consistence is firm or very firm, and the horizon is weakly cemented in places. Texture is dominantly loamy sand but ranges to sand.

The lower part of the B horizon ranges from very dark-grayish brown (10YR 3/2) to pale brown (10YR 6/3). It is single grain or massive; consistence ranges from loose to very friable.

The C horizon ranges from dark grayish brown (10YR 4/2) to pale yellow (5Y 7/4). Texture is sand or stratified sand and gravel. It is single grain or massive, and consistence ranges from loose to very friable.

Atsion soils are near Berryland soils. Atsion soils are similar to Berryland soils, except that they have a thinner organic surface horizon, and the water table is at a greater depth. These soils are also near Wareham and Walpole soils, both of which are similar in drainage to Atsion soils but they lack a B horizon that has an accumulation of humus, iron, and aluminum. In addition, Atsion soils are coarser textured than Walpole soils.

Atsion sand (At).—This is the only Atsion soil mapped in the county. This nearly level, somewhat poorly drained to poorly drained soil is near ponds and creeks and along the bottoms of deeply cut meltwater channels. Most areas are small and irregularly shaped. Areas on channel bottoms are narrow and long.

Included with this soil in mapping are areas of Berryland, Wareham, and Deerfield soils that are too small to map separately.

The hazard of erosion is slight on this Atsion soil. This soil has a high water table, and drained areas have very low available moisture capacity. Scarcity of good outlets makes this soil difficult to drain.

This soil is not well suited to crops commonly grown in the county. Very little of this soil has been cleared. Most areas that have been cleared have been allowed to revert to brush or woodland. In the western part of the county, some areas of this soil have been filled to provide sites for homes. The soil is better suited to woodland or to habitat for some types of wildlife than to other uses. Capability unit IVw–1; woodland suitability group 4wl.

Beaches

Beaches (Bc) are made up of sandy, gravelly, or cobbly areas between water at mean sea level and dunes or escarpments. Slope is nearly level in most areas but it is as much as 15 percent in some places on the Atlantic shore. All the beaches along Long Island Sound are very gravelly and cobbly. A few very large boulders that rolled down from the adjoining bluffs of the Harbor Hill Moraine are present. The Atlantic Ocean beaches are sandy except for a few small areas near Montauk Point. In most places beaches on the bays are sandy, but varying amounts of gravel are mixed with the sand.

These areas are not suited to farming. Measures should be taken to control erosion to keep the beach wide enough to protect the nearby dunes or uplands. Capability unit VIIIs–1; woodland suitability group not assigned.

Berryland Series

The Berryland series consists of deep, very poorly drained, coarse-textured soils. These nearly level soils formed in deep sandy outwash deposits on low-lying wet areas adjacent to ponds, tidal creeks, and low-gradient streams or between areas of tidal marsh and better drained uplands. This soil is mainly along the Peconic River. Native vegetation is red maple, blackgum, and highbush blueberry. Sphagnum moss is common.

In a representative profile a dark reddish-brown and black layer of organic matter, about 10 inches thick, is on the surface. The upper 2 or 3 inches of this organic

matter consists of partly decomposed plant fibers. The surface layer is black mucky sand 1 inch thick. It is underlain by a subsurface layer of grayish-brown, loose sand to a depth of 5 inches. The upper part of the subsoil, to a depth of about 10 inches, consists of very dark grayish-brown, friable sand that contains large accumulations of organic matter. The lower part of the subsoil consists of brown to dark-brown loose sand to a depth of about 20 inches and grayish-brown sand to a depth of about 30 inches. The substratum, to a depth of 52 inches, is light olive-gray loose sand.

Berryland soils have a high water table. The water table is at the surface or within 6 inches of the surface most of the year. Permeability is rapid. If the water table is lowered by drainage, these soils have very low available moisture capacity. These soils are strongly acid to very strongly acid throughout. Natural fertility is low. Rooting depth is limited mainly to the upper 6 to 12 inches.

Representative profile of Berryland mucky sand, in a wooded area, one-fourth mile east of the edge of the village of Sag Harbor on State Route 114; 200 yards north of highway:

O1—10 to 8 inches, dark reddish-brown (5YR 3/4) loose leaves and partly decomposed organic matter.
O2—8 inches to 0, black (5YR 2/1) decomposed organic material, heavily matted with roots; abrupt, smooth boundary.
A1—0 to 1 inch, black (10YR 2/1) mucky sand; massive; very friable; very strongly acid; abrupt, smooth boundary.
A2—1 to 5 inches, grayish-brown (10YR 5/2) sand; single grain; loose; a few roots; very strongly acid; clear, smooth boundary.
B21h—5 to 10 inches, very dark grayish-brown (10YR 3/2) sand; massive; friable; a few roots; very strongly acid; gradual, wavy boundary.
B22—10 to 20 inches, brown to dark-brown (10YR 4/3) sand; single grain; loose; a few roots; strongly acid; gradual, wavy boundary.
B3—20 to 30 inches, grayish-brown (2.5Y 5/2) sand; single grain; loose; very strongly acid; gradual, wavy boundary.
C—30 to 52 inches, light olive-gray (5Y 6/2) sand; single grain; loose; strongly acid.

The solum ranges from 28 to 40 inches in thickness. It is dominantly sand, but ranges to loamy sand in places. The solum generally is free of coarse fragments, but in old channel bottoms, the B horizon has as much as 15 percent coarse fragments. Reaction ranges from strongly acid to very strongly acid in the solum. The O horizon ranges from 6 to 16 inches in thickness.

The A1 horizon is dominantly black (10YR 2/1 or N 2/0). The A1 horizon is massive or the structure is weak granular. The A2 horizon ranges from very dark gray (10YR 3/1) to grayish brown (10YR 5/2). It is mainly sand, but ranges to loamy sand in places. The A2 horizon is dominantly single grain, but where the profile has a weakly expressed A2 horizon, it ranges to massive.

The B21h horizon ranges from dark reddish brown (5YR 3/2) to very dark brown (10YR 2/2). A chroma of 2 is dominant. Texture ranges from sand to loamy sand. Consistence is friable or firm. The B22 horizon ranges from dark reddish brown (5YR 3/2) to brown to dark brown (10YR 4/3). The B22 horizon is more strongly developed where the fluctuation of the ground water level is greater. The lower part of the B horizon ranges from pale brown (10YR 6/3) to grayish brown (2.5Y 5/2). Texture is sand or loamy sand. In places this horizon contains coarse mottles that have a chroma of more than 2.

The C horizon generally ranges from olive gray (5Y 5/2) to pale brown (10YR 6/3), but in a few places where organic staining has penetrated deep into the profile, value is as low as 3. Texture ranges from sand to gravelly sand in this horizon.

Berryland soils are near Atsion soils. Berryland soils are similar to these soils, but they have a thicker organic surface horizon and a higher perennial water table. They are also near Walpole and Wareham soils, which are better drained and finer textured, but which lack a B horizon that has an accumulation of humus.

Berryland mucky sand (Bd).—This is the only Berryland soil mapped in the county. This wet soil is throughout the county along the margins of tidal marshes, ponds, creeks, and streams. Areas of this soil generally are small and round or long and narrow.

Included with this soil in mapping are small areas of Muck and of Atsion and Wareham soils. Also included are a few small areas of finer textured soils that are very poorly drained. Some of these included soils, especially along Carmans River and Connetquot River, do not have a well-defined gray subsurface layer and subsoil that have a large accumulation of humus. Also included along the Peconic River are very poorly drained cranberry bogs that are essentially Berryland soils that have had sand spread on the surface.

The hazard of erosion is slight on this Berryland soil. The very high water table in this soil severely limits it for both farm and nonfarm uses. A lack of suitable outlets makes this soil very difficult to drain. Most areas can be used as habitat for some types of wildlife.

None of this soil has been cleared. Most areas are in brush or trees, except along the shore in the southwestern part of the county, where small areas have been filled to provide sites for homes. Only one commercial cranberry bog is in operation. The other bogs have been allowed to revert to their original condition and are growing up in water-tolerant grasses and shrubs. Capability unit Vw–1; woodland suitability group 5w2.

Bridgehampton Series

The Bridgehampton series consists of deep, well drained to moderately well drained, medium-textured soils that formed in thick silty deposits over coarse sand and gravel. Bridgehampton soils are only on the south fork of the county in an area extending eastward from the village of Southampton to Amagansett. These soils generally are nearly level to gently sloping and are mainly on flat outwash plains, but a small area of these soils is near Montauk on uneven moraines, and slope is as much as 12 percent.

In a representative profile the surface layer is dark-brown silt loam 11 inches thick. The upper part of the subsoil, to a depth of about 23 inches, is yellowish-brown and light olive-brown, friable silt loam. Below, to a depth of about 34 inches, is friable, olive silt loam that contains grayish-brown and yellowish-brown mottles. The lower part of the subsoil, to a depth of 56 inches, is strong-brown, friable silt loam and very fine sandy loam that contains yellowish-brown and olive-gray streaks. The substratum is yellowish-red to yellowish-brown loose sand and gravel to a depth of 80 inches.

Bridgehampton soils have a high available moisture capacity. Natural fertility is low, but crops respond well to applications of lime and fertilizer. Reaction is strongly acid to very strongly acid in the solum and

strongly acid to medium acid in the substratum. Permeability is moderate in the silt loam layers, very rapid in the sandy substratum, and moderately slow in the till substratum of the till phases. The root zone is unrestricted. Because of the great difference in grain size between the lower part of the subsoil and the substratum, water does not move freely between these two layers. In places this condition causes temporary waterlogging in the lower subsoil during wet periods.

Representative profile of Bridgehampton silt loam, 0 to 2 percent slopes, 0.3 mile south of Stephan Hands Path on east side of Long Lane in East Hampton:

Ap—0 to 11 inches, dark-brown (10YR 3/3) silt loam; weak, medium and fine, granular structure; friable; many fine roots; lower 3 to 4 inches has moderately thick plates (plowpan) and is slightly firmer than upper part; strongly acid; abrupt, smooth boundary.

B21—11 to 19 inches, yellowish-brown (10YR 5/6) silt loam; fingers of dark grayish brown (10YR 4/2) along some root chanels: weak, medium and coarse, subangular blocky structure; friable; a few fine roots; strongly acid; clear, smooth boundary.

B22—19 to 23 inches, light olive-brown (2.5Y 5/4) silt loam; a few, fine, faint, grayish-brown and distinct, yellowish-brown mottles; very weak, medium, subangular blocky structure; friable; a few fine roots; strongly acid; clear, wavy boundary.

A'2—23 to 34 inches, olive (5Y 5/3) silt loam; a few, fine, faint, grayish-brown and distinct, yellowish-brown mottles; very weak, coarse, subangular blocky structure; friable; a few fine roots; strongly acid; clear, wavy boundary.

B'2—34 to 56 inches, strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), and olive-gray (5Y 5/2) stratified silt loam and very fine sandy loam; moderate, thin to thick, inherited platy structure; friable; a few fine roots; thickness of the various strata ranges from 1/16 to 1/4 inch; strongly acid; abrupt, wavy boundary.

IIC—56 to 80 inches, yellowish-red (5YR 4/6) fine gravel and sand that grades, with depth, to yellowish brown (10YR 5/6); firm and massive in upper 3 to 4 inches and loose and single grain below; partly indurated in upper part by iron that dissipates with depth; strongly acid.

The thickness of the solum ranges from 36 to 56 inches, depending on the thickness of the silty mantle overlying the stratified coarse sand and gravel. The content of coarse fragments ranges from 0 to 5 percent in the solum and from 5 to 65 percent in the substratum. Reaction ranges from strongly acid to very strongly acid in the solum and from strongly acid to medium acid in the substratum. Texture throughout the solum ranges from silt loam to very fine sandy loam, but it generally is silt loam. Fine mica flakes are common in the solum.

The Ap horizon ranges from very dark grayish brown (10YR 3/2) to dark brown (10YR 3/3). In places that have an A1 horizon, color ranges to very dark brown (10YR 2/2). The Ap horizon is massive or has weak granular structure. Consistence is friable, though in places continual cultivation has caused a firm plowpan to form in the lower part of the horizon.

The B horizon ranges from brown or dark brown (7.5YR 4/4) to light olive brown (2.5Y 5/6), and generally the darker colors are in the B21 horizon and the lighter colors are in the B22 horizon. Texture ranges from silt loam to very fine sandy loam. The B horizon is massive or has weak subangular blocky structure. Consistence is friable, but is somewhat firmer in places where there is a plowpan.

The A'2 horizon ranges from olive (5Y 5/3) to light brownish gray (10YR 6/2). Texture is silt loam or very fine sandy loam. It is massive or has very weak subangular blocky structure.

The B'2 horizon ranges from brown (7.5YR 5/4) to strong brown (7.5YR 5/8) and has streaks or thin layers that range from olive gray (5Y 5/2) to yellowish brown (10YR 5/6). Texture is silt loam and very fine sandy loam.

The IIC horizon ranges from yellowish red (5YR 4/6) to yellow (2.5Y 7/6). Texture is stratified sand and gravel or firm loamy sand, sandy loam, or fine sandy loam, and it is gravelly in places. Fine textures are in the till substratum phase of the series.

In Suffolk County, some of the Bridgehampton soils have a thicker solum than the defined range for the series. This difference generally does not alter their usefulness or behavior.

Bridgehampton soils are near Haven, Raynham, and Riverhead soils. They are siltier and have a thicker solum than Haven soils. Bridgehampton soils are less sandy than Riverhead soils, and they lack the high water table and gray color of Raynham soils. Bridgehampton soils have a bisequum color profile that distinguishes them from all these soils.

Bridghampton silt loam, 0 to 2 percent slopes (BgA).—This soil has the profile described as representative of the series. It is nearly level and is on outwash plains on very broad, level flats. Areas of this soil are large. Slopes are generally uniform, but minor areas of this soil are slightly undulating.

Included with this soil in mapping are areas of Haven soils that are too small to be mapped separately. These soils generally occur where the upper surface of the sandy substratum is wavy. In such places, the thinner profiles are made up of Haven soils and the thicker profiles are made up of Bridgehampton soils. Also included are small areas of Plymouth loamy sand, silty substratum, that are in close association. Thick silty soils that do not have a subsoil with alternating olive and strong-brown layers are included. Closed shallow depressions in the undulating areas contain soils that have abnormally thick surface horizons.

The hazard of erosion is slight on this Bridgehampton soil. This soil tends to crust after rain and to form a traffic pan or a plowpan if farmed intensively, and these are the major concerns of management. A cover crop on these soils in winter helps to control erosion and soil blowing. Growing deep-rooted grasses and legumes in the rotation helps to maintain structure and to loosen a plowpan.

This soil is well suited to all crops commonly grown in the county. Most of this soil has been cultivated, but a few areas around the villages of Southampton and East Hampton are used for housing developments and other nonfarm purposes. Capability unit I–1; woodland suitability group 3o1.

Bridgehampton silt loam, 2 to 6 percent slopes (BgB).—This gently sloping soil is on the outwash plains on large, moderately undulating areas or on side hills between broad flats and intermittent drainageways.

Because of past erosion, this soil is a few inches shallower to sand and gravel than the soil described as representative of the series. Also, in places the gray material in the lower part of the subsoil is less conspicuous and contains somewhat more medium sand, but the two profiles otherwise are similar.

Included with this soil in mapping are areas of Haven and Riverhead soils too small to be mapped separately. Also included are small areas near the village of Bridgehampton that have a thin layer of sand between the upper part of the subsoil and the olive or olive-gray layer in the lower part of the subsoil. Some areas near Sagaponac Pond are olive or olive gray immediately under the plow layer but are better drained than the color indicates.

The hazard of erosion is moderate on this Bridgehampton soil. The erosion hazard and the tendency of the soil to crust on drying are the main concerns of management. Measures need to be taken to control runoff.

This soil is well suited to all crops commonly grown in the county. Most of this soil has been cleared and farmed for many years, but a few areas near the larger villages are used for small housing developments. Capability unit IIe–1; woodland suitability group 3o1.

Bridgehampton silt loam, till substratum, 2 to 6 percent slopes (BhB).—This soil is mainly on the moraine in the vicinity of Montauk and Montauk Point, though a few small areas are on Shelter Island. Slopes are complex in many areas. Areas of this soil are much smaller than areas of Bridgehampton silt loam, 0 to 2 percent and 2 to 6 percent slopes.

The profile of this soil is similar to that of the soil described as representative of the series, except that it has a substratum of compact, gravelly sandy loam till. The till substratum generally is at a depth of about 48 inches. This soil has not been plowed in many places, and its surface layer, 5 to 6 inches thick, is much darker than that of the profile described, likely because of a grass cover for many years and a moist, marine climate.

Included with this soil in mapping are some areas of Montauk silt loams that have slopes of 0 to 2 percent and 2 to 6 percent and that are deeper over a fragipan than in the profile described as representative of that series. Also included are areas of Bridgehampton silt loam, till substratum, 0 to 2 percent slopes, that make up a very small part of the total acreage. Also included are small areas of wet soils.

The hazard of erosion is moderate on this Bridgehampton soil. The management concern is controlling erosion and runoff.

This soil is suited to all crops commonly grown in the county. Most areas were cleared many years ago and were used as open range for a long time, but most areas are now idle or are in brush or trees. A few areas on two or three horse farms are used as pasture. A few areas are used near Montauk and Montauk Harbor as sites for developments. The underlying till is suitable fill material. Capability unit IIe–1; woodland suitability group 3o1.

Bridgehampton silt loam, till substratum, 6 to 12 percent slopes (BhC).—This soil is on the moraine in the area around Montauk Point. Slopes are complex. The areas of this soil are smaller than areas of Bridgehampton silt loam, 0 to 2 percent slopes.

The profile of this soil is similar to that of the soil described as representative of the series, except that it is underlain by till. This soil generally is a few inches shallower to the till substratum than Bridgehampton silt loam, till substratum, 2 to 6 percent slopes, and it has a few large stones on the surface and within. This soil has not been plowed in many places, and it has a darker surface layer than that in the profile described, likely because of long years of a grass cover and a moist, marine climate.

Included with this soil in mapping are areas of Montauk silt loams that have slopes of 0 to 3 percent and 3 to 8 percent and that are deeper over a fragipan than that of the soil described as representative of that series. Also included are intermittent ponds or poorly drained soils in the bottom of small kettle holes.

The hazard of erosion is moderately severe. This soil is suited to most crops commonly grown in the county. Growing crops in a rotation helps to maintain tilth and the organic-matter content. This soil was cleared many years ago and used as open range. At the present time most of this soil is idle, or it has been allowed to revert to brush or woodland. A small area is used for pasture. Capability unit IIIe–2; woodland suitability group 3o1.

Bridgehampton silt loam, graded (Bm).—This soil is made up of Bridgehampton silt loam that has been altered by grading operations for housing developments, shopping centers, and similar nonfarm uses. Slope ranges from 0 to 6 percent.

The profile of this soil is similar to that of the soil described as representative of the series, except that in many places the surface layer and the upper part of the subsoil have been removed. Also, in low spots the original soil has been covered with a thin layer of material, 1 to 2 feet thick, that has been cut from adjoining high spots. The original Bridgehampton soil can be identified because the fill and the cuts are not deep enough to completely destroy the original subsoil and substratum. Because of the thickness of these silty deposits, the soil remaining after grading still has a silt loam surface layer. In many places, the material removed in grading has been replaced, so that texture of the surface layer is similar to that of the original surface layer.

Included with this soil in mapping and making up as much as 25 percent of the unit is Bridgehampton silt loam that has not been graded. Also included, and making up about 15 percent of the unit, is Cut and fill land, some of which is moderately steep and steep.

This Bridgehampton soil is suited to most grasses and shrubs commonly used for lawns and landscaping. Generally, the number of houses at a specific site determines the further uses of this soil. Capability unit not assigned; woodland suitability group not assigned.

Canadice Series

The Canadice series consists of deep, nearly level, poorly drained soils that have a medium-textured surface layer and a moderately fine textured to fine textured subsoil. These soils formed in reddish silty and clayey deposits. Most of these soils are north and west of Greenport in a nearly continuous area of about 450 acres. Isolated spots of these soils are on Gardiners Island and near Sag Harbor. Native vegetation consists of red maple, black gum, highbush blueberry, and a few oaks and beech.

In a representative profile about 4 inches of black organic matter overlies a surface layer of dark-brown silt loam about 4 inches thick. A subsurface layer of gray or light-gray, slightly sticky silt loam and loam extends to a depth of about 18 inches. The upper part of the subsoil, to a depth of about 24 inches, is mottled, gray or light-gray, sticky clay loam. The lower part, to a depth of 50 inches, is reddish-brown, sticky silty clay that contains mottles of gray and strong brown.

These soils have a seasonal high water table. Depth to the water table ranges from about 6 to 18 inches. Permeability is slow in the subsoil. If the water table is low-

ered by drainage, these soils can be used for crops. Reaction is strongly acid to medium acid in the surface layer and medium acid to slightly acid in the subsoil. Natural fertility is medium, which is somewhat higher than that of other soils in the county. The response of crops to lime and fertilizer is good. The root zone is 20 to 25 inches thick. Available moisture capacity is high in the lower part of the root zone.

Representative profile of Canadice silt loam, in a wooded area, between Franklin Avenue and the railroad tracks, one-half mile southwest of Greenport:

O1—4 to 3 inches, loose oak and beech leaves.
O2—3 inches to 0, black (10YR 2/1), partly decomposed organic matter; very heavily matted with roots.
A1—0 to 4 inches, dark-brown (10YR 3/3) silt loam; weak, medium, granular structure; friable; many roots; very strongly acid; clear, wavy boundary.
A21g—4 to 6 inches, gray or light-gray (10YR 6/1) silt loam; massive; slightly sticky; common roots; very strongly acid; clear, irregular boundary.
A22g—6 to 18 inches, gray or light-gray (10YR 6/1) loam; many, medium and coarse, faint, light yellowish-brown and yellowish-brown mottles; massive; sticky; common roots; strongly acid; clear, irregular boundary.
B21t—18 to 24 inches, gray or light-gray (10YR 6/1) clay loam; many, medium, prominent, dark yellowish-brown and strong-brown mottles; very weak, fine, blocky structure; sticky; a few patchy clay films; medium acid; clear, wavy boundary.
IIB22t—24 to 50 inches, reddish-brown (5YR 5/4) silty clay; a few, medium, prominent, gray mottles and a few, medium, distinct, strong-brown mottles; weak, medium, blocky structure; firm; sticky; a few roots; many reddish-gray (5YR 5/2) clay films on ped faces and in pores; a few streaks and pockets of gray sandy and gravelly material; a few black iron concretions; medium acid.

The solum is 40 to 50 inches thick. The content of coarse fragments in the solum is less than 5 percent. Reaction is very strongly acid to medium acid in the A horizon and in the upper part of the B horizon, and it is medium acid to slightly acid in the lower part of the B horizon.

The A1 horizon ranges from black (10YR 2/1) to dark brown (10YR 3/3). It has weak to moderate granular structure. Consistence is friable or very friable. In the A2 horizon color ranges from gray to light gray (10YR 6/1) or light brownish gray (10YR 6/2).

In the B21t horizon color ranges from dark grayish brown (10YR 4/2) to gray or light gray (10YR 6/1). Texture in this horizon ranges from clay loam to silty clay loam. In the IIB22t horizon color ranges from reddish brown (5YR 5/4) to weak red (2.5YR 4/2). Texture ranges from silty clay to silty clay loam.

Canadice soils are redder in the lower part of the B horizon and are more acid throughout the solum than the defined range for the series. These differences do not alter their usefulness or behavior.

Canadice soils are near Walpole and Raynham soils. Canadice soils are similar to those soils in drainage, but they have a higher content of clay and are redder in the lower part of the B horizon than Walpole and Raynham soils.

Canadice silt loam (Ca).—This is the only Canadice soil mapped in the county. It is mainly in one large continuous area near Greenport. Slope is 3 percent or less.

Included with this soil in mapping are small areas of moderately well drained, gently sloping soils that formed in the same kind of material as Canadice soil. Old clay pits are common because this soil provided an excellent source of clay for making bricks.

The hazard of erosion is slight on this soil. The soil must be artificially drained for successful production of commonly grown crops, but a lack of suitable outlets makes artificial drainage difficult. Because of wetness, most areas of this soil have been left as woodland. Capability unit IVw–2; woodland suitability group 5w1.

Carver Series

The Carver series consists of deep, excessively drained, coarse-textured soils. These soils are nearly level to steep and are throughout the county on rolling moraines and broad outwash plains. Slopes range from 0 to 35 percent. Native vegetation is white oak, black oak, scrub oak, and pitch pine.

In a representative profile a thin layer of leaf litter and partly decayed organic matter is on the surface. Below this is the surface layer of dark-gray sand about 3 inches thick. The subsurface layer is gray or light-gray loose sand to a depth of 8 inches. The subsoil is loose sand to a depth of about 22 inches. It is brown in the upper part and strong brown in the lower part. The substratum, to a depth of 60 inches, is loose sand that contains some gravel. It is light yellowish brown to brownish yellow to a depth of 31 inches. Below this, it is light yellowish brown.

