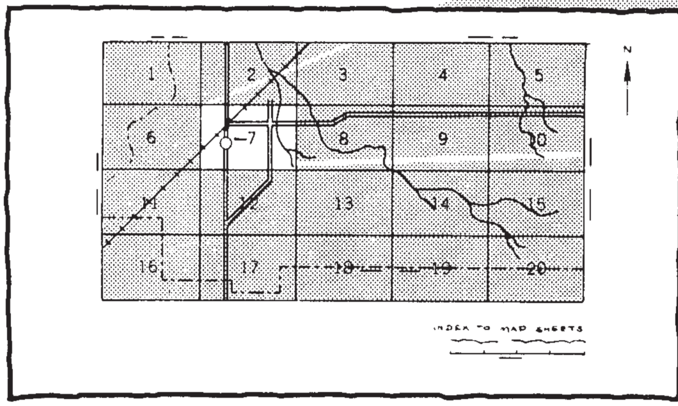
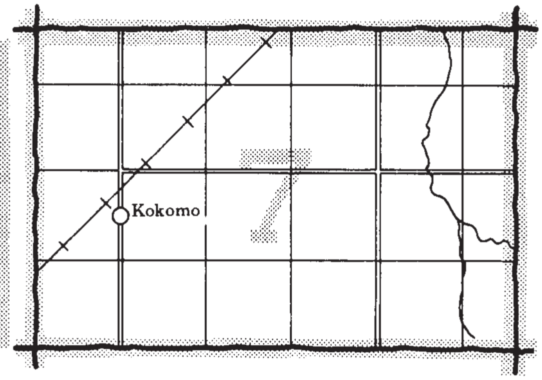
soil survey of Gloucester County Virginia

United States Department of Agriculture
Soil Conservation Service
in cooperation with the
Virginia Polytechnic Institute and State University

HOW TO USE

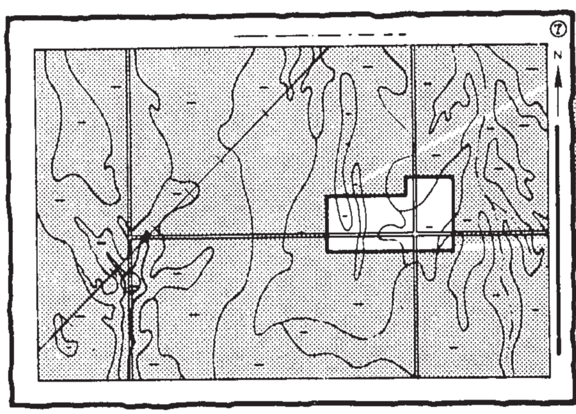
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

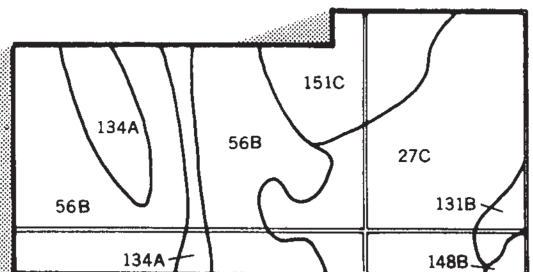




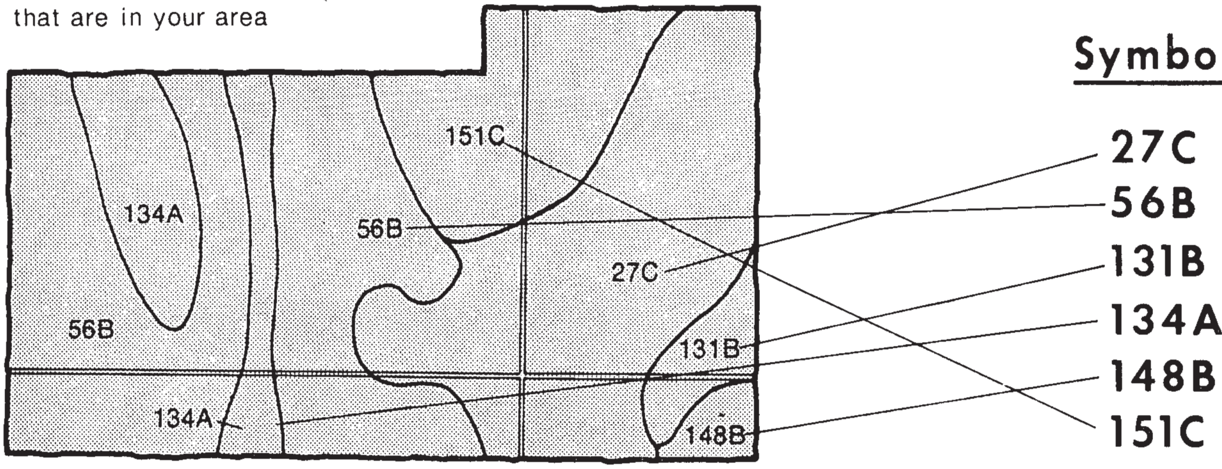
2. Note the number of the map sheet and turn to that sheet.