Carver soils have very low available moisture capacity. Natural fertility is very low. The response of crops to applications of lime and fertilizer is fair. Permeability is rapid throughout. The root zone is mainly in the uppermost 30 to 40 inches.

Representative profile of Carver sand from an area of Carver and Plymouth sands, 0 to 3 percent slopes, 4.8 miles east of Riverhead on south side of State Route 24 in Southampton:

O1—2 inches to 1 inch, loose hardwood leaves.
O2—1 inch to 0, black mull; a few white sand grains.
A1—0 to 3 inches, dark-gray (10YR 4/1) medium and coarse sand; massive; loose; common roots; very strongly acid; clear, wavy boundary.
A2—3 to 8 inches, gray or light-gray (10YR 6/1) medium and coarse sand; single grain; loose; common roots; dark staining from charcoal left by forest fires; very strongly acid; abrupt, wavy boundary.
B21—8 to 14 inches, brown (7.5YR 5/4) coarse and medium sand; single grain; loose; common roots; very strongly acid; clear, irregular boundary.
B22—14 to 22 inches, strong-brown (7.5YR 5/6) coarse sand; massive to very weak, medium, subangular blocky structure; very friable to loose; common roots; some interfingering of dark-brown material; 5 percent rounded gravel in lower part; very strongly acid; clear, wavy boundary.
C1—22 to 31 inches, light yellowish-brown (10YR 6/4) to brownish-yellow (10YR 6/6) coarse sand; single grain; loose; a few roots; 5 percent rounded gravel; a few yellowish-brown spots; very strongly acid; gradual, wavy boundary.
C2—31 to 60 inches, light yellowish-brown (2.5Y 6/4) coarse sand and a few pebbles; single grain, loose; 10 percent fine gravel; very strongly acid.

The thickness of the solum ranges from 16 to 32 inches. The content of coarse fragments ranges from 0 to 15 percent in the solum and from 5 to 30 percent in the substratum. Reaction ranges from very strongly acid to strongly acid throughout. Texture of the solum ranges from fine sand to coarse sand, but it generally is medium and coarse sand. Consistence ranges from very friable to loose.

The A1 horizon ranges from black (10YR 2/1) to dark gray (10YR 4/1). It is massive or has weak, granular structure. The A2 horizon ranges from gray (10YR 5/1) to light brownish gray (10YR 6/2).

The B horizons range from brown (7.5YR 5/4) to brownish yellow (10YR 6/6). These horizons are single grain or massive to weak granular structure.

The C horizon ranges from yellowish brown (10YR 5/4) to yellow (2.5Y 7/6).

Carver soils are associated with Plymouth soils. Carver soils are similar to Plymouth soils; but they have a prominent A2 horizon, and the upper part of the B horizon is richer in iron and humus. Also associated with Carver soils are Deerfield soils that have a seasonal high water table within a depth of 18 to 24 inches.

Carver and Plymouth sands, 0 to 3 percent slopes (CpA).—These soils are mainly on outwash plains; however, they are also on some flatter hilltops and intervening draws on moraines. A small part of this mapping unit is slightly undulating. This unit can be made up entirely of Carver sand, entirely of Plymouth sand, or of a combination of the two soils.

The Carver soil in this mapping unit has the profile described as representative of the Carver series. The Plymouth soil has a profile similar to the one described as representative of the Plymouth series, except that its texture is sand throughout the profile, rather than loamy sand.

Included with these soils in mapping are small areas of Plymouth loamy sand and areas of loamy sands that have a profile similar to soils of the Carver series. Also included are soils that are like Carver soils that have dark iron and humus coatings on the sand grains in the upper part of the subsoil. Also included are small areas of Haven or Riverhead soils on moraines that have dense cover of vegetation and a complex topography.

The hazard of erosion is slight on the soils in this unit. These soils are droughty. Natural fertility is low.

These soils are not well suited to the crops commonly grown in the county. Because these soils tend to be droughty, lawns and shrub plantings are difficult to establish and maintain. Almost all of this unit has been left in woodland or in brush. Many areas previously cleared for farming are now idle. Most areas in the western part of the county and near the shores of the eastern part of the county are used for housing developments. Capability unit VIIs–1; woodland suitability group 5s1.

Carver and Plymouth sands, 3 to 15 percent slopes (CpC).—These soils are mainly on rolling moraines; however, they are also on the side slopes of many drainage channels on the outwash plains. Individual areas of this mapping unit are large on the rolling topography of the Ronkonkoma moraine, and in these areas slopes are complex. On the outwash plain, this unit is in long, narrow strips parallel to drainageways. This unit can be made up entirely of Carver sand, entirely of Plymouth sand, or of a combination of the two soils.

The Carver soil in this mapping unit has a profile similar to the profile described as representative of that series. The Plymouth soil in this unit has a profile similar to the profile described as representative of the Plymouth series, except that its texture is sand throughout the profile, rather than loamy sand.

Generally included with this unit in mapping are areas of Plymouth loamy sand or loamy coarse sand that are very close to sand in texture. Also included are small areas of Carver and Plymouth sands, 0 to 3 percent slopes. Small areas of these soils on moraines are as much as 25 percent gravel throughout, especially along the crests of low ridges. Also included are soils similar to this Carver soil that have dark iron and humus coatings on the sand grains in the upper part of the subsoil. In the bottom of many closed depressions, these soils have siltier accumulations from adjoining hillsides; and in some places silty lenses are deep into the substratum.

The hazard of erosion is slight to moderate on the soils in this unit. These soils are droughty, and natural fertility is low. In some places, slope is a limitation to use.

These soils are not well suited to crops commonly grown in the county. These sandy soils severely limit installation and maintenance of lawns and landscaping shrubs. Almost all of these soils are in woodland. Many areas in the western part of the county, particularly along the north shore, are used as homesites. Capability unit VIIs–1; woodland suitability group 5s1.

Carver and Plymouth sands, 15 to 35 percent slopes (CpE).—These soils are almost exclusively on moraines except for a few steep areas on side slopes along some of the more deeply cut drainage channels on outwash plains. On morainic landforms these areas are large, and slopes generally are complex, especially on the Ronkonkoma moraine. On the outwash plains the areas are in long, narrow strips parallel to the drainage channels. Some areas are made up entirely of Carver sand, others entirely of Plymouth sand, and still others of a combination of the two soils.

The Carver soil in this mapping unit has a profile similar to the profile described as representative of that series, except that the gravel content is greater, and gravel makes up as much as 15 percent, by volume, of the soil in some places. The Carver soil in this unit generally is a few inches thinner to the substratum than the soil described as representative. The Plymouth soil in this unit is similar to the soil described as representative of the Plymouth series, except that its texture is sand rather than loamy sand. Also, it has a higher content of gravel, and gravel makes up as much as 15 percent, by volume, of the soil in some places.

Included with these soils in mapping are small areas of loamy sand and small areas of Carver and Plymouth sands, 0 to 3 percent slopes, or 3 to 15 percent slopes. Also, on moraines, some areas of this unit contain as much as 30 percent gravel and a few cobblestones. Such areas generally are small and are in a mixed pattern with soils that contain less gravel. Also included are areas of Montauk loamy sand, sandy variant, 15 to 35 percent slopes, that have a weakly developed fragipan or a fragipan that is at a depth of more than about 4 feet. Also included are soils that are similar to Carver soils that have dark iron and humus coatings on the sand grains in the upper part of the subsoil. Also included are small areas of Haven and Riverhead soils that have slopes of more than 15 percent.

The hazard of erosion is moderate to severe on the soils in this unit. These soils are droughty, and natural fertility is low. Moderately steep to steep slopes are a limitation to use.

The soils of this unit are poorly suited to crops commonly grown in the county. Areas of these soils have not been cleared for farming. A few areas in the western

part of the county along the north shore are being used as homesites. Capability unit VIIs–1; woodland suitability group 5s2.

Cut and Fill Land

Cut and fill land is made up of areas that have been altered in grading operations for housing developments, shopping centers, and similar nonfarm uses. Generally, the initial grading consists of cuts and fills for streets or parking lots. During this phase, excess soil material is stockpiled for final grading and topdressing around houses or other buildings.

Areas of Cut and fill land contain deep cuts in or near the sandy substratum of the soil or sandy fills of 28 inches or more. Generally, cuts are so deep or fills so thick that identification of soils by series is not possible. The soil material making up the upper 40 inches of this unit contains as much as 12 inches of sandy loam, loam, or silt loam in some places. The 28 inches that remain are loamy fine sand or coarser textured material. Cut and fill land is generally associated with Carver and Plymouth soils.

The soil material that remains after grading operations are completed has low available moisture capacity, is droughty, and is low to very low in natural fertility.

The areas of Cut and fill land have severe limitations to use in establishing and maintaining lawns and landscaping. The areas are not suited to farming operations because of the alteration of existing soil material and the presence of buildings and other works of man.

Cut and fill land, gently sloping (CuB).—This unit is made up of level to gently sloping areas that have been cut and filled for nonfarm uses. Slopes range from 1 to 8 percent; and because of final grading around houses and other buildings, slopes generally are complex. The areas generally are large, but some areas are about 5 acres in size.

Cut and fill land makes up at least 75 percent of this unit. Texture is dominantly loamy fine sand or coarser textured material throughout. The 25 percent that remains consists of areas of soils of the Carver, Haven, Plymouth, or Riverhead series. The areas of these soils are smaller than 5 acres.

Included with this land type in mapping are small areas of Riverhead and Haven soils, graded, 0 to 8 percent slopes, and small areas that have more than 12 inches of sandy loam, loam, or silt loam in the upper 40 inches.

This land type has few, if any, limitations to use as building sites. Capability unit not assigned; woodland suitability group not assigned.

Cut and fill land, sloping (CuC).—This unit is made up of moderately sloping areas that have been graded for building sites. Slopes range from 8 to 15 percent. Individual areas are generally small, often following the side slopes of drainage channels. The smallest area mapped is 5 acres.

Cut and fill land makes up 60 to 70 percent of this unit. Its texture is dominantly loamy fine sand or coarser textured material. Making up the remaining percentage of this unit are soils of the Carver, Haven, Plymouth, or Riverhead series. Because of moderate slopes on some areas of Riverhead and Haven soils, cuts and fills are deep enough that the soil material that remains after grading is dominantly loamy fine sand, or coarser textured material, throughout the upper 28 inches. For this reason, this unit is as commonly associated with Riverhead and Haven soils as with Carver and Plymouth soils. Grading on these sloping soils generally is restricted to sites for buildings and to areas immediately surrounding the houses.

This land type has limitations for most nonfarm uses because of slope. Capability unit not assigned; woodland suitability group not assigned.

Cut and fill land, steep (CuE).—This unit is made up of moderately steep or steep areas that have been graded for building sites or of areas where excess soil material from excavations has been stockpiled. Slopes range from 15 to 35 percent. The areas of this unit are small. The smallest area mapped is 5 acres.

Cut and fill land makes up 60 to 70 percent of the unit. The remaining 30 to 40 percent is made up of soils of the Carver and Plymouth series. Texture throughout is loamy fine sand or coarser textured material. This unit occurs where deep cuts have been made into hillsides to establish level areas for homesties. The material removed from cuts is used to fill and grade yards. Most areas between building sites are ungraded. Areas that have not been used as homesites are severely limited for most nonfarm purposes because of slope. Capability unit not assigned; woodland suitability group not assigned.

Deerfield Series

The Deerfield series consists of deep, moderately well drained, coarse-textured soils that formed in sand or loamy sand materials over deep layers of sand or sand and gravel. This nearly level soil is throughout the county in depressional areas, or it is adjacent to wetter soils that form the borders around lakes, ponds, or tidal marshes. It is primarily on outwash plain. Native vegetation is white pine, pitch pine, white oak, and red oak and huckleberry bushes.

A representative profile has a thin layer of black organic matter on the surface about 3 inches thick. Below this is a surface layer of gray sand about 6 inches thick. The subsoil, to a depth of about 25 inches, is dark reddish-brown, friable sand in the upper 2 inches. Below this it is olive-yellow and light yellowish-brown, very friable sand. The substratum, to a depth of 53 inches, is light-gray loose sand.

Deerfield soils have very low available moisture capacity in the surface layer and upper part of the subsoil; however, deeper rooted plants can draw moisture from the water table. Permeability is rapid throughout the surface layer and subsoil. A seasonal high water table is at a depth of about 18 to 24 inches. Reaction is strongly acid to very strongly acid throughout. Natural fertility is low. Crop response to applications of lime and fertilizer is fair. The root zone is mainly in the upper 25 to 30 inches.

Representative profile of Deerfield sand, wooded, one-fourth mile north of intersection of Swamp Road and State Route 114, in the Town of East Hampton:

O1—3 to 2 inches, loose hardwood leaves and pine needles.
O2—2 inches to 0, decomposed leaves and twigs; many roots.

A2—0 to 6 inches, gray (10YR 5/1) sand; yellowish-brown (10YR 5/4) vertical streaks; single grain; loose; common roots; very strongly acid; abrupt, wavy boundary.

B21—6 to 8 inches, dark reddish-brown (5YR 3/4), strong-brown (7.5YR 5/6), and dark-brown to brown (7.5YR 4/4) sand; massive; friable; common roots; very strongly acid; abrupt, irregular boundary.

B22—8 to 15 inches, olive-yellow (2.5Y 6/6) sand; common, medium, distinct, dark-brown to brown mottles; massive; very friable; common roots; strongly acid; clear, wavy boundary.

B23—15 to 25 inches, light yellowish-brown (2.5Y 6/4) sand; massive; very friable; a few roots; strongly acid; diffuse boundary.

C—25 to 53 inches, light-gray (2.5Y 7/2) sand; single grain; loose; strongly acid.

The thickness of the solum ranges from 18 to 30 inches. Texture ranges from sand to loamy sand in the solum. In the finer textured part, the solum thickness corresponds with the upper boundary of the underlying coarse sand or stratified sand and gravel. Volume of coarse fragments in the solum is normally less than 5 percent. It ranges from 5 to 35 percent in the substratum. Reaction is very strongly acid to strongly acid throughout. The O horizons range from dark reddish brown (5YR 2/2) to black (10YR 2/1).

A thin, black (10YR 2/1) A1 horizon is present in some profiles. It is dotted with many, clean, white sand grains. The A2 horizon ranges from gray (10YR 5/1) to pinkish gray (5YR 7/2). Where present, the Ap horizon ranges from very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2). It ranges from 8 to 10 inches in thickness.

The B21 horizon ranges from dark reddish brown (5YR 3/3) to strong brown (7.5YR 5/6). There is no mottling in the B21 horizon. Consistence of this horizon is friable, but a few firm lumps are in places. It is massive or single grain. The B22 and B23 horizons are light olive brown (2.5Y 5/4) or brownish yellow (10YR 6/6). These horizons may have a few mottles that have chromas greater than 2. They are single grain or massive.

The C horizon ranges from olive gray (5Y 5/2) to very pale brown (10YR 7/4). In places texture is stratified sand and gravel below a depth of 40 inches.

Deerfield soils are mapped near Atsion and Carver soils, and they are similar to these soils. They are associated with soils of the Wareham series in many places. Deerfield soils have a more weakly formed B21 horizon, a thinner organic surface horizon, and greater depth to the water table than Atsion soils. They are similar to the Carver soils, but they generally have a thicker A2 horizon and a seasonal water table at a depth of 18 to 24 inches. Wareham soils lack horizons of iron and humus accumulations that are present in the Deerfield soils, and they are not as deep to the seasonal high water table.

Deerfield sand (De).—This is the only Deerfield soil mapped in the county. This soil is between areas of somewhat poorly drained soils and well drained or excessively drained soils at slightly higher elevations. Slopes are 3 percent or less and are slightly concave in places. Except for some areas along the south shore, most areas of this soil are small.

Included with this soil in mapping are moderately well drained loamy sand or sand soils that lack a thick, gray subsurface horizon and a horizon of iron and humus accumulation. Also included are small areas of Carver and Atsion soils. The Atsion soils are indicated on the detailed map by conventional symbols for wet spots. Areas of Carver soil that have a seasonal high water table at depths of 40 to 50 inches are included with this unit.

The hazard of erosion is slight. This soil is fairly well suited to crops commonly grown in the country. It is seasonally too wet or too dry in the root zone. Natural fertility is low. Small areas of Deerfield sand have been cleared for farming. Generally this soil has been left in woodland with adjoining areas of wetter soils; however, many areas in the southwestern part of the county have been filled and are used as sites for housing developments. In some places slab-type construction has been used without filling. Capability unit IIIw-3; woodland suitability group 4o1.

Dune Land

Dune land (Du) is made up of mounds or small hills of sand that have been piled up by wind. No soil horizons have formed in this sandy material. This land type is mainly along the barrier beach and the large area of dunes in the vicinity of Napeague and Hither Hills State Park. Smaller areas are along Long Island Sound and the bays at the east end of the Sound. Slope ranges from 1 to 35 percent. Vegetation is sparse in some areas, but other areas have a thick cover of pine.

Included with this land type in mapping are low-lying, nearly level areas between dunes where ground water is at a depth of 18 to 30 inches in places. Also included are a few small, blown-out areas along the north shore. In these places sand dunes have migrated into the woodland surrounding the blowout.

Dune land is suitable only for use as wildlife habitat or recreation. It should be stabilized and left undisturbed to provide protection from storms and high tides. Structures on sand dunes are subject to damage from coastal storms. Capability unit VIIIs–1; woodland suitability group not assigned.

Escarpments

Escarpments (Es) are made up of bluffs that have slopes greater than 35 percent. Most areas are along the north shore, but a few are near Peconic Bay and along the Atlantic coastline near Montauk Point (fig. 12). Areas are also along the coastline of offshore islands.

The soil horizons have not formed in this actively eroding material. Except for a few scattered areas, this unit is devoid of vegetation. Generally the slopes are uniform with very little dissection except on the more resistant material around Montauk Point and on parts of Gardiners Island. Height of the escarpments ranges from about 20 feet to more than 100 feet.

The material in the escarpments is sand along the north shore and sandy loam or loamy sand at Montauk Point. In the northeast and western parts of Gardiners Island, the material contains a fairly high proportion of reddish clay. Many escarpments have large boulders embedded in the soil, which roll to the beach as the escarpment erodes.

Escarpments are used by some species of songbirds. Where possible, slopes should be stabilized to reduce erosion. Capability unit VIIIs–2; woodland suitability group not assigned.

Fill Land, Dredged Material

Fill land, dredged material (Fd), is made up of areas that have been filled with material from hydraulic or mechanical dredging operations. These operations are

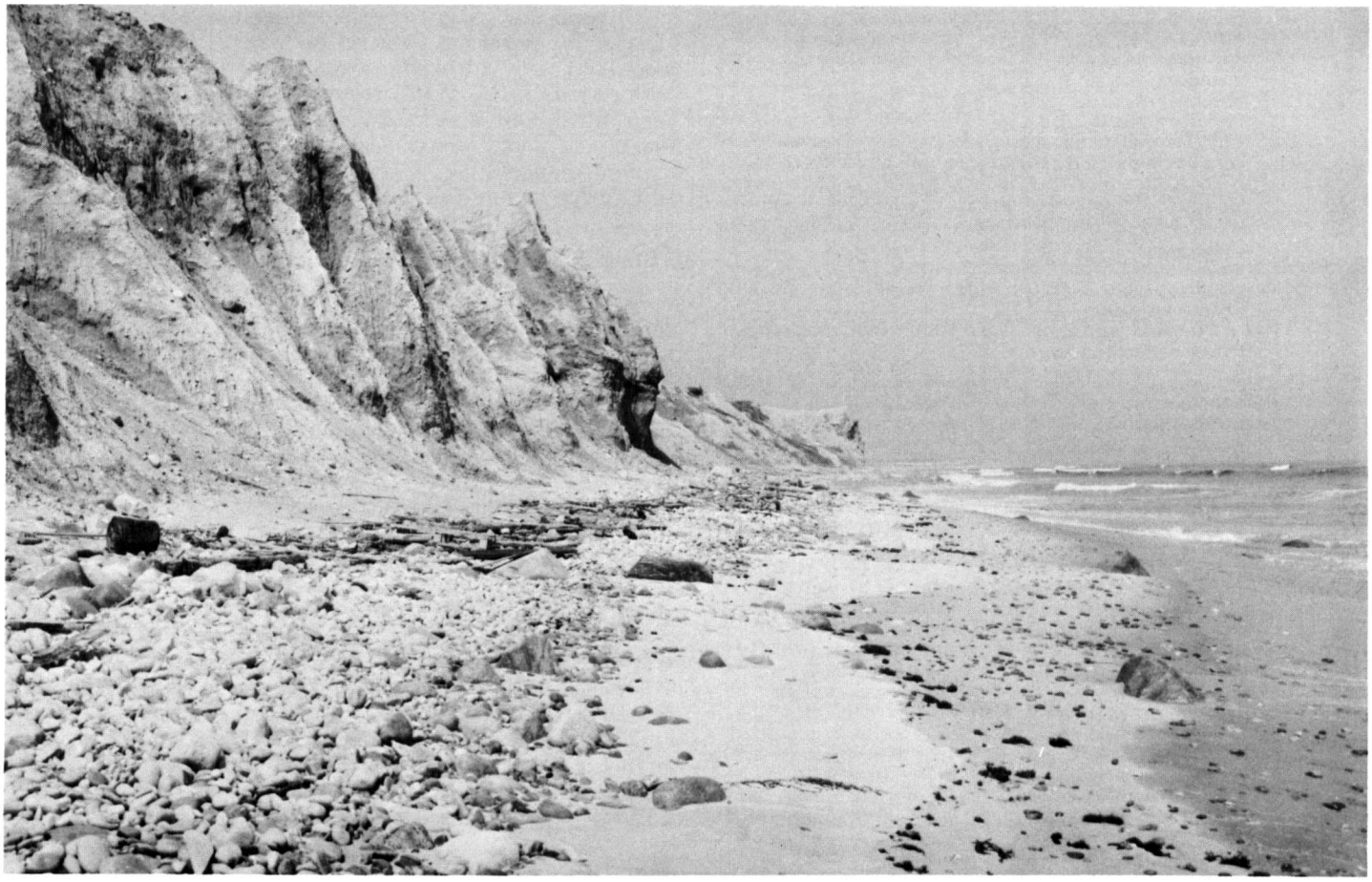

Figure 12.—**Escarpments, nearly vertical and actively eroding, near Montauk Point. The soil material is firm glacial till, such as underlies most soils of the Montauk Point area.**

used mainly to widen or deepen boat channels in salt water; however, some dredged material has been obtained from new channels cut into tidal marshes. Most of the dredged material is pumped onto tidal marshes. Smaller amounts are placed on beaches and dunes and on nearby mineral soils in a few places.

The practice generally is to dike an area by using onsite material. The dredgings are then pumped into the diked area and allowed to settle. Excess water drains back into the bay. After the water drains off, heterogeneous deposits of sand, gravel, and sea shells remain. In many places a dark-gray silty mud remains. Protective dunes have been built with clean sand and gravel dredgings in some places, and in such places a few naturally formed dunes are included in mapping.

Fill land, dredged material, is not suited to farming. Areas are satisfactory for building sites where the fill is adequate and if the highly compressible organic layers in the tidal marshes are removed prior to filling. Areas where the fill is placed on marshes containing thick organic layers are likely to be unstable and need onsite investigation before building on them.

Droughtiness, low fertility, and high salt content severely limit the establishment of lawns and other landscape plantings. Cesspools do not function properly where the ground water is at a shallow depth. Capability unit not assigned; woodland suitability group not assigned.

Fill Land, Sandy

Fill land, sandy (Fs) is made up of areas where sandy fill material has been placed on somewhat poorly drained, poorly drained, or very poorly drained soils to provide building sites. In places thin layers of loam or silt loam soil material are in the sandy fill. The thickness of the fill ranges from about 1½ feet to 20 feet; however, thickness generally is about 4 to 10 feet. Slopes are mostly nearly level, but range to 8 percent where areas are graded around buildings.

The sources of fill material used in this unit are variable; consequently, the fills are a heterogeneous mixture of sand and gravel that contain varying amounts of finer soil material. In places portions of fills have been made by using nonsoil materials.

Included with this land type in mapping are small areas of Atsion, Berryland, Walpole, and Wareham soils and mucks that were not covered in filling operations. Also included are a few areas where this type of fill has been placed on Tidal marshes along the south shore in the towns of Babylon and Islip. The buried organic

layers in such areas are thicker than those in the profile described.

Fill land, sandy is mostly along the waterfront and is used as building sites. It is not suited to most other uses. Onsite investigation is needed to determine the suitability of individual areas for building sites. Because of droughtiness on thicker fills and low fertility of most fill material, limitations are severe on this land type for establishing and maintaining lawns and landscaping. Ground water pollution is a hazard where thinner fills provide little or no filter material between the bottoms of cesspools and the water table. Capability unit not assigned; woodland suitability group not assigned.

Gravel Pits

Gravel pits (Gp) are open excavations that have been made for the purpose of mining sand and gravel. These pits range in depth from 8 or 10 feet to more than 100 feet. The sides of the pits generally are left nearly vertical, and the bottoms are level.

Abandoned pits are not suited to farming. Most of these areas are in a cover of native vegetation. Houses have been built in some of the larger pits. Capability unit not assigned; woodland suitability group not assigned.

Haven Series

The Haven series consists of deep, well-drained, medium-textured soils that formed in a loamy or silty mantle over stratified coarse sand and gravel. These soils are present throughout the county, but most areas are on outwash plains between the two terminal moraines. Slopes range from 0 to 12 percent, but they generally are 1 to 6 percent. Native vegetation consists of black oak, white oak, red oak, scrub oaks, and pitch pine.

In a representative profile a thin layer of leaf litter and decomposed organic matter is on the surface in wooded areas. Below this is the surface layer of dark grayish-brown loam about 3 inches thick. In cultivated areas the surface layer is mixed with the material formerly in the upper part of the subsoil, and a plow layer of brown or dark-brown loam, about 10 inches thick, is present. The subsoil is dark-brown to strong-brown, friable loam to a depth of about 19 inches. The lower part, to a depth of 28 inches, is yellowish-brown, friable gravelly loam. The substratum, to a depth of 55 inches, is yellowish-brown to brownish-yellow loose sand and gravel.

Haven soils have high to moderate available moisture capacity. Reaction is strongly acid to very strongly acid throughout. Natural fertility is low. The response of crops to lime and fertilizer is good. Internal drainage is good. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. The root zone is 25 to 35 inches thick.

Representative profile of Haven loam, 0 to 2 percent slopes, in a wooded area, on Gerrard Road, 1½ miles north of Sunrise Highway in Brookhaven:

O1—3½ to 1½ inches, loose pine needles, leaves, and twigs.
O2—1½ inches to 0, black (5YR 2/1) humified organic material.
A1—0 to 3 inches, dark grayish-brown (10YR 4/2) loam; weak, fine and medium, granular structure; friable; many fine and coarse roots; many pores; very strongly acid; abrupt, smooth boundary.
B21—3 to 10 inches, brown to dark-brown (7.5YR 4/4) loam; weak, fine and medium, subangular blocky structure; friable; common roots; many pores; a few root channels filled with dark grayish-brown loam; very strongly acid; clear, wavy boundary.
B22—10 to 19 inches, strong-brown (7.5YR 5/6) loam; weak, fine and medium, subangular blocky structure; friable; common roots; many pores; 5 percent gravel ¼ to ½ inch in diameter; very strongly acid; gradual, wavy boundary.
B23—19 to 28 inches, yellowish-brown (10YR 5/6) gravelly loam; weak, medium and fine, subangular blocky structure; friable; a few fine roots; 20 percent fine gravel; very strongly acid; abrupt, wavy boundary.
IIC—28 to 55 inches, yellowish-brown (10YR 5/4) to brownish-yellow (10YR 6/6) gravelly sand; single grain; loose; 30 percent gravel ¼ to 1 inch diameter; very strongly acid.

Depth to strongly contrasting sand and gravel ranges from 18 to 36 inches, depending on the thickness of the solum. The content of gravel ranges from 2 to 15 percent in all horizons above any B23 or IIB3 horizons that are present. Reaction is strongly acid or very strongly acid throughout.

In the Ap horizon color ranges from very dark grayish brown (10YR 3/2) to brown or dark brown (10YR 4/3). In the Al horizon color ranges from dark grayish brown (10YR 4/2) to black (10YR 2/1). The Ap horizon has weak or moderate granular structure. It commonly has a firm, platy plowpan in the lower part. If a plowpan is present in the Ap horizon, the material above the plowpan is friable or very friable. The Ap horizon is 8 to 12 inches thick. In places accumulated A horizons range from 12 to 30 inches in thickness.

In the B21 and B22 horizons color ranges from brown or dark brown (7.5YR 4/4) to light olive brown (2.5Y 5/6). The texture of these horizons ranges from very fine sandy loam to silt loam. It is massive or structure is weak, subangular blocky. Consistence is very friable or friable. Where a B23 horizon is present, it has the same range of characteristics as the B21 and B22 horizons, except that the content of gravel ranges from 15 to 35 percent.

In the strongly contrasting IIC horizon, color ranges from yellowish brown (10YR 5/4) to olive yellow (2.5Y 6/6). This horizon is coarse or medium sand, and typically is stratified. The content of gravel is 10 to 50 percent.

In places is a transitional B3 or IIB3 horizon that ranges from sandy loam to gravelly sand in texture. It is 2 to 5 inches thick. The content of coarse fragments in this horizon ranges from 1 to 20 percent.

Haven soils are near Riverhead, Scio, Bridgehampton, and Montauk soils. Haven soils are similar to Riverhead soils, but they have less sand in the B2 horizon. They are similar to Scio soils, but lack the colors that indicate wetness in those soils. They are similar to Bridgehampton soils, but have a thinner solum, are less silty, and lack the bisequum color profile of the Bridgehampton soils. They are similar to Montauk soils, but lack the fragipan and the till substratum typical of those soils.

Haven loam, 0 to 2 percent slopes (HaA).—This soil has the profile described as representative of the series. It is mostly nearly level and generally is on outwash plains. Some areas of this soil are on moraines and generally are on the top of low-lying hills. Some of these areas are slightly undulating. Most areas of this soil are large, but on moraines the areas are smaller and are irregular in shape.

Included with this soil in mapping are small areas of Scio soils and some crescent-shaped, gravelly areas. Also included are soils that have a moderately coarse textured surface layer and a medium-textured subsoil. In many areas of this soil that are mapped in association with

Bridgehampton soils, the soil is deeper and siltier than that described as representative of the series. Bridgehampton soils generally are included in mapping in these areas. Also included, on moraines, are areas of Montauk soils that have a very weak fragipan. Montauk soils formed in loose, sandy till.

The hazard of erosion is slight on this Haven soil. Primary management concerns are keeping the soil from crusting after rain, maintaining tilth, and reducing the plowpan.

This soil is used extensively for crops, and it is well suited to all crops commonly grown in the county. Potatoes are the main crop, but cauliflower, cabbage, corn, onion, and sod crops are also grown. Because of the nearly level slope and ease of excavation, most areas of this soil in the western part of the county are being used for housing developments and industrial parks. Capability unit I–1; woodland suitability group 3o1.

Haven loam, 2 to 6 percent slopes (HaB).—This soil is on outwash plains and moraines, commonly along shallow, intermittent drainage channels. Slopes are short. In larger areas this soil is mostly undulating. Most areas of this soil are smaller than the areas of Haven loam, 0 to 2 percent slopes.

In cultivated areas this soil is 2 or 3 inches shallower to sand and gravel than the soil described as representative of the series, and it contains a larger amount of gravel. Otherwise the two profiles are similar.

Included with this soil in mapping are small areas of Riverhead and Bridgehampton soils, some of which are in a complex pattern with the dominant Haven soil. These included soils generally are in the larger areas of this soil. Also included are Montauk silt loams that have a very weak fragipan. In places areas of this soil that are mapped near Montauk soils have layers of till deep in the substratum. Also included are areas along the bottom of narrow drainage channels that have a silty surface layer that is thicker than that in the profile described.

The hazard of erosion is moderate to slight on this Haven soil. Management concerns are controlling runoff and erosion and keeping the surface loose and free from crusting.

This soil is well suited to all crops commonly grown in the county. It generally is farmed the same as adjoining areas of nearly level soils. Crops commonly grown are potatoes, cauliflower, cabbage, and corn. Most areas in the western part of the county are used for housing developments. Capability unit IIe–1; woodland suitability group 3o1.

Haven loam, 6 to 12 percent slopes (HaC).—This soil is on moraines where slopes generally are complex or on the short side slopes along drainage channels. Areas on moraines are large and are irregular in shape. Areas on outwash plains are long and narrow and follow drainage channels that cut into the plains.

The profile of this soil is similar to that of the soil described as representative of the series, except that in cultivated areas this soil is 5 or 6 inches shallower to sand and gravel and contains more gravel.

Included with this soil in mapping are small areas of Bridgehampton silt loam, 6 to 12 percent slopes. Most of these areas are north of Scuttlehole Road and Millstone Road in Southhampton. Also included are narrow areas of Haven soils that have a thick surface layer. These areas are along the bottom of intermittent drainage channels. Included on moraines are small areas of Riverhead soils that are in a complex with the dominant Haven soils or have textures that are transitional. Montauk silt loams that have a very weakly expressed fragipan are also included. In places, in areas that are mapped adjacent to Montauk soils, this Haven soil has layers of till deep in the substratum.

The hazard of erosion is moderate to severe on this Haven soil. In places small gravelly areas limit the growing and harvesting of some truck crops.

This soil is suited to potatoes and to most crops commonly grown in the county, but only a small acreage is in potatoes. This soil is better suited to hand-harvested crops or to crops that can be planted and harvested by small machines. Some areas are used for crops, but most areas that were formerly cultivated have now reverted to grass or brush. In the western part of the county, most areas adjoining large residential areas of less sloping soils are being used as homesites. Capability unit IIIe–2; woodland suitability group 3o1.

Haven loam, thick surface layer (He).—This soil is mainly on outwash plains throughout the county. It occupies the bottom of the larger drainage channels or closed depressions where silty material has accumulated from surrounding areas. Slope is less than 3 percent. Areas of this soil generally are quite small. They are mostly long and narrow, but in closed depressions the areas are nearly round.

This soil has the profile described as representative of the series, except that the content of organic matter in the surface layer increases with depth, and the surface layer ranges from about 12 to 30 inches in thickness. Also, in most places the surface layer contains more silt than the soil described as representative of the series, and in some places the subsoil is loam or silt loam.

Included with this soil in mapping are small areas of soils that have a surface layer less than 1 foot thick or more than 2½ feet thick. These included soils are on the same landform and in close association with this soil. Also included are small areas of Scio soils, on the wetter sites, and areas of coarser textured soils that have thick accumulations on the surface. Areas of somewhat poorly drained or wetter soils are shown on the map by the conventional symbol for wet spots.

The hazard of erosion is slight on this Haven soil, except where the soil receives large amounts of water from adjoining sloping soils. Summer crops in closed depressions are damaged if heavy rain falls during the growing season.

Most areas of this soil are well adapted to most crops commonly grown in the county. In closed depressions, however, wheat and rye are frequently damaged by ponding. Areas of this soil generally are used along with adjoining areas of Haven, Bridgehampton, and Riverhead soils. Most areas are cleared and are used for crops or, in the western part of the county, for homesites. Capability unit IIw–2; woodland suitability group 3o1.

Made Land

Made land (Ma) is made up of areas that are mostly covered with pieces of concrete, bricks, trash, wire, metal, and other nonsoil material. Some areas are on the surface of the original soil, others are in large holes dug for disposal purposes, and still others are in old gravel pits converted to this use. Included with this unit in mapping are sanitary landfills that have been excavated and subsequently filled with trash and garbage. After these areas are filled, they are covered with several feet of soil material. Capability unit not assigned; woodland suitability group not assigned.

Montauk Series

The Montauk series consists of deep, well drained to moderately well drained, moderately coarse textured to medium-textured soils that formed in fine sandy loam or in a mantle of silt loam and loam. These soils have a fragipan over a compact firm glacial till. They are on terminal moraines and have the topography characteristic of this landform. Slope ranges from 0 to 15 percent, but it generally is 3 to 15 percent. In many places slopes are complex and characterized by closed depressions. Native vegetation is white oak, red oak, and scarlet oak.

In a representative profile, in wooded areas, the surface layer is brown to dark-brown fine sandy loam about 2 inches thick. In cultivated areas the surface layer is mixed with material formerly in the upper part of the subsoil, and a plow layer of brown to dark-brown fine sandy loam, about 9 inches thick, is present. The subsoil is yellowish-brown, friable to very friable fine sandy loam to a depth of about 27 inches. The lower part is a dark-brown to reddish-brown sandy loam fragipan to a depth of about 40 inches. It is firm and brittle, and the content of gravel is 5 to 10 percent. The substratum, to a depth of about 60 inches, is reddish-brown to dark-brown loamy sand that is firm and brittle.

Montauk soils have moderate to high available moisture capacity. Permeability is moderate to moderately rapid in the surface layer and in the upper part of the subsoil and moderately slow in the fragipan and underlying till. On lower slopes the seasonal water table rises to within 2 or 3 feet of the surface. Crop response is good to applications of lime and fertilizer; however, natural fertility is low. Reaction is strongly acid to very strongly acid throughout. The root zone is mainly in the upper 25 to 35 inches.

Representative profile of Montauk fine sandy loam, 3 to 8 percent slopes, in a wooded area, 0.3 mile north of Stephan Hands Path in East Hampton:

A1—0 to 2 inches, brown to dark-brown (10YR 4/3) fine sandy loam; very weak, fine, granular structure; very friable; many fine and common coarse roots; less than 1 percent fine gravel; strongly acid; abrupt, smooth boundary.

B21—2 to 17 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, medium, subangular lumps that parts to weak, fine, granular; very friable; a few fine and coarse roots; many pores; less than 5 percent gravel; very strongly acid; clear, smooth boundary.

B22—17 to 27 inches, yellowish-brown (10YR 5/6) fine sandy loam (slightly heavier than that in B21 horizon); very weak, medium, subangular blocky structure that parts to weak, medium, platy in the lower 2 inches; friable; a few fine and coarse roots; many pores; less than 5 percent gravel; strongly acid; abrupt, smooth boundary.

B'x—27 to 40 inches, brown to dark-brown (7.5YR 4/4) to reddish-brown (5YR 4/4) sandy loam; very weak, thick, platy structure; firm, brittle; a few fine roots; many fine pores; 5 to 10 percent gravel; a few patchy clay films; strongly acid; clear, wavy boundary.

IICx—40 to 60 inches, reddish-brown (5YR 4/4) to brown or dark-brown (7.5YR 4/4) loamy sand; light-brown (7.5YR 6/4) splotches; massive; firm, brittle; a few fine roots; many fine pores; 5 to 10 percent gravel; strongly acid.

The solum is 23 to 40 inches thick. The gravel content ranges from 0 to 20 percent throughout the upper part of the solum and from 5 to 35 percent in the fragipan and underlying till. In some places, the soil contains boulders that are 10 inches to 5 feet in diameter. Reaction is strongly acid to very strongly acid throughout.

The A1 horizon ranges from very dark brown (10YR 2/2) to brown or dark brown (10YR 4/3). Texture ranges from silt loam to fine sandy loam. Structure is weak to moderate, granular. Consistence is friable to very friable.

In plowed areas, the Ap horizon is very dark grayish brown (10YR 3/2) to brown or dark brown (10YR 4/3). It is 6 to 11 inches thick. Texture range in this horizon is the same as that in the A1 horizon.

The B2 horizon ranges from brown or dark brown (7.5YR 4/4) to yellowish brown (10YR 5/6). Layers or pockets of gray silty material are common in the lower part of the B horizon in places where the upper part of the surface of the IICx horizon is wavy or irregular. Texture of the B2 horizon ranges from loam to sandy loam. The B22 horizon is massive or the structure is weak subangular blocky, and a few weak plates are in the lower part. Consistence is friable or very friable. The B'x horizon is mainly 7.5YR or 10YR in hue, but ranges from reddish brown (5YR 4/3) to light olive brown (2.5Y 5/6). Texture ranges from fine sandy loam to loamy sand.

The IICx horizon has the same color range as the B'x horizon. It generally is massive but has weak, platy structure in the lower part. Consistence is firm and brittle. Texture is the same as for the B'x horizon. In some profiles firm or very firm, dark-reddish, horizontal bands about one-half inch thick and spaced 5 to 8 inches apart are in the IICx horizon. These bands are more prominent in profiles that have weakly developed fragipans. Silt caps, 2 to 5 millimeters thick, generally are on the upper part of the surfaces of stones and gravel in the IICx horizons. Thickness of the till ranges from 2 to 15 feet.

Montauk soils are near the sandy variants of Montauk soils, and Haven and Riverhead soils. Montauk soils have the same substratum material as Montauk, sandy variant soil, but they are finer textured throughout the solum. Montauk soils are similar to Haven and Riverhead soils, but they have a fragipan and till substratum, rather than a loose sand and gravel substratum that is characteristic of the latter soils.

Montauk fine sandy loam, 0 to 3 percent slopes (MfA).—This soil is on less sloping areas of moraines. The areas are small and make up a very small part of the total acreage in the county. The largest area is in North Haven.

Included with this soil in mapping are small areas of Riverhead soils or areas that have very weakly developed fragipans that intergrade to soils of the Riverhead series. Till layers are at a depth of more than 4 feet in some of the intergrading soils. Also included are Montauk soils that have a sandy loam surface layer and subsoil and small areas of Montauk, sandy variant soils, that range from sandy loam to loamy sand.

The hazard of erosion is slight on this Montauk soil. It is limited only by moderate droughtiness in the moderately coarse textured solum.

This soil is well suited to all crops commonly grown in the county. In the area in the village of North Haven, the soil was formerly cleared and farmed, but now most areas are idle or are used as homesites. Capability unit IIs–1; woodland suitability group 3o1.

Montauk fine sandy loam, 3 to 8 percent slopes (MfB).—This soil has the profile described as representative of the series. It is on moraines, and in many places slopes are complex or undulating. Most areas are of medium size.

Included with this soil in mapping are areas of Montauk fine sandy loam, 0 to 3 percent slopes and 8 to 15 percent slopes, that are too small to map separately. Also included are Riverhead soils and sandy loam soils, more than 4 feet deep, that are in a complex pattern with this soil. In such areas the fragipan is very weak, which indicates an intergrade between Montauk and Riverhead soils. Also included are areas of Montauk soils that contain 15 to 30 percent gravel in the solum or areas that are sandy loam throughout.

The hazard of erosion is moderate to slight on this Montauk soil. If this soil is used for crops, controlling runoff and erosion, providing suitable outlets for the removal of excess surface water, and providing adequate moisture supplies are the main concerns of management.

This soil is well suited to all crops commonly grown in the county. Where this soil is around the foot slopes of higher landforms, the seasonal high water table rises to within 2 or 3 feet of the surface. This condition is particularly common near Montauk Point where extensive till layers impede water infiltration. A few areas of this soil have been cleared and are used for farming. Most areas are in woodland or are idle and reverting to brush, because they are associated with areas that are not well suited to intensive cultivation. Capability unit IIe–2; woodland suitability group 3o1.

Montauk fine sandy loam, 8 to 15 percent slopes (MfC).—This soil is on moraines. It has an uneven surface and many kettle holes that are characteristic of this landform. Areas of this soil are medium to large in size.

The profile of this soil is similar to the one described as representative of the series, but in cultivated areas this soil generally is 6 to 8 inches shallower than the soil in the profile described, because of erosion losses. In these areas the gravel content of the surface layer is greater than that in the representative profile.

Included with this soil in mapping are small areas of Montauk soils, 3 to 8 percent slopes, that are generally in a complex pattern with this soil, Montauk sandy loams that have thin sand layers between the solum and till substratum, and Montauk soils that have a sandy loam texture throughout. Riverhead soils that have till layers below 4 feet are also included in mapping. Also included are small, severely eroded spots of Montauk soils along draws in cultivated fields.

The hazard of erosion is moderately severe on this Montauk soil. Slopes limit the use of large farm machinery and make applications of irrigation water difficult. If this soil is farmed, intensive measures to control erosion are needed to limit runoff and to reduce losses from erosion.

This soil is suited to all crops commonly grown in the county. Most of this soil, except near Montauk Point, is wooded. Most areas near Montauk Point are idle or are growing up in brush. Because of the esthetic value of rolling soil and good tree growth, many areas are being used as homesites. Capability unit IIIe–1; woodland suitability group 3o1.

Montauk silt loam, 0 to 3 percent slopes (MkA).—This soil is on the flatter broad ridgetop areas of moraines. Areas of this soil generally are in the western part of the county near Dix Hills and Huntington. This soil is also in a few places on Shelter Island and near Montauk Point. The surface is slightly undulating in places. Areas of the soil are medium to large in size.

The profile of this soil is similar to the profile of the soil described as representative of the series, except that texture of the surface horizon is silt loam and texture of the underlying horizons is loam. Also, in many places in the western part of the county, the content of silt and clay in the till layers is greater than it is in the representative profile. Gray spots and streaks are more common in the lower part of the subsoil than in the profile of the representative soil. Areas near Montauk Point have darker surface horizons, which indicates a higher content of organic matter.

Included with this soil in mapping, particularly near Huntington, are small areas of Haven soils, 0 to 2 percent slopes, that are in a complex pattern with this Montauk soil. Also included are soils that have a reworked till substratum that tends to be friable, but it is not as loose and does not drain as freely in the substratum as the Haven soils. Also included are areas of Montauk fine sandy loam soils that are marginal to this soil in texture. Soils in which the solum above the fragipan is silt loam are also included.

The hazard of erosion is slight on this Montauk soil. This soil is well suited to all crops commonly grown in the county. Most of this soil is cleared for farming, but only a few areas are used for crops. Housing developments are being built on most areas in the western part of the county. Capability unit I–1; woodland suitability group 3o1.

Montauk silt loam, 3 to 8 percent slopes (MkB).—This gently sloping to undulating soil is on moraines. Most areas are in the western part of the county south of Huntington, in the eastern parts of Shelter Island, and at Montauk Point. Areas of this soil are medium to large in size.

The profile of this soil is similar to the one of the soil described as representative of the series, except that the surface layer is silt loam, and the underlying layers are loam. The underlying till in areas near Huntington contains more silt and clay than the till in the eastern parts of the county. This soil also contains more gray streaks in the lower part of the subsoil than the soil described as representative of the series. On Montauk Point this soil has a thicker, darker surface layer than the soil described as representative, which indicates a higher organic-matter content. In cultivated areas this soil is 6 to 8 inches shallower to compact, firm glacial till than in the soil described as representative, and it contains more gravel.

Included with this soil in mapping are small areas of Haven soils that are in a complex pattern with this Montauk soil. The underlying till layers in this soil

likely underlie the adjoining Haven soils. Also included are soils that are similar to Haven soils, except that they have a reworked loamy sand till substratum. Also included are soils that have a silt loam subsoil above the fragipan.

The hazard of erosion is moderate to slight on this Montauk soil. This soil is well suited to all crops commonly grown in the county. In areas that are farmed, the main concern of management is the control of runoff and erosion. A few areas are cleared for farming, but most areas are idle and are in brush and trees, or they are used as homesites. Capability unit IIe–1; woodland suitability group 3o1.

Montauk silt loam, 8 to 15 percent slopes (MkC).—This soil is on rolling moraines where many kettle holes or closed depressions dot the landscape. It is mainly in the area between Montauk and Montauk Point. Slopes are complex in many places. Areas of this soil are medium to large in size.

The profile of this soil is similar to the profile described as representative of the series, except that the surface layer is silt loam and the subsoil texture is loam. In areas near Montauk Point, the surface layer is darker than the surface layer of the soil described as representative because of a higher content of organic matter. In cultivated areas this soil is several inches shallower to compact glacial till than the soil described as representative of the series, and it has a higher content of gravel.

Included with this Montauk soil in mapping are small areas of Montauk silt loam, 3 to 8 percent slopes, that generally are in a complex pattern with this soil. Also included are small areas of Haven soils that in places have a loose loamy sand substratum that has thin, firm layers or bands that restrict water movement. These soils are intergrades between Haven and Montauk soils. They are included in mapping with the soil of this unit rather than with Haven soils that overlie loose, stratified sand and gravel. Also included are soils in which the subsoil is silt loam above the fragipan. Small spots, severely eroded in cultivated fields, that contain 20 to 25 percent gravel are included. Small areas near Montauk Point have many boulders on the surface.

The hazard of erosion is moderately severe on this Montauk soil. This soil is suited to all crops commonly grown in the county. If this soil is cultivated, measures are needed to help to control erosion.

A few areas near Montauk are in old grassland, and they are idle and slowly growing up in brush. Most other areas are wooded or are used as sites for housing developments. Capability unit IIIe–2; woodland suitability group 3o1.

Montauk soils, graded, 0 to 8 percent slopes (MlB).—This mapping unit consists of areas of Montauk fine sandy loam, of Montauk silt loam, or of both. The areas have been altered by grading and are used for housing developments, shopping centers, industrial parks, or similar nonfarm purposes. These are nearly level and gently sloping soils.

In most places the surface layer and the upper part of the subsoil have been removed, stockpiled, and partly replaced during grading operations, but the profile of these soils otherwise is similar to that of the soil described as representative of the Montauk series.