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



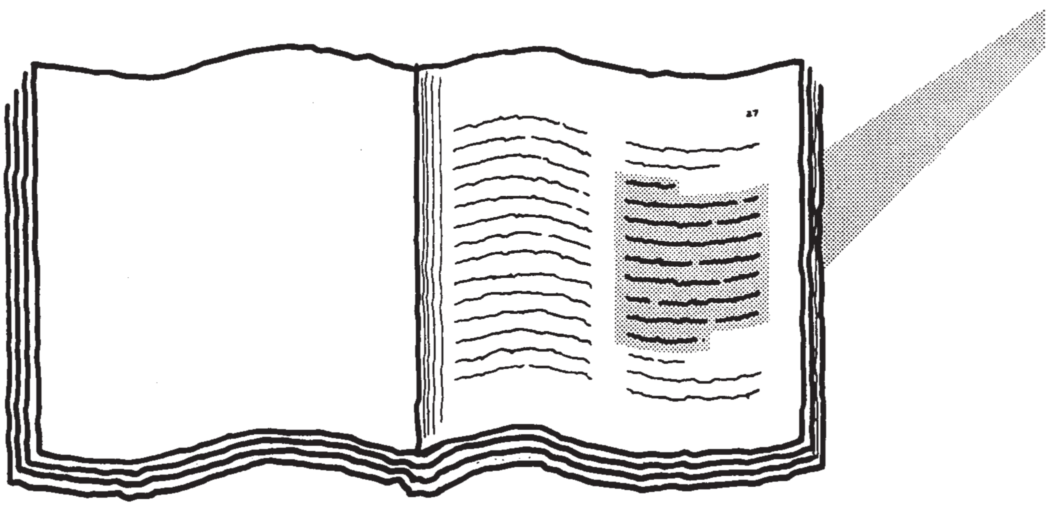


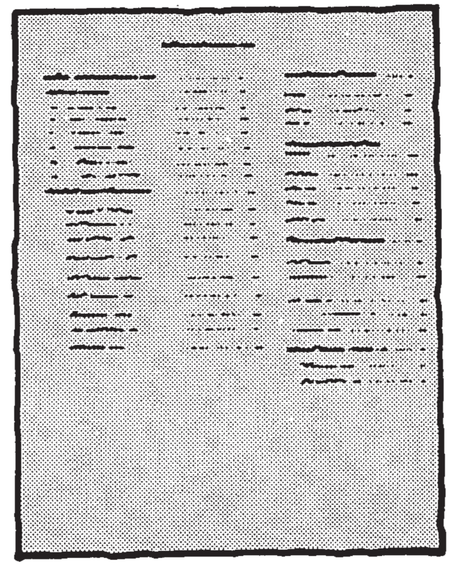
4. List the map unit symbols that are in your area