Included with these soils in mapping are areas of ungraded Montauk fine sandy loam or Montauk silt loam that are less than 5 acres in size. As much as 25 percent of this unit is made up of either of these soils. Also included are small areas that have cuts and fills that are so deep that positive identification of either of these two soils is impractical or impossible. These areas make up 10 to 15 percent of the mapping unit. In places where these soils grade to Riverhead and Haven soils, graded, 0 to 8 percent slopes, or to Cut and fill land, gently sloping, small areas of the latter units are included in mapping.

These soils are suited to most grasses and shrubs commonly grown for lawns and landscaping. Areas that are very deeply cut or filled are droughty in some places and require irrigation water. The remaining till substratum is the main feature affecting the use of these soils for most nonfarm uses. Generally, the presence of or the extent of developments are the determining factors for use of these areas. Capability unit not assigned; woodland suitability group not assigned.

Montauk soils, graded, 8 to 15 percent slopes (MlC).—This mapping unit consists of areas of Montauk fine sandy loam, of Montauk silt loam, or of both. These areas have been altered by grading and are used as building sites for homes. They are small and generally are along the side slopes of drainageways. Slopes are complex.

These soils have a profile similar to that of the soil described as representative of the series, except that the surface layer and part of the subsoil have been removed during grading operations. The cut material is stockpiled and then partly replaced, but not to the extent that this is done in less sloping areas. Also, more cut material is used to fill natural irregularities in the landscape than on Montauk soils, graded, 0 to 8 percent slopes. In these areas, the lower part of the subsoil and the substratum generally are left intact; consequently, they can be included in the Montauk series.

Included with these soils in mapping are areas of ungraded Montauk fine sandy loam or Montauk silt loam that are less than 5 acres in size. As much as 25 to 30 percent of this unit is made up of either of these soils. Also included are small areas that have cuts and fills that are so deep that positive identification of either of the two soils is impractical or impossible. These areas make up 15 to 20 percent of this soil. In places where the areas merge with areas of Riverhead and Haven soils, graded, 8 to 15 percent slopes, or with Cut and fill land, sloping, small areas of these units are included in mapping.

The hazard of erosion is severe on these soils unless a cover of plants is established. The soils of this unit are suited to most grasses and shrubs commonly used for lawn and landscaping. Areas that are deeply cut or filled generally are droughty, and natural fertility is low. These areas need irrigation water and heavy applications of lime and fertilizer. Slope and moderately slow permeability are the main factors that limit the use of areas on which houses have not been built. Generally, the number of existing houses determines the use that can be made of these areas. Capability unit not assigned; woodland suitability group not assigned.

Montauk Series, Sandy Variants

The sandy variants of the Montauk series are made up of deep, excessively drained, coarse-textured soils that contain a fragipan over firm glacial till. This soil is mainly on the Ronkonkoma moraine east of the Shinnecock Canal. The largest areas are between East Hampton and Springs. Other large areas are on Montauk Point and Shelter Island. Slopes range from 0 to 35 percent, and they generally are complex on all areas except the nearly level areas. Native vegetation is white oak, red oak, and some scarlet oak.

In a representative profile the surface layer in wooded areas is very dark grayish-brown loamy sand about 3 inches thick. In cultivated areas the surface layer is mixed with material formerly in the upper part of the subsoil, and there is a brown or dark-brown plow layer of loamy sand about 10 inches thick. The subsoil is friable or very friable, yellowish-brown to dark yellowish-brown loamy sand to a depth of about 34 inches. The till substratum, to a depth of about 60 inches, is dark yellowish-brown, firm loamy sand.

Montauk, sandy variant soils have very low to low available moisture capacity above the fragipan. Permeability is rapid in the upper 18 to 36 inches, moderately slow in the fragipan, and moderate in the till. Moderately slow permeability in the fragipan slows the rapid downward movement of water. Reaction is strongly acid to very strongly acid throughout. Crop response to applications of lime and fertilizer is fair to moderate. Natural fertility is low. The root zone is mainly in the upper 25 to 35 inches.

Representative profile of Montauk loamy sand, sandy variant, 0 to 3 percent slopes, in a wooded area, town borrow pit 0.3 mile southeast of Three Mile Harbor Road and 0.2 mile northeast of Manor Lane in East Hampton:

A1—0 to 3 inches, mixed, very dark grayish-brown (10YR 3/2) and light brownish-gray (10YR 6/2) loamy sand; single grain; very friable; many fine and coarse roots; very strongly acid; abrupt, smooth boundary.

B21—3 to 19 inches, yellowish-brown (10YR 5/6) loamy sand; single grain in coarse lumps; very friable; common coarse and fine roots; less than 5 percent fine gravel; ¼ to ½ inch strong-brown (7.5YR 5/6) layer at top of horizon; strongly acid; clear, smooth boundary.

B22—19 to 24 inches, yellowish-brown (10YR 5/6) and dark yellowish-brown (10YR 4/4) loamy sand; single grain in coarse lumps; friable; a few roots; 5 to 10 percent gravel; strongly acid; clear, smooth boundary.

Bx—24 to 34 inches, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/6) loamy sand; strong-brown (7.5YR 5/6) splotches; massive; firm in place, friable and brittle when removed; a few roots; 10 to 15 percent gravel; a few thin clay films; strongly acid; clear, smooth boundary.

Cx—34 to 60 inches, dark yellowish-brown (10YR 4/4) loamy sand; streaks of yellowish red (5YR 4/6) and strong brown (7.5YR 5/6); massive; firm in place, friable and brittle when removed; 10 to 15 percent gravel; strongly acid.

The solum is 24 to 40 inches thick. The content of coarse fragments ranges from 5 to 20 percent in the upper part of the solum to as much as 35 percent in the fragipan. A few boulders as large as 5 feet in diameter are on the surface and in the regolith. Reaction in the profile ranges from strongly acid to very strongly acid throughout. Mineralogy is dominantly quartz. Thin micropodzols generally are in the upper 2 to 3 inches of the solum.

The A horizon ranges from very dark grayish brown (10YR 3/2) to brown or dark brown (10YR 4/3). It is single grain (structureless) or structure is weak granular; consistence ranges from friable to very friable. Where the Ap horizon is present, it ranges from 8 to 12 inches in thickness.

The B21 and B22 horizons range from yellowish brown (10YR 5/6) to brown or dark brown (7.5YR 4/4). Texture ranges from loamy sand to sand. They are single grain or the structure is weak, subangular blocky or weak granular. Consistence ranges from friable to very friable. In places a layer of loose sand 6 to 12 inches thick is between the lower part of the B22 horizon and the till layer.

The Bx horizon ranges from reddish brown (5YR 4/3) to light olive brown (2.5Y 5/6), but hues are mainly 10YR or 7.5YR. In places the Bx horizon contains strong-brown or reddish-brown horizontal streaks, ¼ inch to ¾ inch thick, that are firm or very firm. In many places streaks are near pockets or lenses of pale-brown coarser material. Texture of the Bx horizon is loamy sand or sand. This horizon is massive or the structure is weak platy. Consistence ranges from firm to friable. Where consistence is friable, bands or streaks that have the characteristics of a fragipan are throughout the horizon. Most pebbles in the fragipan have silt caps 1 to 2 millimeters thick on the upper part of the surfaces. The color and texture range in the Cx horizon are the same as in the Bx horizon.

The till generally ranges from 2 to 18 feet in thickness, but it is more than 65 feet thick in some areas. It is over loose sand and gravel.

Montauk, sandy variant soils are associated with Carver, Montauk, and Plymouth soils. They are similar to Plymouth soils, except that they are over firm till rather than coarse sand and gravel. Montauk, sandy variant soils lack the loose sandy substratum, the thick light-gray to gray A2 horizon, and the iron-enriched B21 horizon of Carver soils. Their texture is coarser in the upper part of the solum than in Montauk soils. Montauk, sandy variant soils have the same kind of substratum as Montauk soils.

Montauk loamy sand, sandy variant, 0 to 3 percent slopes (MnA).—This soil has the profile described as representative for the series. It is on the nearly level ground moraine in the Springs area northeast of East Hampton. Some areas of this soil are slightly undulating. The areas vary in size, but most areas are large.

Included with this soil in mapping are areas that intergrade between this soil and Plymouth soils. The soils in these areas have a weak fragipan. Because they have thin, brittle layers, water movement is more restricted than in the representative Plymouth soil. Also included are Montauk sandy variant soils that contain 15 to 25 percent gravel and cobblestones in the surface layer and the subsoil. Areas that have many boulders on the surface are indicated on the detailed map by the conventional symbol for stoniness.

The hazard of erosion is slight on this Montauk sandy variant. Irrigation water is needed to maintain an adequate moisture level, and large quantities of lime and fertilizer are needed to increase fertility.

This soil is moderately well suited to crops commonly grown in the county. Most of this soil is wooded, and most of the cleared areas are growing up in trees. The largest remaining cleared areas are near Springs, and they are used mainly for pasture. Much of this soil provides building sites for summer homes, because it is near large bodies of water. Capability unit IIIs-1; woodland suitability group 4s1.

Montauk loamy sand, sandy variant, 3 to 8 percent slopes (MnB).—This soil is on gently sloping hillsides and

gently undulating moraines. Areas are narrow and long on short side slopes along drainage channels. Areas that have complex slopes make up the larger acreages.

Included with this soil in mapping are areas of soils that have a weak fragipan. These soils are similar to Plymouth soils, except that they have firm bands in the substratum. Also included are areas that have a fragipan at a depth of more than 40 inches and areas that contain as much as 25 percent gravel and cobblestones. Very stony or stony areas are indicated on the detailed map by the conventional symbol for stoniness.

The hazard of erosion is slight on this Montauk sandy variant. This soil is moderately well suited to the crops commonly grown in the county. The main concerns of management are droughtiness and low fertility. Most of this soil is wooded, but a few areas are cleared and are used for pasture or homesites. Capability unit IIIs–1; woodland suitability group 4s1.

Montauk loamy sand, sandy variant, 8 to 15 percent slopes (MnC).—This unit is on moraines along drainage channels and on large areas of complex, undulating to rolling topography where the dominant slope is 8 to 15 percent.

The profile of this soil is similar to the one described as representative for the series, except that it has more gravel in the upper 2 feet in some areas.

Included with this soil in mapping are areas that have a weak fragipan that intergrade to soils of the Plymouth series. Also included are sandy soils without stones that are underlain by till. These small included areas appear to be aeolian in nature and are scattered throughout the unit. Also included on complex slopes are a few areas of Montauk loamy sand, sandy variant, 3 to 8 percent slopes.

The hazard of erosion is moderate to severe in areas that are cleared for cultivation. This soil is not well suited to most crops commonly grown in the county, because slopes are steep, available moisture capacity is low or very low, and fertility is low. Growing crops in longer rotations helps to control runoff and erosion. Almost all of this soil is in woodland. A few areas are used as sites for summer homes. Capability unit IVs–1; woodland suitability group 4s1.

Montauk loamy sand, sandy variant, 15 to 35 percent slopes (MnE).—This soil is on the complex topography of the moraine on the eastern end of the south fork. Most areas of this soil are large. Only a few small areas have simple slopes. Deep kettle holes and low steep-sided ridges and mounds are characteristic in areas of this soil.

The profile of this soil is similar to the profile of the soil described as representative of the series, except expression of the fragipan is variable. Also, more areas of this soil contain as much as 15 percent coarse fragments, and more boulders are on the surface of this soil, especially east of Montauk.

Included with this soil in mapping are Montauk and Bridgehampton, till substratum soils that have slopes of more than 15 percent. These soils are underlain by till, and they make up less than 5 percent of the unit. Also included are many small areas of Carver, Plymouth, and Riverhead soils that are too small to map separately. In places these soils have till below a depth of 4 feet. Small knobs, ridges, and hogbacks included with this unit contain from 15 to 30 percent gravel and cobblestones. These gravelly areas generally are small, and they are in a complex pattern with nongravelly soil. Small areas of gently sloping and moderately sloping Montauk sandy variant soils are also included.

The hazard of erosion is moderate to severe on this Montauk sandy variant. This soil is not suited to crops commonly grown in the county, because of steepness of slope and droughtiness. This soil is suited to woodland, and most of it is used for that purpose. A few less sloping areas are used as sites for homes. Capability unit VIIs–1; woodland suitability group 4s2.

Muck

Muck (Mu) is made up of very poorly drained organic soils that formed in partly decomposed or almost completely decomposed woody or herbaceous plants. The areas generally are nearly level and occur in the bottom of closed depressions or kettle holes and along a few of the larger streams. Most areas are along the Peconic River and near Montauk in many depressions that are irregular in shape. A few areas, however, are between tidal marshes and areas of better drained upland soils.

Muck is made up of 16 to 48 inches of spongy, black or dark-reddish organic material over loose sand and gravel. The amount of partly decayed plants in the organic layer varies. The water table is at or near the surface most of the year. Several inches of water are on the surface late in winter and in spring.

Included with this land type in mapping are small areas that are muck to a depth of more then 48 inches and a few areas of fresh-water marsh along the Peconic River that are under water throughout the year.

Muck is suited to cranberries in some places; however, most areas are small, and it is not economically feasible to develop them. Almost all of this land type is in woodland or marsh grass. It is better suited to habitat for wetland wildlife than to other uses. Capability unit VIIw–1; woodland suitability group not assigned.

Plymouth Series

The Plymouth series consists of deep, excessively drained, coarse-textured soils that formed in a mantle of loamy sand or sand over thick layers of stratified coarse sand and gravel. These nearly level to steep soils are throughout the county on broad, gently sloping to level outwash plains and on undulating to steep moraines. Native vegetation consists of white oak, black oak, pitch pine, and scrub oak.

In a representative profile the surface layer is very dark grayish-brown loamy sand, about 4 inches thick, in wooded areas. In cultivated areas the surface layer is mixed with material formerly in the upper part of the subsoil, and there is a brown to dark-brown plow layer of loam about 10 inches thick. The subsoil is yellowish-brown and brown, very friable and loose loamy sand to a depth of about 27 inches. The substratum, to a depth of about 58 inches, is yellowish-brown, loose gravelly coarse sand.

Plymouth soils have low to very low available moisture capacity. Natural fertility is low. The response of

crops to lime and fertilizer is fair. Reaction is strongly acid to very strongly acid throughout the profile of most of these soils, but it is strongly acid to medium acid in the lower substratum of soils in the silty substratum phase. The root zone is confined mainly to the upper 25 to 35 inches. Internal drainage is good. Permeability is rapid in all of these soils except in those of the silty substratum phase. Permeability is moderate in the silty layer of soils in the silty substratum phase.

Representative profile of Plymouth loamy sand, 0 to 3 percent slopes, in a wooded area, in Heckscher State Park:

A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) loamy sand; very weak, medium, granular structure; very friable; many fine roots; 5 percent fine gravel; many clean white sand grains; very strongly acid; clear, wavy boundary.

B21—4 to 10 inches, yellowish-brown (10YR 5/4) loamy sand; single grain to very weak, medium, subangular blocky structure; very friable; common roots; 5 percent fine gravel; material similar to that in the A1 horizon makes up 20 percent of the mass; very strongly acid; gradual, wavy boundary.

B22—10 to 17 inches, yellowish-brown (10YR 5/6) loamy sand; single grain; loose; common roots; 5 percent fine gravel; very strongly acid; gradual, wavy boundary.

B23—17 to 27 inches; brown (7.5YR 5/4) loamy sand; single grain; very friable; a few roots; 10 percent gravel; very strongly acid; clear, wavy boundary.

IIC—27 to 58 inches, yellowish-brown (10YR 5/6) gravelly coarse sand; single grain; loose; a few very fine roots; 30 percent rounded pebbles 1 inch and less in diameter; very strongly acid.

The solum in uneroded profiles ranges from 20 to 36 inches in thickness and corresponds with the depth to underlying coarse sand and gravel. The content of gravel or boulders in the solum ranges from about 2 to 20 percent, by volume. The content of gravel and cobblestones in the substratum ranges from 10 to 40 percent, by volume. Reaction ranges from strongly acid to very strongly acid.

The A1 and Ap horizons range from very dark grayish brown (10YR 3/2) to brown or dark brown (7.5YR 4/2). In undulating areas a thin, light-colored, weak A2 horizon is present below the A1 horizon in some profiles. Texture in the A horizon ranges from sand to loamy sand and gravelly loamy sand. It is massive or the structure is weak or very weak granular. Consistence is very friable or loose. The Ap horizon, if present, ranges from 8 to 12 inches in thickness.

The B horizon ranges from dark yellowish brown (10YR 4/4) to strong brown (7.5YR 5/6). Texture ranges from sand to loamy sand and loamy fine sand, and in some places, it is gravelly. It is single grain or has very weak, subangular, blocky structure; the latter is in profiles that have higher proportions of fine and very fine sand. Consistence ranges from friable to loose. In places a coarse sand or loamy coarse sand B3 horizon is present and ranges from 4 to 7 inches in thickness.

The C horizon ranges from yellowish brown (10YR 5/6) to light yellowish brown (2.5Y 6/4). Texture is mainly gravelly coarse sand or coarse sand, but in some areas silt loam layers are below a depth of 40 inches to a depth of 5 to 8 feet. Pebbles in the C horizon generally range from ½ inch to 3 inches in diameter, but a few cobblestones are present in some profiles.

Plymouth soils are near Carver, Deerfield, Haven, Riverhead, Wareham, and Montauk loamy sand, sandy variant soils. Plymouth soils are similar to these soils. Plymouth soils are mapped as an undifferentiated unit with Carver soils. They are similar to Carver soils in texture, but Plymouth soils lack the leached A2 horizon and the B21 horizon, made up of iron and humus accumulation, of Carver soils. Plymouth soils contain more sand in the solum than the Riverhead and Haven soils, and they lack the seasonal high water table that is characteristic of Deerfield and Wareham soils. Plymouth soils lack the fragipan and till substratum of Montauk, sandy variant soils.

Plymouth loamy sand, 0 to 3 percent slopes (PlA).—This soil has the profile described as representative of the series. It is mainly on outwash plains south of the Ronkonkoma moraine. It is also on flat hilltops and in drainageways on morainic deposits. The areas generally are nearly level, but they are somewhat undulating in some places. Areas on outwash plains are large and uniform, and areas on the moraine are small and irregular.

Included with this soil in mapping are small areas of Riverhead soils that have a texture that is marginal to loamy sand. Also included are some loamy sands that have a profile similar in appearance to the soils of the Carver series. On moraines, scattered areas of Montauk sandy variant soils that have a weak fragipan and loose underlying till layers are included. These areas intergrade between Plymouth loamy sands and Montauk loamy sand, sandy variants. In the larger areas of this unit, small acreages of Carver and Plymouth sands are included. Scattered throughout the county and on Fishers Island are areas that are dominantly fine sand.

The hazard of erosion is slight on this Plymouth soil. This soil is fairly well suited to crops commonly grown in the county. Many areas were formerly cleared for farming, but most of these areas are idle or are in brush or trees. Small areas that are in large tracts with Riverhead or Haven soils are the only areas used for farming. In the western part of the county, most of this soil is used for housing developments and as industrial sites. Capability unit IIIs–1; woodland suitability group 4s1.

Plymouth loamy sand, 3 to 8 percent slopes (PlB).—This soil is on moraines and outwash plains. Slopes are undulating, or they are single along the sides of intermittent drainageways. The undulating areas generally are large. The areas along intermittent drainageways are narrow and long, and they follow the course of the drainage channel.

Included with this soil in mapping are small areas of Riverhead soils that are marginal to loamy sand in texture. Also included are loamy sands that have profiles similar to those of soils in the Carver series. Other inclusions on moraines are Montauk loamy sand, sandy variant soils that have a weak fragipan or areas that are too small to map separately. These are intergrades between Plymouth loamy sand and Montauk loamy sand, sandy variant soils. Small gravelly areas less than about 2 acres in size are included. Included are a few small areas, particularly on Fishers Island, that are dominantly fine sand.

The hazard of erosion is slight on this Plymouth soil. This soil tends to be droughty.

This soil is fairly well suited to the crops commonly grown in the county. Some areas were formerly used for farming, but most such areas are in brush or are idle. In the western part of the county, this soil is used mainly for housing developments. Capability unit IIIs–1; woodland suitability group 4s1.

Plymouth loamy sand, 8 to 15 percent slopes (PlC).—This moderately sloping soil is on moraines and outwash plains. Where it occurs on moraines, slopes are rolling in many places, and the surface is broken by closed depressions. On outwash plains this soil is on the short side slopes along intermittent drainageways. Areas on

moraines are fairly large, but most other areas are small and long and narrow.

The profile of this soil is similar to that described as representative for the series, except that in places it is a few inches shallower to coarse sand and gravel and contains as much as 15 percent gravel. The more gravelly areas generally are along the crests of low ridges on moraines.

Included with this soil in mapping on moraines are small areas of Plymouth loamy sand, 3 to 8 percent slopes, and small areas of Riverhead sandy loam that is marginal to loamy sand in texture. Also included are areas of Montauk loamy sand, sandy variant, soils that have a weak fragipan or that are in small areas that are scattered throughout areas of this Plymouth soil. Such areas intergrade between Plymouth loamy sand and Montauk loamy sand, sandy variant soils. Areas of Plymouth soil, on ridges and hogbacks on moraines, that contain 15 to 35 percent gravel are included.

The hazard of erosion is moderate to severe because of slope and the sandy texture of this soil. A cropping system that includes several years of close-growing crops is necessary to provide adequate protection from erosion. Slope and droughtiness are the main limitations on this soil for most nonfarm uses.

This Plymouth soil is not well suited to crops commonly grown in the county. Most of this soil is wooded. Small acreages are cleared and are farmed with adjoining areas of level or gently sloping soils. Such areas are used mainly for growing grasses, but some areas are idle. Where extensive excavating is not needed, some areas are used for estate-type housing developments. Capability unit IVs–1; woodland suitability group 4s1.

Plymouth gravelly loamy sand, 3 to 8 percent slopes, eroded (PmB3).—This gently sloping, gravelly soil is throughout the county. It is generally on short slopes along drainage channels in cultivated fields. In most places, the areas are small and slopes are uniform.

This soil has a profile that differs from that of the soil described as representative of the series in that it is shallower to loose sand and gravel. It generally is less than 12 to 14 inches thick. In addition, the material in the solum is 15 to 20 percent rounded gravel, by volume, because of the loss of the finer soil particles. All the surface soil and much of the subsoil have been lost through erosion.

Included with this soil in mapping are small areas of gravelly Riverhead and Haven soils that have been severely damaged by erosion. In these areas the plow layer is sandy loam.

The hazard of further erosion is slight to moderate on this Plymouth soil. These areas show signs of moisture deficiency after short periods of dry weather sooner than the less eroded Plymouth soils.

This soil is not suited to farming, because of the loss of most of the original soil and extreme droughtiness, though small areas in large tracts of tillable land are farmed with the deeper, less eroded Plymouth soils. At one time most of the areas were cleared, but accelerated erosion severely damaged this soil. Most of this soil is no longer used for farming, except where it is mixed with other soils. Capability unit VIIs–1; woodland suitability group 5s1.

Plymouth gravelly loamy sand, 8 to 15 percent slopes, eroded (PmC3).—This moderately sloping soil is throughout the county, but it generally is on short slopes along drainage channels that have been cleared for cultivation. In most places the areas are narrow and long, and they are parallel to the adjoining drainageways.

The profile of this soil differs from the profile of the soil described as representative of the series in that all the surface soil and a large part of the subsoil have been lost through erosion. In addition, this soil is shallower to loose sand and gravel; the gravel content of the remaining solum ranges from 15 to 35 percent, by volume, and the solum is only 10 to 12 inches thick because of accelerated erosion.

Included with this soil in mapping are small areas of moderately sloping Riverhead soils that have been severely damaged by erosion. In many places the plow layer of these soils is coarse sandy loam. Also included are small areas of severely eroded Plymouth soils that have a plow layer of gravelly loamy sand over a coarse sand and gravel substratum.

The hazard of further erosion is moderate to severe on this Plymouth soil. In the small areas that are farmed, crops show signs of severe moisture deficiency after short periods of dry weather.

This soil is not suited to crops commonly grown in the county because of damages from past erosion and extreme droughtiness of the remaining soil. In places, however, small areas of this soil that adjoin less sloping soils are farmed the same way as soils that are better suited to crops. At one time this soil was farmed, but as erosion damages increased, most areas were left idle, and the soil grew up in grasses or brush. Capability unit VIIs–1; woodland suitability group 5s1.

Plymouth loamy sand, silty substratum, 0 to 3 percent slopes (PsA).—This nearly level Plymouth soil is almost exclusively on outwash plains between Sagaponack and East Hampton. It generally is associated with Bridgehampton soils, and it exists as a transition to the coarser textured Carver and Plymouth soils. The elevation of this soil is slightly higher than that of the adjoining Bridgehampton soils.

The uppermost 40 inches of this soil is similar to that of the soil described as representative of the series, except that the solum contains more fine sand. Below about 40 inches, the substratum is silt loam. The silty substratum is almost identical with the olive and strong-brown silty subsoil that is characteristic of soils of the Bridgehampton series. Below a depth of 5 to 8 feet, the substratum, like that in the representative profile, is sand and gravel. This soil has few or no coarse fragments in the surface layer, in the subsoil, and in the upper part of the substratum.

Included with this soil in mapping are areas that are sandy loam in the surface layer and in the upper part of the subsoil and loamy sand in the lower part of the subsoil above the silty substratum. Also included are areas that have Plymouth sand overlying the silty layers. In many places depth to the silty layers is as much as 5 feet, and in other places the silty layers are at a depth of 30 to 40 inches.

The hazard of erosion is slight for this Plymouth soil. This soil is more droughty than adjoining areas of Bridgehampton soils.

This soil is better suited to most crops than the soil described as representative of the series because of the higher available moisture capacity of the silty layer that supplies moisture to deep-rooted crops. About half of this soil has been cleared and farmed with adjacent areas of Bridgehampton silt loams. The rest of it is used as woodland or for pasture and hay. Most areas that are farmed are used for potatoes, corn, and similar crops. Capability unit IIs–1; woodland suitability group 4s1.

Plymouth loamy sand, silty substratum, 3 to 8 percent slopes (PsB).—This soil is on outwash plains between Sagaponack and East Hampton, on some areas of less sloping morainic deposits at North Haven, and along shallow drainageways. Slopes are undulating in many places. This soil is associated with Bridgehampton soils. It commonly is between Bridgehampton soils and nearby areas of Carver and Plymouth soils.

The surface layer and subsoil of this soil are similar to those described as representative of the Plymouth series, except that they contain a somewhat larger amount of fine sand, and below a depth of 40 inches, the substratum is silt loam. The silty substratum is similar to the olive and strong-brown silty subsoil that is characteristic of the soils of the Bridgehampton series. Below a depth of 6 to 8 feet, the substratum of this soil, like that in the representative profile, is sand and gravel. This soil has few or no coarse fragments in the surface layer, in the subsoil, or in the silty substratum.

Included with this soil in mapping are soils in which the surface layer and upper part of the subsoil are sandy loam, but the lower part of the subsoil is loamy sand. Also included are areas in which the material over the silty substratum is sand. Also included are areas where the silty substratum is at a depth of 30 to 40 inches and occurs in a mixed pattern with thicker soil.

The hazard of erosion is slight in this Plymouth soil. Because of the slope lateral movement of moisture above the substratum tends to make this soil almost as droughty as Plymouth loamy sand, 3 to 8 percent slopes.

This soil is only fairly well suited to crops commonly grown in the county because of droughtiness. Most of this soil is in woods or grassland. Small acreages inside large tracts of Bridgehampton soils are used for potatoes, corn, and similar crops. Capability unit IIIs–1; woodland suitability group 4s1.

Raynham Series

The Raynham series consists of deep, poorly drained to somewhat poorly drained, medium-textured soils that formed in loam, very fine sandy loam, or silt loam. This soil generally is around tidal marshes and creeks of the south shore and in areas around the headwaters of the Peconic River. Slopes are less than 3 percent, and in many places, the areas are concave. Native vegetation consists of red maple and blackgum and high bush blueberry. Some white oak and pitch pine also grow.

In a representative profile in a wooded area, a thin cover of organic matter overlies a surface layer of very dark gray loam about 1 inch thick. In cultivated areas the surface layer is mixed with material from the upper part of the subsoil, forming a very dark grayish-brown plow layer of loam that is about 8 inches thick. The subsoil to a depth of about 10 inches is mottled gray or light-gray, friable loam. Below, to a depth of about 40 inches, it is mottled light-gray to gray, friable silt loam. The substratum, to a depth of about 51 inches, is mottled greenish-gray, friable silt loam.

These soils have a seasonal high water table 6 to 18 inches below the surface. Permeability is moderate in the surface layer and subsoil and moderately slow in the substratum. Available moisture capacity is moderate to high in the root zone, which is restricted mainly to the upper 18 to 24 inches. Natural fertility is low; however, the response of crops to applications of lime and fertilizer is good. Reaction is strongly acid to very strongly acid throughout.

Representative profile of Raynham loam, in a wooded area, on the William Floyd Parkway, one-fourth mile north of entrance to Brookhaven National Laboratory:

O2—1 inch to 0, black mull.
A1—0 to 1 inch, very dark gray (5YR 3/1) loam; weak, fine, granular structure; very friable; many roots; strongly acid; abrupt, wavy boundary.
B1g—1 to 5 inches, gray or light-gray (10YR 6/1) loam; a few, fine, distinct, pale-olive mottles; weak, medium, subangular blocky structure; friable; common to many roots; a few fine pores; strongly acid; clear, wavy boundary.
B21g—5 to 10 inches, light-gray (10YR 7/1) loam; many (45 percent) medium, distinct, light yellowish-brown mottles in ped interiors; weak, coarse, prismatic structure; friable; common fine roots; a few fine pores; a few fine quartz pebbles; strongly acid; clear, wavy boundary.
B22g—10 to 20 inches, light-gray (N 7/0) silt loam; many, medium, distinct, horizontally elongated, light yellowish-brown mottles; weak, coarse, prismatic structure; friable; a few fine roots; a few fine quartz pebbles; strongly acid; gradual, wavy boundary.
B23g—20 to 40 inches, light-gray to gray (N 6/0) silt loam ped surfaces; common to many, medium, distinct, yellowish-brown mottles; strong, coarse, prismatic structure that parts to coarse, blocky; friable; many fine roots on ped surfaces; a few fine pores; silt coats, 3 to 8 millimeters thick, that extend to a depth of 27 inches on prisms; dark grayish-brown (10YR 4/2) root stains on silt coats of peds; strongly acid; clear, wavy boundary.
C—40 to 51 inches, greenish-gray (5G 6/1) silt loam; a few, medium, distinct, olive mottles; massive; friable; nonsticky and nonplastic; strongly acid.

The solum thickness ranges from 16 to 40 inches. Depth to underlying sand and gravel ranges from about 40 to 60 inches. The solum generally does not have coarse fragments, but the B horizon has as much as 10 percent fine gravel in places. Reaction in the solum ranges from strongly acid to very strongly acid. The O horizon ranges in thickness from 1 to 8 inches.

The Al horizon ranges from black (5YR 2/1) to dark grayish brown (10YR 4/2). Structure ranges from weak blocky to weak granular, and consistence ranges from friable to very friable. In cultivated areas an Ap horizon ranges from very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2). This horizon ranges in thickness from 7 to 12 inches.

The B horizon ranges from brown or dark brown (10YR 4/3) to light gray (N 7/0). It contains common to many grayish-brown to pale-olive mottles. Texture ranges from very fine sandy loam to loam or silt loam. Structure ranges from weak to strong prismatic to weak subangular blocky.

The C horizon ranges from greenish gray (5G 6/1) to light brownish gray (2.5Y 6/2). Texture is mainly silt loam, but ranges to loam. This horizon contains thin lenses of sandy loam, loamy sand, or sand.

In Suffolk County Raynham soils are more acid and are grayer in the solum than the defined range for the series.

These differences do not seriously alter their usefulness and behavior.

Raynham soils are associated with Scio and Walpole soils. They are similar to Scio soils in texture, but they have a higher seasonal water table and are more poorly drained, as is indicated by the grayer color in the solum. Also, Raynham soils lack the till substratum of some of the Scio soils, and they are thicker over sand and gravel than the sandy substratum phase of Scio soils. The B horizon of Raynham soils contains more silt and very fine sand than that of Walpole soils. Although Raynham soils are not associated with Wallington soils, the two are similar, but Raynham soils lack the fragipan and the compact till substratum of Wallington soils.

Raynham loam (Ra).—This is the only Raynham soil mapped in the county. This nearly level soil is in low-lying areas beside marshes and creeks. In many places it forms a transition between poorly drained areas and better drained areas on uplands. It is on outwash plains and moraines. Areas generally are small and irregular.

Included with this soil in mapping are wet spots of Berryland soils and a very poorly drained silt loam soil. Also included are soils that have a water table at a similar depth as Raynham soils, but they lack the gray color of Raynham soils, have a slightly coarser subsoil, and have sand and gravel below a depth of 30 inches.

The hazard of erosion is slight on this Raynham soil. If this soil is used for farming, artificial drainage is needed.

This soil is not well suited to crops commonly grown in the county unless it is artificially drained. Because of its position on the landscape, it is difficult to locate adequate drainage outlets. Near Southhampton, small areas of this soil were formerly cleared and used for crops, but most of these areas are idle and are in brush. Most of the other areas of this soil are wooded. This soil is better suited to woodland and to recreational areas than to other uses. In places, areas of this soil have been filled and used as homesites. As demand for building lots increases, more areas will be filled for use as building sites. Capability unit IIIw–1; woodland suitability group 4w1.

Recharge Basin

Recharge basin (Rc) is made up of basins that vary in size or of dugouts that have been dug into a porous sand and gravel substratum. These basins provide for the disposal of surface water by acting as catchments and by allowing the water to infiltrate the sand and gravel and recharge the ground water supply. Recharge basins are used to catch runoff from areas such as highways (fig. 13), housing developments, or parking lots.

Small basins less than 2 acres in size are indicated on the detailed map by a spot symbol, and basins larger than 2 acres are delineated and identified by the symbol Rc. Capability unit not assigned; woodland suitability group not assigned.

Riverhead Series

The Riverhead series consists of deep, well-drained, moderately coarse textured soils that formed in a mantle of sandy loam or fine sandy loam over thick layers of coarse sand and gravel. These soils occur throughout the county in rolling to steep areas on moraines and in level to gently sloping areas on outwash plains. These soils range from nearly level to steep; however, they generally are nearly level to gently sloping. Native vegetation consists of black oak, white oak, red oak, and scrub oak.

In a representative profile the surface layer is brown to dark brown sandy loam about 12 inches thick. The upper part of the subsoil, to a depth of about 27 inches, is strong-brown, friable sandy loam. The lower part of the subsoil is yellowish-brown, very friable loamy sand to a depth of about 32 inches. Below is yellowish-brown, friable gravelly loamy sand to a depth of about 35 inches. The substratum is very pale brown and brown loose sand and gravel or sand to a depth of 65 inches.

Riverhead soils have moderate to high available moisture capacity. Internal drainage is good. Permeability is moderately rapid in the surface layer and in the subsoil and very rapid in the substratum. Natural fertility is low. Reaction is strongly acid to very strongly acid throughout. The response of crops to lime and fertilizer is good. The root zone is mainly in the upper 25 to 35 inches. In many places where these soils have been farmed, a plowpan is in the lower part of the surface layer and in the upper part of the subsoil.

Representative profile of Riverhead sandy loam, 0 to 3 percent slopes, 0.9 mile south of State Route 25, 0.3 mile north of junction of County Road 21 and Longwood Road in Brookhaven, "Camp Wilderness, Boy Scouts of America":

Ap—0 to 12 inches, brown to dark-brown (10YR 4/3) sandy loam; weak, fine, granular structure; friable; many fine roots in upper part; moderate to strong, platy, firm plowpan in lower 4 inches; strongly acid; abrupt, smooth boundary.

B2—12 to 27 inches, strong-brown (7.5YR 5/6) sandy loam; very weak, medium, subangular blocky structure that parts to weak, fine granular; friable; a few fine roots; many fine pores; less than 5 percent gravel; strongly acid; clear, wavy boundary.

B31—27 to 32 inches, yellowish-brown (10YR 5/4) loamy sand; very weak, fine, granular structure; very friable; a few fine roots; 10 percent gravel; strongly acid; abrupt, smooth boundary.

IIB32—32 to 35 inches, yellowish-brown (10YR 5/4) gravelly loamy sand; massive; friable; a few fine roots; 30 percent gravel; strongly acid; abrupt, smooth boundary.

IIIC1—35 to 40 inches, brown to dark-brown (7.5YR 4/4) sand; single grain; loose; 10 percent fine gravel; strongly acid; abrupt, smooth boundary.

IIIC2—40 to 65 inches, very pale brown (10YR 7/4) coarse and medium sand that contains 2-inch layers of gravel, 8 to 24 inches apart; single grain; loose; strongly acid.

The solum ranges from 22 to 36 inches in thickness. It corresponds in depth to the upper boundary of the underlying coarse sand and gravel. The content of gravel or stones ranges from 2 to 15 percent, by volume, in the upper part of the solum and from 5 to 35 percent in the substratum. The content of gravel in the solum is higher in soils that have a thin solum. In places the solum is more than 30 inches thick, and streaks and pockets of olive-gray colors are present immediately above the sand or sand and gravel substratum. Reaction ranges from strongly acid to very strongly acid throughout.

In places these soils have an Ap horizon that ranges from very dark grayish brown (10YR 3/2) to brown or dark brown (10YR 4/3). The A1 horizon ranges from black (10YR 2/1) to dark grayish brown (10YR 4/2).

The B horizon ranges from brown or dark brown (7.5YR 4/4) to light olive brown (2.5Y 5/6). Texture is dominantly sandy loam, but it ranges to fine sandy loam. Structure is massive, or very weak subangular blocky. Consistence ranges from friable to very friable.

Figure 13.—Recharge basin that catches runoff from adjoining highway. Water comes into the basin through the pipe at the back corner.

Many Riverhead soils have a thin loamy sand horizon in the lower part of the B horizon. This horizon has the same color range as the upper part of the B horizon, and it is as much as 35 percent coarse fragments.

The C horizon ranges from brown or dark brown (7.5YR 4/4) to yellow (2.5Y 7/6). Texture is sand or sand and gravel, and it is generally stratified.

Riverhead soils are near Haven, Plymouth, Sudbury, and Walpole soils. Riverhead soils are sandier throughout the solum than Haven soils, and they are less sandy throughout the solum than Plymouth soils. Sudbury soils are moderately well drained, and Walpole soils are somewhat poorly drained or poorly drained.

Riverhead sandy loam, 0 to 3 percent slopes (RdA).—This soil has the profile described as representative of the series. It generally is on outwash plains, and the areas are large and uniform. Where this soil occurs on outwash plains, it generally has slope characteristics of this landform. Slopes are undulating in places. A few small, irregular areas are on moraines.

Included with this soil in mapping are small areas of Sudbury soils that are less than 1 to 2 acres in size. Also included are areas of soils near Bridgehampton that have a profile similar to that of this soil, except that at a depth of about 30 inches they have layers of gray and strong-brown silt loam 1 to 2 feet thick. Also included are areas of Haven and Plymouth soils that have a texture marginal to sandy loam and areas of soils that have a loam or fine sandy loam surface layer and a sandy loam subsoil. Areas of Montauk soils on moraines that have a very weak fragipan formed in loose sandy till are included.

The hazard of erosion is slight on this Riverhead soil. This soil is limited only by moderate droughtiness in the moderately coarse textured solum. It tends to develop a plowpan if it is intensively farmed.

This soil is well suited to all crops commonly grown in the county, and it is used extensively for that purpose. Most areas in the western part of the county, however,

are used for housing developments and industrial parks. Capability unit IIs–1; woodland suitability group 3o1.

Riverhead sandy loam, 3 to 8 percent slopes (RdB).—This soil is on moraines and outwash plains. It generally is in areas along shallow, intermittent drainageways. Slopes generally are moderately short, but large areas on moraines are undulating.

The profile of this soil is similar to the one described as representative of the series, though in cultivated areas this soil is likely to be 2 to 3 inches shallower to coarse sand and gravel, and the surface layer is likely to contain a slightly larger amount of gravel.

Included with this soil in mapping are small areas of Bridgehampton, Haven, and Plymouth soils in a complex pattern. The texture of these soils is marginal to sandy loam. These included soils generally are on large separations. Near Bridgehampton are included areas of Riverhead soils that have gray and strong-brown silt loam layers at a depth of 26 to 30 inches. Also included are narrow strips of Haven loam, thick surface layer, along intermittent drainageways, and soils that have a surface layer of loam or fine sandy loam and a subsoil of sandy loam. Included with this soil on moraines are Montauk soils that have a very weak fragipan that formed in loose, sandy till.

The hazard of erosion is moderate to slight on this Riverhead soil. The main concerns of management are controlling runoff and erosion and providing adequate moisture.

This soil is well suited to all crops commonly grown in the county, and it is used mainly for this purpose. Most areas in the western part of the county, however, are used for housing developments and as industrial sites. Capability unit IIe–2; woodland suitability group 3o1.

Riverhead sandy loam, 8 to 15 percent slopes (RdC).—This soil is in narrow bands on outwash plains along the side slopes of deep, intermittent drainageways. Slopes are short. On the Harbor Hill moraine and on the Ronkonkoma moraine east of the Shinnecock Canal, the areas of this soil are larger than in other places in the county and they generally are rolling.

The profile of this soil is similar to the one described as representative of the Riverhead series, but in cultivated areas this soil generally is 3 to 4 inches shallower to coarse sand and gravel, and it is as much as 15 percent gravel, by volume.

Included with this soil in mapping are eroded and gravelly areas too small to map separately. Also included in a complex pattern with this Riverhead soil are Haven and Plymouth soils that have a texture marginal to sandy loam. These soils generally are in large separations on moraines. Along the bottom of intermittent drainageways, strips of Haven loam, thick surface layer, that are too narrow to map separately are also included. Other inclusions are Montauk soils that have a very weak fragipan that formed in loose sandy till and some areas that have a sand and gravel substratum, 1 to 2 feet thick, underlain by till at a depth of more than 42 inches.

The hazard of erosion is moderately severe on this Riverhead soil. Controlling erosion is the main concern of management. This soil is limited by droughtiness and by the difficulty of applying irrigation water. The response of crops to applications of lime and fertilizer is good. Slope limits the use of large farm machines.

This soil is suited to crops commonly grown in the county; however, the hazard of erosion reduces its usefulness for farming. Most areas of this soil are in trees or brush. A few small tracts were formerly cleared and farmed along with adjoining less sloping soils, but many of these areas are now in grass or brush because the use of heavy farm equipment on these areas is impracticable. Many of the larger areas of this soil are used for housing developments where large lots are needed. These rolling areas are in the western part of the county. Capability unit IIIe–1; woodland suitability group 3o1.

Riverhead very stony sandy loam, 3 to 8 percent slopes (ReB).—This gently sloping Riverhead soil is on Fishers Island. It is on morainic deposits, and the areas are complex and undulating, characteristic of moraines. Areas of this soil are small, and they make up a very small part of the total acreage of the county.

The profile of this soil is similar to the one described as representative of the series, except that it has many stones larger than 10 inches in diameter scattered over the surface. In addition, this soil contains more fine sand than the soil described as representative of the series.

Included with this soil in mapping are small areas that have no stones or that have too few stones to be classified stony. A very small acreage of Plymouth soils that are very stony are included.

The hazard of erosion is moderate to slight on this Riverhead soil. The stones on the surface of this soil limit its use to woodland or pasture.

This soil is pooorly suited to farming. Some areas are cleared, but they are not farmed. These areas have been left idle, and most of them are reverting to woodland. Areas on Fishers Island are mainly used as sites for large estates. This soil has little value for uses other than woodland or hunting areas. Capability unit VIs–1; woodland suitability group 3o1.

Riverhead very stony sandy loam, 8 to 15 percent slopes (ReC).—This soil is on Fishers Island. It is on morainic deposits. Many closed depressions or kettle holes are on the surface. The areas of this soil are small to medium.

The profile of this soil is similar to the one described as representative of the series, except that many stones larger than 10 inches in diameter are scattered over the surface or are imbedded in the soil. Also, this soil contains more fine sand than the soil described as representative of the series.

Included with this soil in mapping are small areas that have no stones or that have too few stones to be classified stony. In addition, areas of Plymouth soils, 8 to 15 percent slopes, that are very stony make up about 10 percent of this unit.

The hazard of erosion is moderate on this Riverhead soil. The stones on the surface of this soil limit its use to woodland or to pasture.

This soil is poorly suited to crops. Some areas are cleared, but most areas have been allowed to revert to brush or trees. This soil has little value for uses other than woodland and hunting areas. Capability unit VIs–1; woodland suitability group 3o1.

Riverhead and Haven soils, graded, 0 to 8 percent slopes (RhB).—This mapping unit consists of areas of Riverhead sandy loam, of Haven loam, or of both. The

areas have been altered by grading operations for housing developments, shopping centers, industrial parks, and similar nonfarm uses. In the western part of the county, the areas of this mapping unit are very large, and large acreages are used as sites for housing developments (fig. 14).

Originally, the Riverhead and Haven soils in this unit each had the profile described as representative of its respective series, but grading operations have left a man-made profile that is significantly different. In places the surface layer and the upper part of the subsoil have been removed, but in other places they have been left undisturbed. Undisturbed areas have been filled with soil material cut from adjoining high spots, but the Riverhead and Haven soils can be identified because sufficient diagnostic characteristics of the respective series remain. In some areas Riverhead and Haven soils that have not been graded make up as much as 25 percent of this unit. In places another 10 to 15 percent has been so deeply cut or filled that the upper 40 inches is sandy and contains no diagnostic horizons of the respective series.

Included with these soils in mapping are areas in which most or all diagnostic horizons have been destroyed, but these areas contain at least 12 inches of loam, silt loam, or sandy loam in the upper 40 inches. In places this 12 inches of material is in one layer, and in others it is in several thinner layers. Also included are small areas of Cut and fill land and Montauk soils, graded.

These soils are suited to most grasses and shrubs generally used for lawns and landscaping. In places very deeply cut or filled areas are slightly droughty and need supplemental irrigation. The response of plants to applications of lime and fertilizer is good. The practice generally is to build on the soils immediately after grading; therefore, the number of existing buildings on areas of the soils in this unit is the main factor in determining their future uses. Capability unit not assigned; woodland suitability group not assigned.

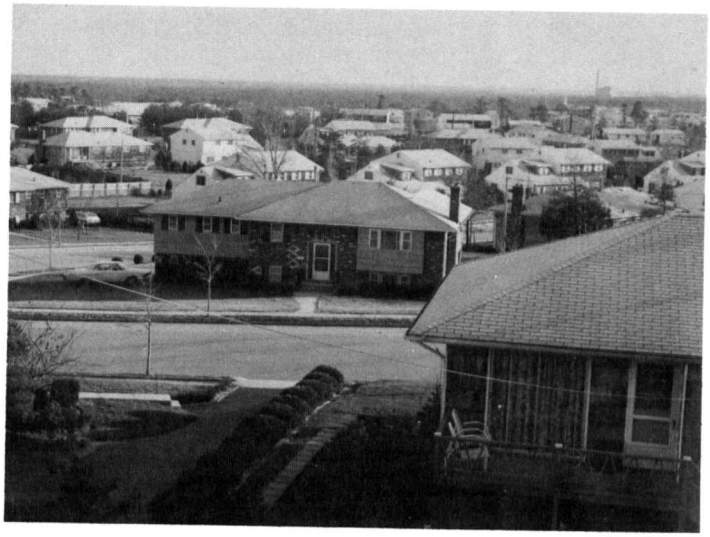

Figure 14.—**Housing development on an area of Riverhead and Haven soils, graded, 0 to 8 percent slopes. Density and pattern are typical of other developments on graded soils and on Cut and fill land, gently sloping.**

Riverhead and Haven soils, graded, 8 to 15 percent slopes (RhC).—This mapping unit consists of areas of Riverhead sandy loam, of Haven loam, or of both. These soils have been altered by grading operations for housing developments, shopping centers, industrial parks, and similar nonfarm uses. Most areas of this unit are small, and are along moderate slopes. These areas are within large areas of level Riverhead and Haven soils that are being shaped.

Originally, the Riverhead and Haven soils in this unit each had the profile described as representative of its respective series, but grading operations have left a man-made profile that is significantly different. The surface layer and most of the subsoil have been removed by cutting or these layers have been buried by fill material, but sufficient diagnostic characteristics remain, so that the Riverhead and Haven soils can be identified according to their respective series. Because of slope, more extensive cuts and fills have been made on this unit than on Riverhead and Haven soils, graded, 0 to 8 percent slopes. In places areas of Riverhead and Haven soils that have not been graded make up 25 to 30 percent of this unit. In other places 15 to 20 percent has been so deeply cut or filled that no diagnostic horizons of the respective series remain in the upper 40 inches of the soil material.

Included with these soils in mapping are soils that contain at least 12 inches of loam, silt loam, or sandy loam in the upper 40 inches, but they do not have horizons characteristic of Riverhead and Haven soils. In places this 12 inches of material is in one layer, but in other places it is in several thinner layers. Also included are small areas of Cut and fill land.

These soils are suited to most grasses and shrubs generally used for lawns and landscaping. If they are used for this purpose, however, a cover of plants is needed to protect sloping areas from erosion. Areas in which there are deep cuts and fill generally are droughty and low in natural fertility; therefore, supplemental irrigation and heavy applications of lime and fertilizer are needed. Generally, the number of buildings on a site determines the future use of these soils. Capability unit not assigned; woodland suitability group not assigned.

Riverhead and Plymouth very bouldery soils, 15 to 35 percent slopes (RpE).—These very bouldery soils are only on Fishers Island. The areas consist of Riverhead soils, of Plymouth soils, or of a combination of the two. The surface layer of these soils is sandy loam or loamy sand. These soils have either short, steep, single slopes or complex slopes that have numerous depressions or kettle holes. Most areas are medium to large in size.

Riverhead and Plymouth soils both have a profile similar to that described as representative of their respective series, except that many large boulders several feet in diameter are scattered over the surface and imbedded in the soil.

Included with these soils in mapping are small areas that are less bouldery than the areas of the soils in this unit. Also included are small areas of very bouldery soils that have slopes of less than 15 percent. These areas generally are in large areas where the topography is complex. Narrow bands of extremely bouldery soils are included along short steep breaks.

These soils are not used for farming because of the boulders. They are best suited to woodland or to habitat for some types of wildlife. They are in brush and trees, and are used as hunting areas. Because of their isolated location, these soils will likely continue to be used for this purpose. Capability unit VIIs–1; woodland suitability group 5s2.

Scio Series

The Scio series consists of deep, moderately well drained, medium-textured soils that formed in a mantle of very fine sandy loam, loam, or silt loam over coarse sand and gravel or compact glacial till. These soils are throughout the county on moraines and outwash plains. Most areas are on outwash plains. They generally are in low-lying areas between poorly drained to somewhat poorly drained Raynham soils and better drained Haven soils or in low-lying areas within larger units of well-drained Haven soils. Slopes range from 0 to 6 percent, but they generally are 0 to 2 percent. Slopes are concave in many places.

In a representative profile a thin layer of leaf litter and decomposed organic matter is on the surface in wooded areas. Below this mat is a surface layer of silt loam about 7 inches thick. It is very dark brown in the upper part and brown to dark brown at a depth of about 4 inches. In cultivated areas, the surface layers are mixed with material originally in the upper part of the subsoil, forming a dark grayish-brown plow layer of silt loam about 9 inches thick. The subsoil extends to a depth of about 28 inches. It is yellowish-brown, friable silt loam that is mottled below a depth of about 19 inches. The substratum, to a depth of about 38 inches, is firm, mottled, yellowish-brown silt loam. Below, to a depth of 61 inches, is firm, gray to light-gray fine sandy loam till that contains streaks and splotches of strong brown.

Scio soils have moderate to high available moisture capacity in the root zone. The water table is at a depth of 18 to 24 inches during wet periods, but it is below a depth of 30 inches during dry periods. In the till substratum phase, permeability is moderate in the surface layer and in the upper part of the subsoil and moderately slow in the lower part of the subsoil and in the substratum. In the sandy substratum phase, permeability is moderate in the surface layer and in the subsoil and rapid in the substratum; however, the water table restricts water movement during periods of wetness. Natural fertility is low. Reaction is strongly acid or very strongly acid. The response of crops to applications of lime and fertilizer is good. The root zone is in the upper 24 to 30 inches.

Representative profile of Scio silt loam, till substratum, 2 to 6 percent slopes, in a wooded area, near Montauk on State Route 27, one-half mile east of East Lake Drive:

O1—2 inches to 1 inch, loose hardwood leaves.

O2—1 inch to 0, very dusky red (2.5YR 2/2) decomposed organic matter; many fine roots.

A11—0 to 4 inches, very dark brown (10YR 2/2) silt loam; very weak, fine, granular structure; very friable; many roots; strongly acid; clear, smooth boundary.

A12—4 to 7 inches, brown to dark-brown (10YR 4/3) silt loam; very weak, fine, granular structure; very friable; common roots; strongly acid; clear, smooth boundary.

B21—7 to 19 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, subangular blocky structure; friable; common roots; common fine pores; strongly acid; clear, smooth boundary.

B22—19 to 28 inches, yellowish-brown (10YR 5/4; silt loam; common, medium and fine, faint and distinct, grayish-brown and strong-brown mottles; weak, medium, subangular blocky structure; friable; common roots; a few fine pores; strongly acid; clear, smooth boundary.

C1—28 to 38 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, faint and distinct, grayish-brown and strong-brown mottles; weak, medium, platy structure; firm; a few roots; a few pores; strongly acid; clear, smooth boundary.

IIC2g—38 to 61 inches, gray to light-gray (5Y 6/1) fine sandy loam till; strong-brown streaks or splotches; massive; firm and compact in place, friable when reworked; 15 percent gravel as much as 1 inch in diameter; strongly acid.

The solum ranges from 24 to 36 inches in thickness. Depth to underlying sand and gravel or compact till ranges from 38 to 50 inches. The content of coarse fragments in the solum generally is less than 10 percent and it ranges from 10 to 35 percent in the substratum. Reaction ranges from strongly acid to very strongly acid in the solum. Texture ranges from very fine sandy loam to silt loam or loam. Texture ranges from fine sandy loam in the substratum of the till substratum phase to sand and gravel in the sandy substratum phase.

The A horizon ranges from very dark brown (10YR 2/2) to brown or dark brown (10YR 4/3). Structure ranges from very weak or weak to moderate granular. Consistence is friable or very friable.

In cultivated areas an Ap horizon ranges from brown or dark brown (10YR 4/3) to dark grayish brown (10YR 4/2) in color and from 8 to 10 inches in thickness.

The B horizon ranges from light olive brown (2.5Y 5/4) to yellowish brown (10YR 5/4). It is distinctly mottled below 18 inches. Mottles range from a few to common, and mottles that have a chroma of 2 make up about 10 percent of the mass. Structure of the upper part of the horizon ranges from very weak to moderate, subangular blocky. The lower part of the B horizon ranges from weak, subangular blocky to weak, platy. Consistence of the B horizon ranges from friable to firm.

The IIC or IICg horizons range from light yellowish brown (10YR 6/4) to gray or light gray (5Y 6/1). In the sandy substratum phase, the C horizon is single grain, and consistence is loose. In the till substratum phase, it is massive, and consistence is firm. Consistence is looser in places where the till has been reworked by water.

Scio soils are associated with Haven, Montauk, Wallington, Walpole, and Whitman soils. They have a mottled B horizon that is lacking in Haven and Montauk soils, and Haven soils lack the high water table of Scio soils. Soils of the Wallington, Walpole, and Whitman series range from somewhat poorly drained to very poorly drained. Scio soils are similar to Sudbury soils, but they are more silty.

Scio silt loam, till substratum, 2 to 6 percent slopes (ScB).—This soil has the profile described as representative of the series. It is in wet areas between well-drained soils on higher slopes and wetter soils in draws and closed depressions on moraines. The areas are small and irregular. This soil is mainly on Montauk Point.

Included with this soil in mapping are small areas of more poorly drained soils that are too small to map separately and moderately well drained silt loam soils that are less than 40 inches thick over till. Also included are small areas of Bridgehampton silt loam, till substratum, and Montauk silt loam that lack the seasonal high water table of this soil.

The hazard of erosion is slight to moderate on this Scio soil. The main concern of management is controlling runoff and erosion. This soil generally is wet early in spring, and it warms up late. Consequently, tillage generally is delayed.

This soil is well suited to all crops commonly grown in the county. It is mainly in trees or brush. Small areas are used for grass or crops. Most areas that are used for crops are on the moraine near Wading River. Because the compact till in this soil is somewhat difficult to excavate, its use for engineering works is more costly than it is for the sandy substratum Scio soils. Inasmuch as the till is well graded and contains sufficient fines, it is suitable for use as road fill and as binder material in other construction work. Capability unit IIe–1; woodland suitability group 3o1.

Scio silt loam, sandy substratum, 0 to 2 percent slopes (SdA).—This nearly level soil is in small, low-lying wet areas within large units of Haven soils or in low-lying areas between poorly drained to somewhat poorly drained Raynham soils and adjacent well-drained Haven soils. It is throughout the county but generally is on outwash plains.

The profile of this soil is similar to the profile of the soil described as representative of the series, except that it overlies loose sand and gravel and the texture of its surface layer and subsoil ranges from silt loam to loam.

Included with this Scio soil in mapping are small areas of Sudbury sandy loam and Walpole sandy loam. Also included are small areas of Haven loam, thick surface layer, that has a mottled subsoil.

The hazard of erosion is slight. Because of wetness, this soil warms slowly in spring and cannot be plowed as early as well-drained soils.

This soil is well suited to all crops commonly grown in the county, except when it occurs in depressional areas that are likely to receive excessive surface water from nearby sloping areas. A large part of this soil is cleared and is used with large tracts of Haven soils for potatoes, cauliflower, onions, and other truck crops. It is also used for sod. In the western part of the county, this soil is used with other soils as sites for housing developments. Capability unit IIw–1; woodland suitability group 3o1.

Scio silt loam, sandy substratum, 2 to 6 percent slopes (SdB).—This soil is throughout the county on moraines and outwash plains. It is on gentle side slopes of depressions or in areas between well-drained Haven soils and lower lying areas of somewhat poorly drained soils. Areas of this mapping unit are small, and they make up a very small part of the total acreage of the county.

The profile of this soil is similar to the profile of the soil described as representative of the series, except that it overlies loose sand and gravel and its subsoil is silt loam or loam.

Included with this soil in mapping are small areas of adjacent Haven soils on higher elevations. Also included are wet spots of Walpole soils. These soils are indicated on the detailed map by the conventional symbol for a wet spot.

The hazard of erosion is moderate to slight on this Scio soil. If it is used for crops, measures are needed to help to control erosion.

This soil is well suited to all crops commonly grown in the county. Much of this soil is cleared and is used with large tracts of Haven soils for potatoes and other truck crops. Areas of this soil and areas of adjoining better drained soils are used for housing developments. Capability unit IIe–1; woodland suitability group 3o1.

Sudbury Series

The Sudbury series consists of deep, moderately well drained, moderately coarse textured soils that formed in a mantle of fine sandy loam or sandy loam over coarse sand and gravel. These soils are throughout the county on outwash plains and moraines. They generally are in low-lying areas between somewhat poorly drained and poorly drained Walpole soils and well-drained Riverhead soils. Slopes range from 0 to 3 percent, and slopes are concave in many places.

In a representative profile a thin layer of leaf litter, twigs, and decomposed organic matter about 2 inches thick is on the surface in wooded areas. Below this mat is a surface layer of dark-gray sandy loam. In cultivated areas the surface layer is mixed with material originally in the upper part of the subsoil, forming a dark grayish-brown plow layer of sandy loam about 9 inches thick. The subsoil extends to a depth of about 24 inches. It is friable, light olive-brown sandy loam that is distinctly mottled below a depth of about 13 inches. The substratum to a depth of 31 inches is mottled, friable, olive loamy sand. The next layer is grayish-brown, very friable loamy sand to a depth of about 36 inches. Below this, to a depth of about 51 inches, it is loose, pale-brown stratified sand and gravel.

This soil has moderate to high available moisture capacity. The depth of the water table ranges from 18 to 24 inches in wet periods; however, in some dry periods, it is below 30 inches. Permeability is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Natural fertility is low. Reaction is strongly acid or very strongly acid throughout. Crops respond fairly well to applications of lime and fertilizer. The root zone is in the upper 24 to 30 inches.

Representative profile of Sudbury sandy loam, in a wooded area, one-fourth mile north of Hauppauge-Nesconset Road, C.R. 85 aud one-half mile west of Terry Road:

O1—2 inches to 1 inch, loose leaves and twigs.
O2—1 inch to 0, decomposed organic matter.
A2—0 to 1 inch, dark-gray (10YR 4/1) sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.
B21—1 to 13 inches, light olive-brown (2.5Y 5/4) sandy loam; a few, fine, faint, yellowish-brown mottles; weak, coarse, subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.
B22—13 to 24 inches, light olive-brown (2.5Y 5/4) sandy loam; a few, fine, distinct, strong-brown, and a few, medium, distinct, light brownish-gray mottles; weak, coarse, subangular blocky structure; friable; a few roots; strongly acid; clear, smooth boundary.
IIC1—24 to 31 inches, olive (5Y 5/3) loamy sand; common, medium, distinct, strong-brown mottles and common, medium, faint, olive-gray mottles; massive; friable; a few roots; strongly acid; clear, smooth boundary.
IIC2—31 to 36 inches, grayish-brown (2.5Y 5/2) loamy sand; massive; very friable; a few roots; strongly acid; clear, smooth boundary.

IIIC3—36 to 51 inches, pale-brown (10YR 6/3) stratified sand and gravel; single grain; loose; 25 percent fine gravel; strongly acid.

The solum ranges from 20 to 40 inches in thickness. Depth to underlying sand and gravel ranges from 20 to 40 inches. The content of coarse fragments ranges from 0 to 10 percent in the solum and from 10 to 35 percent in the substratum. Reaction ranges from strongly acid to very strongly acid throughout. Texture ranges from fine sandy loam to sandy loam in all horizons of the solum except in the B3 horizon. Texture in the substratum is coarse sand, loamy sand, or stratified sand and gravel.

The A1 horizon ranges from very dark brown (10YR 2/2) to brown or dark brown (10YR 4/3). Structure ranges from weak to moderate, fine, granular. Consistence is friable or very friable.

In cultivated areas an Ap horizon ranges from brown or dark brown (10YR 4/3) to dark grayish brown (10YR 4/2). It ranges from 8 to 10 inches in thickness.

The A2 horizon ranges from dark gray (10YR 4/1) to gray (10YR 5/1). Structure ranges from weak to moderate, fine granular. Consistence is very friable or friable. In places the A2 horizon has a very thin brown to dark-brown (7.5YR 4/4) horizon that contains an accumulation of iron and humus.

The B21 horizon ranges from yellowish brown (10YR 5/6) to light olive brown (2.5Y 5/4). The B22 horizon ranges from yellowish brown (10YR 5/4) to olive (5Y 5/4). Distinct brownish and grayish mottles are present at a depth of 15 to 18 inches. The B horizon is massive and has weak, coarse, subangular blocky structure. Consistence is friable or very friable.

The thin, transitional loamy sand C1 and C2 horizons are grayish brown (2.5Y 5/2) to olive (5Y 5/3). They are massive or single grain. Consistence ranges from friable to loose. The lower part of the C horizon ranges from pale brown (10YR 6/3) to gray (10YR 5/1). They are single grain. Consistence is loose.

Sudbury soils are slightly more olive in the upper part of the B horizon than the defined range for the series. This difference does not alter their usefulness or behavior.

Sudbury soils are associated with Riverhead, Scio, and Walpole soils. Sudbury soils are similar to these soils, but Riverhead soils lack the seasonal high water table and the distinct mottles in the B horizon of Sudbury soils. They are similar to Scio soils in drainage, but they have a sandier solum. Walpole soils are not so well drained as Sudbury soils, and they are grayer throughout the solum.

Sudbury sandy loam (Su).—This is the only Sudbury soil mapped in the county. This nearly level soil is between areas of more poorly drained soils and adjoining well-drained soils of the Riverhead series. In a few places this soil is in the bottom of closed depressions in large tracts of Riverhead sandy loams. Most areas are small.

Included with this soil in mapping are small areas of Walpole soils in wet spots and of well-drained Riverhead soils on higher elevations. Gently sloping, moderately well drained sandy loams are also included.

The hazard of erosion is slight on this Sudbury soil. If the included wet areas are cultivated, artificial drainage is needed. Because of wetness, this soil warms slowly in spring and cannot be plowed as early as well-drained soils. In depressional areas this soil ponds in winter, and winter crops are damaged.

This soil is well suited to all crops commonly grown in the county. The only areas that have been cleared for farming are spots isolated in large tracts of well-drained soils. Most large areas that are next to soils where drainage is poor are wooded. This soil is used for building sites if it is part of a larger development area. Capability unit IIw–1; woodland suitability group 3o1.

Tidal Marsh

Tidal marsh (Tm) is made up of wet areas that are throughout the county around the borders of calmer embayments and tidal creeks. These level areas are not inundated by daily tide flow, but they are subject to flooding during abnormally high moon or storm tides. The areas range from about 2 to several hundred acres.

Tidal marsh has an organic mat on the surface that ranges from a few inches to several feet in thickness. The organic mat overlies pale-gray or white sand. In many places the profile of the marsh is made up of alternating layers of sand and organic material as a result of sand deposited on the organic mat during abnormally high storm tides.

Included with this land type in mapping are areas of tidal marsh that adjoin dunes. Sand that blows from the dunes covers these areas. In many of these places, the dunes have completely encircled the marsh, and the marsh is no longer directly connected to a body of salt water.

These very poorly drained areas are not suited to any kind of farming. They are best suited to use as habitat for certain types of wildlife. Capability unit VIIIw–1; woodland suitability group not assigned.

Urban Land

Urban land (Ur) consists of areas that are more than 80 percent covered by buildings and pavements. Examples are parking lots, business districts of larger villages, and densely developed industrial parks. Examination and identification of the soils in these areas are impractical. Capability unit not assigned; woodland suitability group not assigned.

Wallington Series

The Wallington series consists of deep, somewhat poorly drained, medium-textured soils that have a fragipan at a depth of 18 to 24 inches. They formed in a mantle of silty material over thick deposits of moderately coarse textured or coarse textured material. These soils are in the Montauk Point area of the county and are in low-lying areas along drainageways and near perennial ponds. Slopes are 0 to 5 percent. Native vegetation consists of shadbush, blueberry, and alder.

In a representative profile of a till substratum phase, a thin layer of leaves and organic matter is on the surface in wooded areas. Below this layer is a surface layer of very dark gray silt loam about 2 inches thick over a subsurface layer of grayish-brown to light brownish-gray silt loam that has a few distinct mottles. The subsurface layer extends to a depth of about 10 inches. The upper part of the subsoil, to a depth of about 18 inches, is mottled, grayish-brown, friable silt loam. The lower part of the subsoil, to a depth of 38 inches, is mottled light olive-brown silt loam that makes up a firm and brittle fragipan. The substratum to a depth of 47 inches is mottled gray to light-gray, friable silt loam. Below, to a depth of about 60 inches, the substratum consists of firm, strong-brown fine sandy loam glacial till.

Wallington soils have a high water table within 6 inches of the surface during wet periods, but it drops to

about 18 inches during dry periods. Available moisture capacity is moderate to high in the root zone. Permeability is moderate above the fragipan, moderately slow to slow in the fragipan, moderate in the upper part of the substratum, and moderate to moderately slow in the underlying till. Natural fertility is low. Reaction is strongly acid to very strongly acid throughout. The response of crops to applications of lime and fertilizer is fair. If this soil is used for farming, artificial drainage is needed. The primary root zone is limited to the upper 18 to 24 inches.

Representative profile of Wallington silt loam, till substratum, in a wooded area, one-fourth mile east of Montauk Village and 200 feet south of State Route 27:

O1—4 to 3 inches, loose hardwood leaves.

O2—3 inches to 0, very dusky red (2.5YR 2/2) decomposed organic matter; many fine roots.

A1—0 to 2 inches, very dark gray (10YR 3/1) silt loam; weak, fine, granular structure; friable; many fine roots; very strongly acid; clear, smooth boundary.

A2g—2 to 10 inches, grayish-brown (2.5Y 5/2) silt loam; light brownish gray (2.5Y 6/2) in the lower part; a few, medium, distinct, strong-brown mottles; very weak, thin, platy structure; friable; common roots; very strongly acid; clear, smooth boundary.

B2g—10 to 18 inches, grayish-brown (2.5Y 5/2) silt loam; common, medium, faint, light brownish-gray and yellowish-brown mottles; weak, medium, subangular blocky structure; friable; a few roots; strongly acid; clear, smooth boundary.

Bx—18 to 38 inches, light olive-brown (2.5Y 5/4) silt loam; common, medium, distinct, yellowish-brown mottles; moderate, thick, platy structure; firm and brittle; discontinuous, gray to light gray (5Y 6/1) tubules or streaks about one-half inch thick; strong-brown border mottles; strongly acid; gradual, wavy boundary.

C1g—38 to 47 inches, gray to light-gray 5Y 6/1) silt loam; a few, medium, distinct, light olive-brown mottles; massive; friable; very strongly acid; abrupt, wavy boundary.

IIC2—47 to 60 inches strong-brown (7.5YR 5/6) fine sandy loam glacial till; common, coarse, distinct, grayish-brown mottles; massive; firm and dense in place, friable when removed; 10 percent gravel as much as 1 inch in diameter; very strongly acid.

The solum ranges from 35 to 45 inches in thickness. The volume of coarse fragments in the solum generally is less than 5 percent. The content of coarse fragments in the IIC2 horizon ranges from 10 to 35 percent. Reaction ranges from strongly acid to very strongly acid throughout. The O2 horizon ranges from very dusky red (2.5YR 2/2) to dark reddish brown (5YR 2/2).

The A1 horizon is black (10YR 2/1) or very dark gray (10YR 3/1). The A2 horizon ranges from dark grayish brown (2.5Y 4/2) to light brownish gray (2.5Y 6/2). A few strong-brown or yellowish-brown mottles are in the A2g horizon. Texture is silt loam or very fine sandy loam.

The B2g horizon is grayish brown (2.5Y 5/2 and 10YR 5/2). The texture of this horizon ranges from silt loam to very fine sandy loam. The Bx horizon ranges from grayish brown (2.5Y 5/2) to yellowish brown (10YR 5/4). Texture ranges from silt loam to very fine sandy loam.

The C1g horizon ranges from grayish brown (10YR 5/2) to gray or light gray (5Y 6/1). The texture ranges from silt loam to very fine sandy loam.

The IIC2 horizon is dominantly strong brown (7.5YR 5/6) and has coarse grayish-brown mottles or streaks. The texture of this layer ranges from fine sandy loam to sandy loam or loamy sand. Consistence is firm. The material in the IIC2 horizon is glacial till. In places the range in particle size is greater and the material is firmer than that described as representative for the series.

Wallington soils are mapped near Whitman soils and the till substratum phase of Scio soils. Wallington soils are similar to those soils, but Whitman soils are coarser textured. Scio silt loam, till substratum, lacks the fragipan and low-chroma colors at depths of less than 20 inches that is characteristic of Wallington soils. Raynham soils lack a fragipan; they are over loose sand and gravel.

Wallington silt loam, till substratum (Wa).—This is the only Wallington soil mapped in the county. Slopes are 5 percent or less. It is mainly on wet draws and lower side slopes adjacent to the better drained, higher lying Bridgehampton silt loam, till substratum soil. It is also in small closed depressions. Areas of this soil are small.

Included with this soil in mapping are very poorly drained silt loams on the lowest parts of drainageways. In most areas these included soils have a thick surface layer of black, mucky silt loam. Near the dunes these soils are covered by 2 to 3 feet of overblown sand. Small areas of Scio silt loam, till substratum, and somewhat poorly drained silt loams that are less than 40 inches thick over sandy loam till are included. A few small areas that have stones on the surface and throughout the soil are also included.

The hazard of erosion is slight on this Wallington soil. If this soil is cultivated, artificial drainage is needed. Wetness and difficulty of locating outlets somewhat reduce the suitability of this soil for farming.

This soil is suited to crops commonly grown in the county. All of this soil is in trees or brush. Because of its location, mainly in parks and in government-owned areas, it is unlikely that the future use of this soil will change. Capability unit IIIw–2; woodland suitability group 4w1.

Walpole Series

The Walpole series consists of deep, somewhat poorly drained and poorly drained, moderately coarse textured soils that formed in a mantle of sandy loam or fine sandy loam over coarse sand or sand and gravel. These soils generally are around tidal marshes and creeks of the south shore where the water table generally is at a shallow depth. The soils are also in areas adjacent to ponds and rivers. Slopes are less than 3 percent. Native vegetation consists of red maple, blackgum, highbush blueberry, and some white oak and pitch pine.

In a representative profile a thin layer of leaves and decomposed organic matter is on the surface in wooded areas. Below this layer is a surface layer of very dark grayish-brown sandy loam about 5 inches thick. The subsoil to a depth of about 19 inches is friable, mottled, light olive-brown sandy loam. Below is friable, mottled, olive-gray sandy loam to a depth of about 26 inches. The substratum, to a depth of about 52 inches, is loose, light olive-brown sand that contains a few fine pebbles.

Walpole soils have a seasonal high water table at a depth ranging from 6 to 18 inches. These soils have moderate available moisture capacity if the water table is lowered by artificial drainage and the root depth is extended to 28 inches. Permeability is moderately rapid in the surface layer and in the subsoil and rapid in the substratum. Natural fertility is low. Reaction is strongly acid to very strongly acid throughout. The root zone is confined to the upper 18 to 28 inches.

Representative profile of Walpole sandy loam, in a wooded area, west side of South Mott Road, 1 mile south of Village of Brookhaven:

O1—2 inches to 1 inch, loose hardwood leaves.
O2—1 inch to 0, black (10YR 2/1) mull.
A1—0 to 5 inches, very dark grayish-brown (10YR 3/2) sandy loam; massive; friable; many roots; strongly acid; clear, wavy boundary.
B21—5 to 19 inches, light olive-brown (2.5Y 5/4) sandy loam; many (20 percent), medium, distinct, yellowish-brown and strong-brown mottles; massive; friable; common roots; strongly acid; gradual, wavy boundary.
B22—19 to 26 inches, olive-gray (5Y 5/2) sandy loam; a few, medium, distinct, yellowish-brown mottles; massive; friable; a few roots; strongly acid; abrupt, wavy boundary.
IIC—26 to 52 inches, light olive-brown (2.5Y 5/4) sand; single grain; loose; 5 percent fine gravel.

The solum ranges from 18 to 28 inches in thickness. The solum generally is free of coarse fragments, but in places the content is as much as 15 percent in the lower part of the B horizon and ranges from 5 to 25 percent in the substratum. Reaction is strongly acid or very strongly acid in the solum. The organic surface horizon ranges from 1 to 6 inches in thickness.

The A1 horizon ranges from black (10YR 2/1) to dark grayish brown (2.5Y 4/2).

The Ap horizon, if present, ranges from very dark brown (10YR 2/2) to dark brown or brown (10YR 4/3), and from 8 to 10 inches in thickness. Structure of the A1 horizon ranges from weak to moderate granular, or it is massive. Consistence is friable or very friable.

The B21 horizon ranges from yellowish brown (10YR 5/4) to light olive brown (2.5Y 5/4). The B22 horizon ranges from grayish brown (10YR 5/2) to olive gray (5Y 5/2). The texture of the B horizon ranges from fine sandy loam to sandy loam. Structure is blocky or coarse prismatic, or the material is massive.

The C horizon ranges from brown (10YR 5/3) to light olive brown (2.5Y 5/4). The IIC horizon is sand or stratified sand and gravel.

Walpole soils are mapped near Atsion, Berryland, Sudbury, and Wareham soils. Walpole soils are finer textured than Atsion and Berryland soils, and they lack the leached A2 horizon and B horizon of iron and humus accumulation that are characteristic of the Berryland soils. Walpole soils are finer textured throughout the solum than Wareham soils. The seasonal high water table is at a greater depth in Sudbury soils than in Walpole soils.

Walpole sandy loam (Wd).—This is the only Walpole soil mapped in the county. Slopes are 3 percent or less. It is on the sides of tidal marshes and creeks, or it is in low-lying areas between poorly drained and somewhat poorly drained soils and well-drained soils on uplands. The areas are small, and in places they are long and narrow and are parallel to the water course that they adjoin.

Included with this soil in mapping are small areas of Atsion, Berryland, and Wareham loamy sand. Also included are sandy loams that have a seasonal high water table at a depth similar to that of this soil, but they lack grayish color in the upper 20 inches.

The hazard of erosion is slight on this Walpole soil. Because of the seasonal high water table, this soil needs artificial drainage if it is used for farming. Most areas are hard to drain because of difficulty in obtaining suitable outlets.

If this soil is drained, it is fairly well suited to most crops. Most of this soil is wooded, but a few small areas are cleared along with adjoining areas of better drained soils. In the western part of the county, areas of this soil are being filled to provide building sites. Wooded areas are suitable for use as woodland or as habitat for some types of wildlife. Capability unit IIIw–1; woodland suitability group 4w1.

Wareham Series

The Wareham series consists of deep, somewhat poorly drained and poorly drained, coarse-textured soils. These soils formed in a mantle of loamy sand or sand over sand or sand and gravel. They are most generally in areas around tidal marshes and creeks of the south shore. In these areas the water table is generally at a shallow depth. Elsewhere in the county these soils are in low-lying areas adjacent to ponds, rivers, or marshes. Slopes are less than 3 percent. Native vegetation consists of red maple, blackgum, highbush blueberry, and some white oak and pitch pine.

In a representative profile a thin layer of leaves and decomposed organic matter is on the surface in wooded areas. Below this layer is a surface layer of very dark brown loamy sand about 4 inches thick. The subsoil extends to a depth of about 29 inches. It is friable, mottled dark-gray loamy sand in the upper 2 inches and is firm, mottled light brownish-gray loamy sand below. The substratum, to a depth of 54 inches, is loose, light brownish-gray coarse sand and gravel.

Wareham soils have a high seasonal water table at a depth that ranges from 6 to 18 inches. These sandy soils are rapidly permeable and have low to very low available moisture capacity; however, unless drained, the moisture in these soils generally is more than adequate for most plants. Natural fertility is low. Reaction is strongly acid or very strongly acid throughout. The response of crops to applications of lime and fertilizer is fair. The root zone is limited to the upper 18 to 24 inches.

Representative profile of Wareham loamy sand, in a wooded area, east side of road, 200 yards south of main gate to the West Oak Recreation Club:

O1—5 to 3 inches, loose leaves.
O2—3 inches to 0, black (10YR 2/1) mull; some mineral material.
A1—0 to 4 inches, very dark brown (10YR 2/2) loamy sand; weak, fine, granular structure; friable; many roots; 5 percent gravel; many, hard brown lumps rich in iron; strongly acid; clear, wavy boundary.
B21—4 to 6 inches, dark-gray (10YR 4/1) loamy sand; common, medium, distinct, dark-brown and faint, dark grayish-brown mottles; massive; friable; common roots; strongly acid; clear, irregular boundary.
B22—6 to 29 inches, light brownish-gray (10YR 6/2) loamy sand; common, medium, distinct, strong-brown mottles; massive; firm in place, friable when removed; a few roots; common, brown, organic stains 1/16 to 1/32 inch thick; strongly acid; clear, wavy boundary.
IIC—29 to 54 inches, light brownish-gray (10YR 6/2) coarse sand and gravel; single grain; loose; 35 percent coarse fragments; very strongly acid.

The solum ranges from 16 to 31 inches in thickness, which corresponds to the depth of the upper boundary of the underlying coarse sand and gravel. The lower boundary of the solum is least distinct in the coarser textured part of the range. Volume of coarse fragments in the solum generally is less than 10 percent, but it ranges from 10 to 35 percent in the substratum. Reaction ranges from strongly acid to very strongly acid throughout. The O horizons range from dark reddish brown (5YR 2/2) to black (10YR 2/1).

The A1 horizon is less than 6 inches thick. It ranges from black (10YR 2/1) to very dark grayish brown (2.5Y 3/2).

The B horizon ranges from dark gray (10YR 4/1) to light brownish gray (2.5Y 6/2). It contains common to many high-chroma mottles and a few low-chroma mottles. The texture ranges from loamy sand to sand. Structure of the B horizon is massive or single grain, and consistence ranges from friable to loose.

The IIC horizon ranges from grayish brown (10YR 5/2) to light brownish gray (2.5Y 6/2). Mottles in the IIC horizon are similar to those of the B horizon, or they are absent.

Wareham soils in Suffolk County have an A1 horizon that is thinner than the defined range for the series, but this difference does not alter their usefulness and behavior.

Wareham soils are mapped near Atsion, Berryland, and Walpole soils. They are similar to these soils; however, they do not have leached A2 horizons and iron and humus-enriched B horizons that are present in Atsion and Berryland soils. They are sandier throughout the solum than Walpole soils.

Wareham loamy sand (We).—This is the only Wareham soil mapped in the county. It is along the margins of tidal marshes and creeks or in low-lying positions around marshes and ponds. Slopes are 3 percent or less. Areas are small are long and narrow in most places. They are between areas of very poorly drained marshy soils and well-drained upland soils.

Included with this soil in mapping are areas of Atsion and Berryland soils that are too small to map separately. Walpole soils are included in places where textures are marginal between loamy sand and sandy loam. Also included are somewhat poorly drained loamy sands that have a brownish subsoil to a depth of 20 inches.

The hazard of erosion is slight on this Wareham soil. Drainage is poor on this soil, and artificial drainage is needed if it is used for farming. Permeability is rapid. Difficulty in locating outlets seriously reduces the feasibility of installing drainage for crop production. This soil is ponded for a short time during prolonged wet periods. Natural fertility is low.

This soil is not well suited to most crops. Almost all of this soil is wooded, but a few areas along the south shore are filled and are used as homesites. This soil is well suited to use as woodland or as habitat for wildlife. Capability unit IVw–1; woodland suitability group 4w1.

Whitman Series

The Whitman series consists of deep, very poorly drained, moderately coarse textured soils that contain a fragipan at a depth of 10 to 20 inches. These soils formed in a mantle of sandy loam to light loam over thick deposits of moderately coarse textured to coarse textured glacial till. These soils are at Montauk Point. They are in low-lying areas and draws adjacent to better drained soils on rolling moraines. Slopes are 0 to 5 percent. Native vegetation consists of shadbush, alders, blueberries, and some oaks.

In a representative profile a thin layer of loose leaves and decomposed organic matter is on the surface in wooded areas. Below this layer is a surface layer of black sandy loam about 3 inches thick. It is underlain by a subsurface layer of very dark gray loam to a depth of about 10 inches. Below is a very friable, mottled, dark rayish-brown light sandy loam layer. At a depth of about 14 inches and extending to a depth of 50 inches are firm and brittle fragipan layers of mottled grayish-brown, gray, and brown sandy loam.

Whitman soils have a seasonal high water table within 6 inches of the surface during wet periods, but it drops to a depth of about 24 inches during dry periods. Permeability is moderately rapid above the fragipan, moderately slow or slow in the fragipan, and moderately slow below the fragipan. The high water table severely limits these soils for most nonfarm uses. Available moisture capacity is moderate to a depth of 24 inches in the root zone. Artificial drainage systems need to be installed before these soils can be used for farming. Natural fertility is low. Reaction is strongly acid or very strongly acid throughout. The root zone is limited mainly to the upper 18 to 24 inches.

Representative profile of Whitman sandy loam, in a wooded area, north side of Old Montauk Highway, ½ mile east of intersection with State Route 27:

O1—6 to 4 inches, loose leaves.
O2—4 inches to 0, very dusky red (2.5YR 2/2) decomposed organic matter; many fine roots.
A1—0 to 3 inches, black (10YR 2/1) sandy loam; weak, fine, granular structure; friable; many fine and medium roots; less than 5 percent coarse fragments; strongly acid; clear, wavy boundary.
A3—3 to 10 inches, very dark gray (10YR 3/1) light loam; weak, medium, subangular blocky structure; friable; common medium and fine roots; less than 5 percent coarse fragments; strongly acid; clear, smooth boundary.
C1—10 to 14 inches, dark grayish-brown (10YR 4/2) light sandy loam; common, medium, distinct, yellowish-brown mottles; very weak, medium, platy structure that parts to weak, medium, subangular blocky; very friable; common roots; 10 percent coarse fragments; very strongly acid; clear, wavy boundary.
C2x—14 to 22 inches, grayish-brown (2.5Y 5/2) sandy loam; a few, medium, distinct, yellowish-brown mottles; weak, thin, platy structure; firm and brittle; a few roots; 10 percent coarse fragments; strongly acid; gradual, wavy boundary.
C3x—22 to 37 inches, gray (10YR 5/1) sandy loam; common, medium, distinct, yellowish-brown mottles; weak, thin, platy structure; firm and brittle; 10 percent coarse fragments; strongly acid; gradual, wavy boundary.
C4x—37 to 50 inches, brown (10YR 5/3) sandy loam; a few, coarse, faint, gray mottles; massive; firm and brittle; 10 to 15 percent coarse fragments.

Depth to the fragipan ranges from 10 to 20 inches. The volume of coarse fragments in the profile above the till substratum ranges from 5 to 15 percent, and in the till substratum it ranges up to 35 percent. Reaction ranges from strongly acid to very strongly acid throughout. The O2 horizon ranges from very dusky red (2.5YR 2/2) to black (5YR 2/1).

The A1 horizon ranges from black (10YR 2/1) to very dark gray (10YR 3/1). The A3 horizon ranges from brown or dark brown (7.5YR 4/2) to very dark gray (10YR 3/1). Texture in the A3 horizon ranges from light loam to coarse sandy loam.

The C1 horizon ranges from very dark grayish brown (2.5Y 3/2) to dark grayish brown (2.5Y 4/2). Texture ranges from light loam to coarse sandy loam.

The Cx horizons range from gray (10YR 5/1) to pale olive (5Y 6/3). Texture ranges from sandy loam to fine sandy loam in the C2x and C3x horizons and from loamy sand to sandy loam and gravelly analogs of these in the C4x horizon. Consistence of the C2x and C3x horizons ranges from firm to very firm.

Whitman soils in Suffolk County have a higher chroma in the C1 horizon than the defined range for the series. This difference does not influence their usefulness or behavior.

Whitman soils are mapped near Wallington soil. They are similar to Wallington soil, but they are sandier throughout and are more poorly drained.

Whitman sandy loam (Wh).—This is the only Whitman soil mapped in the county. Slopes are 5 percent or less. It is on wet draws and lower side slopes adjacent to better drained Montauk soils on higher side slopes. Areas are small, and they generally follow the drainage pattern of the landform.

Included with this soil in mapping are small areas of moderately well drained sandy loams and very poorly drained silt loams that are too small to map separately. Many areas that have large stones on the surface and throughout the soil are also included.

The hazard of erosion is slight on this Whitman soil. If this soil is farmed, artificial drainage is needed; but locating outlets is difficult.

This soil is not suited to crops commonly grown in the county, because of wetness. All of this soil is wooded or is in brush, and this trend is likely to continue. This soil is suitable for use as woodland or as habitat for some types of wildlife. Capability unit Vw–1; woodland suitability group 5w2.

Genesis, Morphology, and Classification of the Soils

This section discusses the effects of the five major factors that affect the formation of soils in Suffolk County and briefly describes important processes that influence genesis of the soils. Also, the current system of soil classification is explained, and each soil series represented in the county is placed in some categories in that system and in the great soil group of an older system.

Formation of the Soils

Soils are complex mixtures of weathered rocks, minerals, organic matter, water, and air. Soils form through chemical and physical weathering of (1) unconsolidated parent material as influenced by (2) the kind of climate; (3) plants and animals, particularly vegetation; (4) relief, or lay of the land; and (5) the time these factors have affected development. In Suffolk County local differences in the soils are mainly the result of differences in parent material and relief. The climate and vegetation are fairly uniform throughout the county, and most of the soil materials have been exposed to the soil-forming processes for about the same length of time.

Parent material

The soils of Suffolk County formed in mineral materials, most of which were deposited as a result of glaciation during the Wisconsin age. These materials are (1) glacial outwash consisting of sorted sand and gravel, (2) glacial till, and (3) glacial lake-laid silt and clay, which makes up a very small part of the soils of the county. In addition to the formations indicated above, beaches, dunes, and narrow isthmuses were more recently formed by the action of waves and wind along the shorelines. In places soils are forming in decomposed or decomposing plant materials that are accumulating in depressions and in tidal marsh areas. The mineral materials are derived mainly from granite and are largely quartz sand.

As the glacier moved over the county, it carried large quantities of rock, much of which was ground into gravel, sand, and silt-size particles. Smaller amounts of clay were included. A part of this material was deposited directly by the glacier in a compact, heterogeneous mass called glacial till.

In addition to the materials carried by the ice, the advancing glacier moved large quantities of material ahead of it. When the advancing ice stopped, the material that was ahead of the glacier was left in place as a ridge called a terminal moraine.

After stopping, the glacial ice melted, and enormous quantities of swiftly flowing water ran from the glacier, carrying and sorting the glacially transported materials. In addition to carrying large quantities of material from the ice, the water reworked the mixed materials in the moraine and left much of it in a stratified condition. Most of the material thus carried from the glacier was sand and well-rounded gravel, which was redeposited on a broad plain in front of the terminal moraine. These stratified sand and gravel deposits make up the substratum of most of the soils in the county.

Upon further retreat of the ice, most of the till and parts of the outwash and morainic deposits were covered by water or wind-deposited silt, clay, and fine or very fine sand to varying depths. Haven and Bridgehampton soils are examples of soils formed in silty deposits over stratified sand and gravel. Carver and Plymouth soils (fig. 15) are examples of soils formed in deep, stratified sandy material containing little or no silt. Montauk soil is an example of a soil formed in a moderately silty material over till.

A very small acreage of soils formed in clayey parent material that was deposited in quiet waters of glacial lakes or ponds. In Suffolk County, Canadice soil is the only soil formed in clayey lake-laid deposits. In a few places, shallow ponds were created when the glacier receded. In these shallow waters, the remains of water-tolerant plants accumulated. Muck soils are forming in these remains. Tidal marshes are also forming on the accumulating remains of salt-tolerant grasses and reeds around the borders of quieter saltwater bogs.

The recently deposited beach and dune sand does not show evidence of soil formation.

All of the various materials deposited in these ways have provided the parent materials in which the soils of the county formed.

Relief

The slope and shape of the land surface determine to a large extent the amount of water that enters and passes through the soil and the height to which the water table rises within the soil.

The amount of water that stands on, is contained in, or moves through a soil affects the oxidation, bacterial action, weathering, and the amount of removal of the soil minerals within the profile and on the surface. The translocation of components is most noticeable in permeable materials through which water can move readily. The soils in some low-lying areas are waterlogged or they have a water table nearer the surface than the soils of adjacent, higher areas. The surface layer of wet soils is darker than that of well-drained soils because the oxi-

Figure 15.—**Profile of a Plymouth loamy sand, a typical outwash soil in Suffolk County. The dark-colored layer is the solum; it is about 2 feet thick. The light-colored lower part is the substratum; it consists of coarse sand and a few pebbles.**

dation of organic matter is retarded in wet areas and the organic matter tends to accumulate. Also, the subsoil of wet soils is gray or mottled while that of well-drained soils is a brighter brown or yellowish brown, reflecting the more thorough oxidation of minerals in the well-drained soil.

Soils formed in one kind of parent material, but having different characteristics because of differences in degree of wetness, make up a sequence called a drainage sequence. An example of a drainage sequence is: Carver, Deerfield, Atsion, and Berryland soils. Drainage ranges from excessive in the Carver soils to very poor in the Berryland soils.

Plants and animals

The native vegetation in most of Suffolk County was originally hardwoods, mainly oaks, beech, birch, maple, pitch pine, and some white pine. Undergrowth was mainly scrub oak, huckleberry, shadbush, alder, and, in wetter areas, blueberry.

Most of the hardwoods contain some calcium and other bases in their leaves, which are returned to the soils annually as the leaves fall from the trees and rot. Pine needles are more acid and return organic acids to the soil as they fall and rot. In this way, the leachate from the two types of leaves causes differences in soil formed under different types of woodland cover. Soils near Montauk Point have had a grass cover for a sufficient period to materially affect the organic-matter content of the surface horizon.

In addition to the effects of plants, earthworms and larger burrowing animals make the soil more permeable to air and water. Besides altering permeability, animals mix the soil and cause aggregation of soil particles and improve soil structure by the addition of animal wastes.

Bacteria and fungi form organic acids and other compounds as they break down organic material in the leaves and other compounds within the soils.

Man's activities have brought about significant changes in many of the soils of the county. Tillage has accelerated erosion on sloping soils and has resulted in a mixing of the natural surface layer and the upper subsoil with organic matter, developing a manmade surface layer 10 to 12 inches thick. In this layer, the microbiology of the soil is changed by continued use of lime, fertilizer, and pesticides (*4*). The activities of man have resulted in near destruction of the soil where extensive cuts and fills have been made for building highways and various structures.

Climate

Suffolk County has a humid, temperate climate that is strongly influenced by Long Island Sound and the Atlantic Ocean. These bodies of water temper extremes of heat in summer and cold in winter. Detailed climatic data are given in the section, "General Nature of the County". Climate affects soil formation through its influence on chemical, physical, and biological processes. Greater amounts of water passing through the soil effectively alter the chemical composition. Also, chemical changes are accelerated or retarded by changes in temperature. Leaching of soluble salts and translocation of colloidal materials depend directly upon the amount of water passing through the soil. Freezing and thawing affect the physical weathering of rocks and soil material. In addition to affecting chemical change, temperature affects the rate of biological activity. Decomposition of organic matter increases as the average annual soil temperature increases. The climate throughout Suffolk County is fairly uniform; therefore, differences in soils in the county are not directly attributed to differences in climate.

Time

Geologically, the soils of Suffolk County are relatively young. The last glacier receded from the county about 11,000 years ago; and, to a large extent, all soil-forming processes have only had this relatively short period of time to develop the soils as they are known today.

Soils have developed in all the materials deposited directly by the glaciers. More recent deposits, such as sand dunes and organic deposits, do not have any recognizable soils formed in them. In some places, sand dunes are showing the first vestige of soil formation by the accumulation of organic matter in the upper 2 or 3 inches.

Morphology of the Soils

If a vertical cut is made in a soil, several layers, or horizons, are evident. The differentiation of horizons is the result of many soil-forming processes. The most important are (1) physical breakdown of particles, (2) leaching of salts that are more or less soluble, (3) accumulation of organic matter, (4) chemical weathering of primary minerals and the formation of silicate clay minerals, (5) translocation of silicate clay minerals from one horizon to another by percolating water, and (6) accumulation of some iron colloids.

Some of these processes take place in all the soils, but the number of active processes and the degree of their activity vary from one soil to another.

In all of the mineral soils, some organic matter has accumulated to form an A1 horizon. In wooded areas these mineral soils have an organic horizon at the surface, which is designated an O1 or O2 horizon, depending on the extent to which the organic material has decomposed. If the soils are cleared and plowed, their organic and A1 horizons lose their identity as they are mixed into the plow layer, which is called an Ap horizon. This horizon is enriched with organic matter and generally is distinct from the underlying horizons because it is darker and more friable. Bridgehampton soils are examples of soils that have a distinctive, relatively dark Ap horizon. Only in soils developing in very recent alluvium is there no sharp contrast between the A1, or the Ap, horizon and the next underlying horizon.

The upper horizons of a soil normally are more leached of bases and silicate clays than the lower horizons. The leached part of the A horizon that is too far below the surface to be influenced by surface organic matter is called the A2 horizon. Generally, it is the lightest colored horizon in the soil. It is well expressed in the Carver and similar soils. The subsoil of some soils includes a distinct zone of yellowish-brown material that differs little in texture from the A horizon. This zone is called a color B horizon. In this county Plymouth soils have a strong color B horizon.

Characteristics that indicate wetness or class of drainage are evident in soils. Excess water commonly produces mottles or a pattern of colors, dominantly gray. The extent of mottling indicates the degree of gleying, or the process of chemical reduction and transfer of iron. Gleyed soil material normally is gray or bluish gray.

In soils that are well aerated, brown or yellowish brown generally is the color of the subsoil. A soil is considered well drained if it is free of mottles to a depth of at least 20 inches and shows only brownish colors, such as in the Haven soils. Ordinarily, moderately well drained soils are wet for short periods, but they are free of mottles to a depth of about 16 to 20 inches. Sudbury soils are examples of moderately well drained soils.

In areas where the soils are somewhat poorly drained to poorly drained and are wet for long periods, the A2 horizon shows the effect of moderate or intense reduction of iron. This horizon is dominantly grayish but it contains a few brown mottles. Wallington soils are examples of somewhat poorly drained soils. In some areas there are small depressions that remain saturated most of the year unless they are artificially drained. In these areas drainage is very poor, and the surface layer has a high organic-matter content. Berryland soils are examples of very poorly drained soils.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationships to one another and to the whole environment, and to develop principles that help us in understanding their behavior and their response to manipulation. First through classification and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

Thus, in classification, soils are placed in narrow classes that are used in detailed soil surveys so that knowledge about the soils can be organized and used in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*3*) and later revised (*11*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965. The current system is under continual study. Therefore, readers interested in developments of the current system should search the latest literature available (*9, 13*).

Table 9 shows the classification of the soil series of Suffolk County according to higher categories of the current system and according to the great soil groups of the older system. Placement of some soil series in the current system of classification may change as more precise information becomes available.

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped together. The classes that make up the current system are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Two exceptions, Entisols and Histosols, occur in many different climates. Four soil orders are represented in Suffolk County: Alfisols, Inceptisols, Entisols, and Spodosols.

SUBORDER: Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders mainly reflect either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation. The suborder is not shown in table 9.

TABLE 9.—*Soil series classified according to the current system of classification and the 1938 system with later revisions*

Series	Current classification			1938 classification
	Family	Subgroup	Order	Great soil group
Atsion	Sandy, siliceous, mesic	Aeric Haplaquods	Spodosols	Podzols.
Berryland	Sandy, siliceous, mesic	Typic Haplaquods	Spodosols	Ground-Water Podzols.
Bridgehampton [1]	Coarse-silty, mixed, mesic	Entic Haplorthods	Spodosols	Brown Podzolic soils.
Canadice [2]	Fine, illitic, mesic	Typic Ochraqualfs	Alfisols	Gray-Brown Podzolic soils.
Carver	Sandy, mixed, mesic	Entic Haplorthods	Spodosols	Brown Podzolic soils.
Deerfield	Sandy, mixed, mesic	Aquentic Haplorthods	Spodosols	Brown Podzolic soils.
Haven	Coarse-loamy/sandy or sandy-skeletal, mixed, mesic.	Typic Dystrochrepts	Inceptisols	Sols Bruns Acides.
Montauk	Coarse-loamy, mixed, mesic	Typic Fragiochrepts	Inceptisols	Sols Bruns Acides.
Montauk, sandy variant	Sandy, mixed, mesic	Typic Fragiochrepts	Inceptisols	Sols Bruns Acides.
Plymouth	Mixed, mesic	Typic Udipsamments	Entisols	Sols Bruns Acides.
Raynham [3]	Coarse-silty, mixed, non-acid, mesic.	Aeric Haplaquepts	Inceptisols	Sols Bruns Acides.
Riverhead	Coarse-loamy, mixed, mesic	Typic Dystrochrepts	Inceptisols	Sols Bruns Acides.
Scio	Coarse-silty, mixed, mesic	Aquic Dystrochrepts	Inceptisols	Sols Bruns Acides.
Sudbury [4]	Sandy, mixed, mesic	Aquentic Haplorthods	Spodosols	Brown Podzolic soils.
Wallington	Coarse-silty, mixed, mesic	Aeric Fragiaquepts	Inceptisols	Sols Bruns Acides.
Walpole	Sandy, mixed, mesic	Aeric Haplaquepts	Inceptisols	Sols Bruns Acides.
Wareham [5]	Mixed, mesic	Mollic Psammaquents	Entisols	Sols Bruns Acides.
Whitman [6]	Coarse-loamy, mixed, mesic	Typic Fragiaquepts	Inceptisols	Low-Humic Gley soils.

[1] Some of the Bridgehampton soils have thicker solums than defined for the series.
[2] These soils are taxadjuncts to the Canadice series because they are more reddish in the subsoil and more acid throughout the solum.
[3] These soils are taxadjuncts to the Raynham series because they are more strongly acid in the lower solum and underlying material; also, the texture of the B horizon ranges to loam.
[4] These soils are taxadjuncts to the Sudbury series because the colors of the upper B horizon are more olive than is typical for the series.
[5] These soils are taxadjuncts to the Wareham series because they have an A1 horizon that is less than 6 inches thick.
[6] These soils are taxadjuncts to the Whitman series because they have a higher chroma in the C1 horizon than is defined for the series.

GREAT GROUP: Each suborder is divided into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus has accumulated or those that have pans interfering with growth of roots or movement of water. The features used are the self-mulching properties of clays, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like. The great group is not shown separately in table 9, because the name of the great group is the last word in the name of the subgroup.

SUBGROUP: Each great group is divided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of the named great group and also one or more properties of another great group, suborder, or order. Subgroups may also be set up to include soils having properties that intergrade outside of the range of any other great group, suborder, or order.

FAMILY: Families are established within each subgroup, primarily on the basis of properties important to the growth of plants or behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES: The series consists of a group of soils that formed from a particular kind of parent material and have genetic horizons that, except for texture of the surface soil, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, structure, reaction, consistence, and mineralogical and chemical composition.

General Nature of the County

This section provides general information about Suffolk County. It discusses history and population, farming, and industry, transportation, and markets. It also describes the vegetation, climate, water supply, and geology, physiography, and drainage.

History and Population

English settlers from Connecticut established the first permanent white settlements in this area in 1640. They crossed Long Island Sound and settled in Southampton and in Southold. Within the next few years, settlements were established at East Hampton, Huntington, and Brookhaven. Rapid settlement followed, and the population of the county has increased steadily since the first settlements.

In 1970, the population of Suffolk County was 1,116,672. The county has lost all semblance of rural life in the western parts, and suburban developments are gradually moving eastward.

In 1960 about 2 percent of the employees in the county worked in agriculture. About 10 percent were employed in construction and mining work, 24 percent in manufac-

turing, 16 percent in retail and wholesale trades, and the remainder were in transportation, services, public utilities, and public administration.

Farming

Early settlers cleared small areas surrounding their cabins and settlements and planted wheat, rye, barley, oats, corn, and flax. These crops were grown mainly for home consumption and to feed the few cattle. The area at Montauk Point and the Shinnecock Hills provided free range for the settlers of those areas who kept cattle and sheep.

Perhaps the first crop to be exported in large quantities was firewood. Large quantities were harvested in the early 1800's, and at the time of the War of 1812, Brookhaven was exporting an estimated 100,000 cords of firewood annually. As late as the close of the Civil War, Suffolk County was the first woodcutting county in the state.

After the Civil War population growth in New York City provided a good market for farm products. Livestock and related hay and grain crops were the principal farm products. At this time less than 4,000 acres of potatoes were grown. In addition, a few acres were devoted to other vegetables. As the price of land rose near the turn of the century, greater emphasis was placed on crops that could produce higher per acre incomes. In 1901 the acreage planted to potatoes and vegetables was about equal to the acreage devoted to corn and small grain. At this time the number of livestock and the acreage of hay crops were steadily declining.

According to the census of agriculture, in 1964 the principal crops and their acreage were:

	Acres
Potatoes	36,519
Cauliflower	1,648
Cabbage	1,059
Sweet corn	826
Cucumbers	459
Strawberries	420
Lettuce	358
Spinach	333
Other vegetables (for sale)	2,124
Tree fruits	487

In 1964 the acreage in corn, small grain, and hay crops was:

	Acres
Rye	3,838
All hay	1,347
Wheat	1,082
Corn (silage and grain)	918

In 1964 the important kinds of livestock in the county were:

	Number
Ducks	6,250,000
Broilers	614,380
Chickens 4 mos. and older	165,112
Hens and pullets of laying age (estimated)	152,440
Turkeys	53,206
Hogs and pigs	2,895
Milk cows	1,531

Approximately 13 percent of the 590,080 acres in Suffolk County is in farms. In 1964 cropland totaled 60,312 acres, of which 2,377 was in pasture and 3,720 was used for other purposes. Pasture totaled 1,611 acres, of which 163 acres was improved pasture and 1,448 acres was classed as other pasture. Woodland in farms totaled 6,257 acres. Currently, 36,415 acres of irrigated land is in Suffolk County.

The number of farms in the county has steadily decreased, but the size of farms has fluctuated yearly. A slight trend is toward smaller farms, partly because of the large number of specialty farms that produce shrubs, flowers, and other plants for areas of rapid suburban expansion. The number of farms decreased from 1,258 in 1959 to 1,138 in 1964. Of the farms, 57 percent were operated by full owners, 29 percent by part owners, 2 percent by managers, and 12 percent by tenants.

At the present time an estimated 12,000 acres per year are being taken over for urban or similar nonfarm uses.

Industry, Transportation, and Markets

Suffolk County is largely industrial, but farming is still a significant part of the economic base in the eastern part of the county. Most of the working population in the rapidly urbanizing western part of the county commute daily to New York City and Nassau County or work in one of the many plants located in industrial parks in the area. The chief industries in eastern Suffolk County are aircraft manufacturing, farming, tourism, and fishing.

Although the county has no federal highways, a network of state and county roads is available. The main road in the county is the Long Island Expressway, a 6-lane superhighway running from Manhattan to Riverhead. The north shore is served by State Route 25A, which runs easterly from the Nassau County line to the vicinity of Wading River. The center of the county is served by State Route 25, which runs the entire length of the county and terminates at Orient Point on the North Fork. The south shore is served by the Montauk Highway, which runs the entire length of the county and terminates at Montauk Point. The Sunrise Highway, a 4-lane highway running from the Nassau County line to the vicinity of Eastport, also serves the south shore. In addition to these main east-west highways, State Routes 110, 111, 112, 113, and 114 run across the county from north to south. Route 110 is farther west; Route 114 is farther east and is the main route serving Shelter Island.

A railroad and its three branches serve the county. The north shore branch terminates at Port Jefferson and provides commuter service to New York City from Port Jefferson, Smithtown, and Huntington. The central branch runs almost the entire length of the county. It passes through Riverhead and Southold and ends at Greenport. The south shore branch also runs almost the entire length of the county. It passes through Babylon, Patchogue, Southampton, and East Hampton and terminates at Montauk. Fourteen intracounty bus lines serve various parts of the county; however, no direct bus lines connect the county to the mainland.

In the county are 17 airports. One is served by scheduled airline flights, six are for private use, and the remainder are municipal airports for public use. Seasonal ferry service is available between Port Jefferson and Bridgeport, Connecticut, and Orient Point and New London, Connecticut, both of which transport vehicles and passengers. In summer many ferries transport pas-

sengers from the south shore communities to the beach communities on Fire Island. Year-round ferry boats provide service to the north and south shores of Shelter Island. The U.S. Government provides its own ferry service between Orient and Plum Island. Fishers Island, part of the town of Southold, is accessible only by ferry from New London, Connecticut, or by air.

Suffolk County is part of the New York City metropolitan area, the major market for products. The port of New York provides the point through which much of the durable goods is shipped to points throughout the world. The potato crop is marketed throughout much of the United States and is transported largely by rail or truck. Overseas potato shipments are made through the port of New York.

Vegetation

The original vegetation of most of Suffolk County, except for Montauk Point, consisted of stands of hardwood that had softwoods scattered throughout. At Montauk Point, the vegetation consisted mainly of low-growing shrubs and grasses.

Dominant on the morainic deposits containing finer textured soils, such as the areas around Smithtown and Huntington, are red oak, white oak, and black oak. Also, yellow-poplar, red maple, black cherry, and American beech grow in a few places. Understory plants consist of huckleberry, sassafras, dogwood, wood fern, and mountain laurel.

Dominant on much of the less sandy outwash plains are white oak, hickory, pitch pine, white aspen, scarlet oak, and post oak. Common understory plants are huckleberry, bracken fern, greenbrier, sumac, and maple-leaved viburnum. Growing on idle fields in these areas are sweet fern, dwarf gray willow, goldenrod, and American elder. Where these areas have been cut or burned, scrub oak and pitch pine are dominant.

On the sandier soils on both outwash plains and moraines where the water table is at a great depth, scrub oak and pitch pine are dominant. Scattered through these areas are patches of small white oak. The ground cover in these areas generally is bearberry, common grasses, and poison ivy.

On moist sites red maple, blackgum, red oak, and white oak are dominant. In some areas, particularly near Middle Island and Northwest Creek, stands of white pine are dominant. Common understory plants on these soils are highbush blueberry, red cedar, greenbrier, bayberry, summer sweet, inkberry, and American elder. Bulrush, sphagnum moss, and sedges grow on the wettest soils.

Along the dunes the vegetation generally is American beachgrass, poison ivy, sea rocket, beach pea, beach plum, and beach heather. Some sand dune areas are covered by pitch pine. One area, the Sunken Forest, has an unusual and close-growing cover of American holly. The tidal marsh areas, which closely adjoin the dunes, support heavy growths of common reed grass, marsh cord grass, salt marsh hay, and marsh elder.

The Montauk Point area is largely covered by native grasses. Also growing are scattered patches of sumac, blackberry, and other low-growing shrubs. Taller vegetation in the area consists primarily of shadbush, American elder, and various oaks. Some red maple and pitch pine also grow.

Climate [10]

Although greatly modified by the Atlantic Ocean, the climate of Suffolk County is humid-continental. The climate is dominated by continental influences because air masses and weather systems affecting Long Island have their origin principally over the land areas of North America. A maritime influence is also significant. Such characteristics of the climate as an extended period of freeze-free temperatures, a reduced range in both diurnal and annual temperature, and heavy precipitation in winter relative to that in summer are a result of the county's maritime exposure. Climatological data for the county are given in tables 10 and 11.

Climatic conditions are varied because of the effects of topography, elevation, and distance from the ocean. The rise in elevation from the shore inland and features of the terrain favor increased precipitation in the interior of the county. The terrain also contributes to unexpected differences in temperature, especially in the minimum temperature at night. Increasing distance from the shore diminishes the moderating effect of the ocean on temperature. As an example, the afternoon breeze off the sea in the summer penetrates inland about 5 to 8 miles, producing cooler temperatures than those prevailing farther inland.

The winter season, which brings weather conditions of moderate severity, lasts about 3 months in Suffolk County. In general, a temperature of 0°F or colder is recorded on one or two days in about one winter out of four. In most winters, the coldest temperature ranges between 0° and 10°F., but somewhat colder temperatures occur in the Patchogue-Brookhaven section of the county. In this south-central area temperatures of 0° or lower are observed in about half of the winters, and a minimum temperature in January or February of 5° to −10° is not uncommon.

Snow generally falls uniformly over the county. The average seasonal total is 26 to 32 inches. An accumulation of 40 inches or more has been noted in a few winters. Coastal low pressure systems are the principal source of snow, and an appreciable amount is often produced by these storms. Although a snow cover can be expected between late December and early March, the normal moderate winter temperatures result in frequent, extended periods of bare ground.

The summers are warm, mainly because of the moderating effect of the ocean on nighttime cooling. Minimum temperatures are frequently in the mild 60's to low 70's from mid-June through mid-September. Temperatures of 90° or higher occur on an average of from 4 to 6 days along the south shore, but increase to a frequency of about 15 days in the western interior of the county. Prevailing winds from the south or southwest in summer favor conditions of high humidity.

The freeze-free growing season is about 200 to 210 days in much of Suffolk County, but the range is from

[10] Prepared by A. Boyd Pack, state climatologist, National Weather Service, U.S. Dept. of Commerce.

TABLE 10.—*Temperature and precipitation data at Riverhead, Suffolk County, New York*

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	7 years in 10 will have—		Average monthly total	3 years in 10 will have—		Snowfall	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		More than—	Less than—	Average monthly total	4 years in 10 will have more than—
	°F.	°F.	°F.	°F.	In.	In.	In.	In.	In.
January	38	24	52	11	3.6	3.8	2.9	7	6
February	39	25	51	13	3.3	3.9	2.4	7	7
March	46	31	61	21	4.2	5.0	3.0	6	5
April	58	39	74	30	3.6	4.2	2.9	(1)	(2)2
May	69	49	81	39	3.5	4.6	2.0	0	----------
June	78	58	90	47	2.7	3.5	1.9	0	----------
July	83	64	90	55	3.3	4.0	2.1	0	----------
August	81	64	87	53	4.3	4.8	2.4	0	----------
September	75	57	84	44	3.1	3.7	1.6	0	----------
October	65	48	79	35	3.1	4.0	2.3	0	(1 2)
November	54	38	66	26	4.5	5.8	3.1	(1)	(2)1
December	42	28	57	14	4.2	5.5	2.9	6	7
Year	61	44	92	7	43.4	46.5	40.6	26	28

[1] Trace.
[2] One year in 10 will have more.

about 175 days in the Patchogue-Brookhaven section to 220 days in the western interior. The cumulative growing degree-days (base of 50°F. daily mean temperature) for the freeze-free crop season ranges from about 2,600 in eastern shore areas to 3,100 in northwestern sections.

Precipitation is heaviest in the west-central part of the county. A narrow west-east belt about 25 miles long, centered near Lake Ronkonkoma, receives an average annual total of 50 to 52 inches. The amount of precipitation decreases sharply outside of this belt, and the average is 43 to 46 inches in most remaining areas. A similar spatial pattern of precipitation prevails during the growing season of April through October. The average total decreases from 29 inches in the narrow west-central belt to 23 to 25 inches in much of the county. While distribution is normally adequate for farming and other purposes, precipitation becomes seriously deficient in some areas during the warmer months, when the rate of water usage is high.

The climate is characterized by reduced precipitation during June, July, and September and increased precipiation in March, August, November, and December.

Suffolk County is one of the more sunny regions of New York State. The sun shines from 50 to 55 percent of the possible time in winter and as much as 60 to 65 percent of the time from May through October.

Water Supply

Almost all supplies of water for individual and municipal facilities are drawn from ground water by drilled or driven wells. This seemingly inexhaustible supply of water draws its entire recharge from precipitation, which averages about 43 inches annually. Under present conditions of infiltration, ground-water recharge is about 350 billion gallons of water annually.

The wells are supplied by three main aquifers; the upper Pleistocene, the Magothy, and the Lloyd Sand

TABLE 11.—*Probability of last freezing temperature in spring and first in fall, Riverhead, Suffolk County, New York*

Probability	Dates for given probability and temperature of—				
	16°F. or lower	20°F. or lower	24°F. or lower	28°F. or lower	32°F. or lower
Spring:					
1 year in 10 later than	March 16	March 25	April 1	April 15	April 30
2 years in 10 later than	March 8	March 22	March 28	April 12	April 25
5 years in 10 later than	February 22	March 11	March 22	March 30	April 14
Fall:					
1 year in 10 earlier than	December 5	November 24	November 12	November 1	October 13
2 years in 10 earlier than	December 9	December 3	November 23	November 7	October 23
5 years in 10 earlier than	December 19	December 11	December 2	November 16	November 9

member of the Raritan formation (*5*, *10*). These aquifers are made up of sand and gravel and small amounts of silt and clay. This type of aquifer yields very large quantities of water with little pumping. Most wells are driven into the upper Pleistocene or Magothy formations.

Inasmuch as the county is completely surrounded by salt water, contamination of fresh-water supplies by salty water is an ever-present hazard (*7*). This situation is of particular importance on the north fork and in other narrow landforms where the ground-water surface does not rise far above sea level. A situation of this type minimizes the amount of fresh water stored in the aquifers above the underlying salty water. Excessive pumping of ground water in these areas leads to salt-water contamination.

Geology, Physiography, and Drainage

The bedrock under Suffolk County varies in depth from 400 feet below sea level at Lloyd Neck to 2,200 feet below sea level in the south-central part of the county. The bedrock is overlain by Cretaceous sediment called the Raritan formation and the Magothy formation. The Raritan formation, which rests on the bedrock, is subdivided into the Lloyd Sand member and the clay member, the uppermost part. The Raritan formation is below sea level. The Magothy formation crops out at only a few locations on Long Island, and most of these are in Nassau County.

Part of the Magothy formation is overlain by Jameco gravel, which is believed to have been deposited by glaciers of the Kansan stage. These deep gravel deposits are mainly in the southwestern part of the county, and their extent is unknown. Elsewhere, the Magothy is overlain by a marine clay identified as Gardiners clay. This formation is thought to be an interglacial deposit, possibly of the Sangamon interglacial stage. In still other parts of the county the Magothy is overlain directly by upper Pleistocene deposits.

The Pleistocene epoch is divided into four major glacial stages, the Nebraskan, Kansan, Illinoian, and Wisconsin. The youngest, the Wisconsin, produced Long Island Sound and most of the topographic features of Suffolk County as it is known today.

During the earlier part of the Wisconsin stage, the ice sheet moved to about the middle of the county and stopped, leaving before it the central ridge or terminal moraine. This ice sheet was called the Ronkonkoma sheet and the moraine, which runs the entire length of the county from the Nassau County line to Montauk Point, was given the same name. The glacier retreated from this point back to the north of Long Island and then readvanced. The last advance terminated along the north shore; and, again, a hilly terminal moraine was formed. This last advance of the ice was called the Harbor Hill sheet, and the moraine was called the Harbor Hill moraine.

After the two ice sheets reached their southern limits in the county, they began to melt. As they melted, meltwater streams flowed from the glaciers and carried a large volume of sand and gravel farther south. This sand and gravel was deposited in a more or less flat plain, developing what is known as an outwash plain. Two outwash plains are in the county, one between the Ronkonkoma moraine and the Atlantic Ocean and the other between the Harbor Hill moraine and the Ronkonkoma moraine.

After the retreat of the glaciers, recent developments further shaped the county as it exists today. Rainfall has eroded some of the hills and redeposited the material. The barrier beach is probably all of recent origin and the tidal marshes of the south shore are a recent geologic development. To illustrate the recent building of the barrier beach, the western tip of Fire Island is now about 6 miles west of the Fire Island lighthouse. When the lighthouse was built in the late 1800's, it was built on what was then the western tip. Other recent geologic changes consist of the joining of small nearby islands to the main island by sand bars which have risen above sea level. Examples of these connected islands are Lloyd Neck, Eatons Neck, Montauk Point, and North Haven.

Elevation in the county ranges from almost 400 feet at West Hills to sea level. The most prominent landforms in the county are the two morainic ridges with their uneven surfaces, the gently sloping outwash plains extending southward from the hills, the eroded headlands along the northwestern shore line of the county, and the barrier beaches of the south shore and the tidal marshes. Fishers Island, Great Gull Island, Plum Island, Gardiners Island, Shelter Island, and Robins Island, all part of Suffolk County, have uneven landforms typical of the morainic deposits.

Few perennial streams drain the county (*5*). The largest stream is the Peconic River, which heads near Brookhaven National Laboratory and empties into Flanders Bay near Riverhead. It drains an area of about 75 square miles. The second largest is Carmans River which heads near Middle Island and empties into the Great South Bay near Shirley. It drains about 71 square miles. Carlls River heads near Wyandanch and empties into the Great South Bay near Babylon. It drains about 35 square miles. The Nissequogue River heads near Hauppauge and empties into the Smithtown Bay of Long Island Sound. It drains about 27 square miles. The Connetquot River heads between Ronkonkoma and Central Islip and empties into the Great South Bay near West Sayville. It drains an area of about 24 square miles. Sampawams Creek heads near Deer Park and empties into the Great South Bay at Babylon. It drains an area of about 23 square miles. Many other small creeks empty into the southern bays. Most of these creeks are subject to tidal flow.

Two basins that have no surface-drainage outlet are in the county. The largest is the Selden basin near Coram, the other is the Lake Ronkonkoma basin. Elsewhere in the county small areas have no surface-drainage outlet. Runoff runs into shallow, closed depressions and evaporates or percolates into the ground water.

Runoff from most housing developments and highways is disposed of by recharge basins dug into the highly permeable sand and gravel substratum.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; that in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Alluvium. Soil material that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

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 capacity and the amount at the wilting point. It is commonly expressed as inches of water per inch of soil.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

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.

Coarse-textured soil. Sand and loamy sand.

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 and brittle; little affected by moistening.

Cover crop. A close-growing crop grown primarily to improve and to protect the soil between periods of regular crop production; or a crop grown between trees in an orchard or between vines in a vineyard.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Drainage terrace. A relatively deep channel and low ridge constructed across the slope, primarily for drainage. It may be either a diversion terrace or a field terrace.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors, such as light, moisture, temperature, and the physical condition of the soil, are favorable.

Field terrace. A ridge 10 to 20 inches high and 15 to 30 feet wide that has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. The ridge is constructed across the direction of the slope to control erosion by diverting runoff along the contour at a safe speed. It may grade toward one or both ends. Cultivated crops may be grown over such a terrace.

Fine-textured soil. Sandy clay, silty clay, and clay.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic matter and clay but rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Genesis, soil. The manner in which a soil originates. Refers especially to the processes initiated by climate and organisms that are responsible for the development of the solum, or true soil, from the unconsolidated parent material, as conditioned by relief and by the age of the landform.

Gleization. The reduction, translocation, and segregation of soil compounds, notably iron, usually in the lower horizons, as a result of waterlogging with poor aeration and poor drainage; expressed in the soil by mottled colors dominated by gray. The soil-forming process leading to the development of a gleyed soil.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Gully. A miniature, steep-sided valley cut by running water and through which water ordinarily runs only after rain. The distinction between a gully and a rill is one of depth. A gully

generally is an obstacle to farm machinery and is too deep to be obliterated by normal tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material may be sandy or clayey, and it may be cemented by iron oxide, silica, calcium carbonate, or other substances.

Horizon. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residue.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, or sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Irrigation. Application of water to soils to assist in the production of crops.

Leaching. The removal of soluble and insoluble material from a soil by percolating water.

Medium-textured soil. Very fine sandy loam, loam, silt loam, and silt.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineralogical, and biological properties of the various horizons, their thickness, and their arrangement in the soil profile.

Mottling, soil. Irregular marks of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of 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 these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural soil drainage. The conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil; opposed to alter 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 different classes of natural soil drainage are recognized:

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time; if podzolized, they commonly have mottling below a depth of 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although some are free of mottles or nearly so.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Ped. A natural soil aggregate, such as a crumb, a block, in contrast to a clod.

Permeability. The quality of a soil that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid* and *very rapid.*

pH value. A numerical means for designating relatively weak acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill normally is a few inches in depth and width, and not large enough to be an obstacle to farm machinery.

Sand. As a soil separate, individual rock or mineral fragments that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but sand may be of any mineral composition. As a textural class, any soil that is 85 percent or more sand and not more than 10 percent clay.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. If two sequa are present in a single soil profile, the profile is said to have a bisequum.

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, a soil that is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles, less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Soil variant. A soil having properties sufficiently different from those of other known soils to suggest establishing a new series, but a soil of such limited known area that creation of a new series is not believed to be justified.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in a mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum. (Plural, sola).

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoin-

ing aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. 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 (1) single grain (each grain by itself, as in dune sand) or (2) massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches thick. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportions 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."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

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