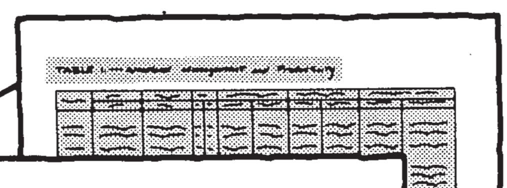
THIS SOIL SURVEY

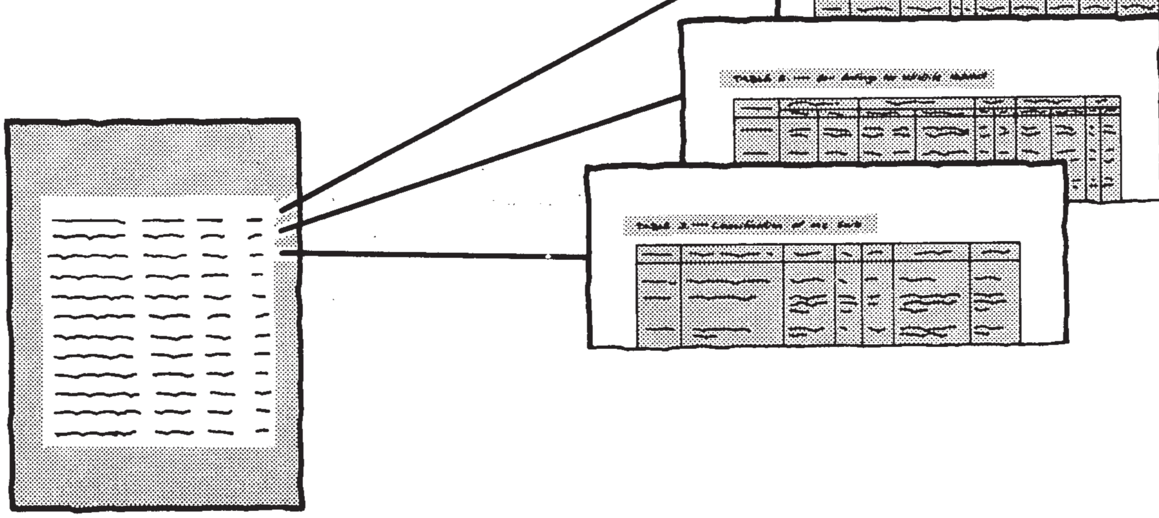
5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.





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





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

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

Major fieldwork for this soil survey was performed in the period 1973-1977. Soil names and descriptions were approved in 1978. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1978. This survey was made cooperatively by the Soil Conservation Service, the Virginia Polytechnic Institute and State University, and the Gloucester County Board of Supervisors. The survey is part of the technical assistance furnished to the Tidewater Soil and Water Conservation District.

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

Cover: Areas of Sulfaquents in Gloucester County provide the spawning grounds for many species of fish.

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Issued September 1980

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Foreword

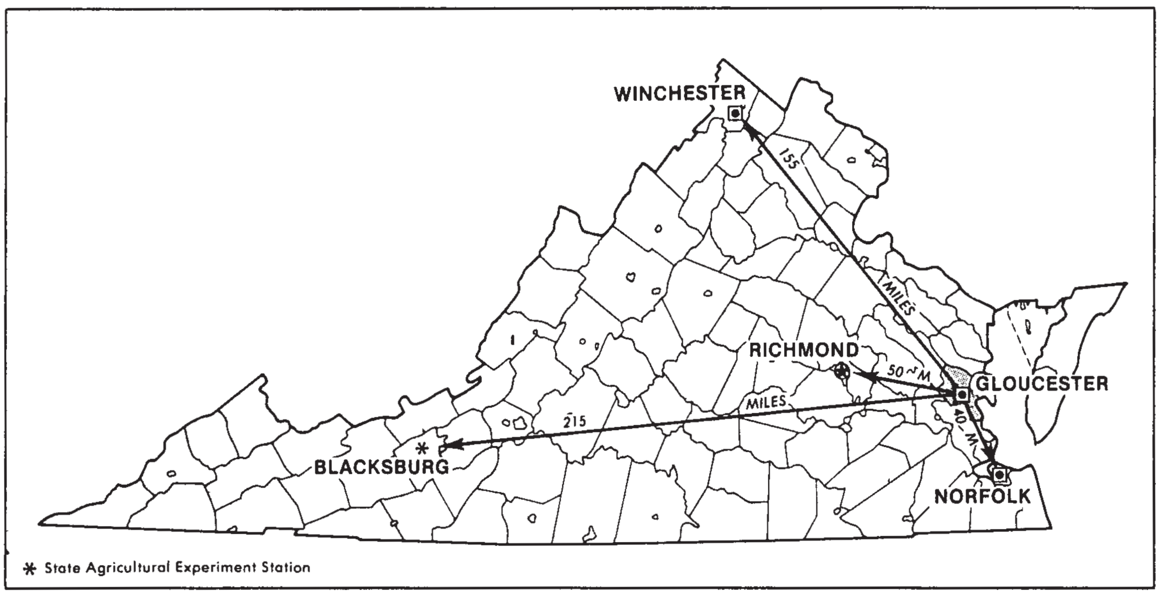
This soil survey contains information that can be used in land-planning programs in Gloucester County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

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

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

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

David N. Grimwood
State Conservationist
Soil Conservation Service



Location of Gloucester County in Virginia

Soil survey of Gloucester County, Virginia

by Michael E. Newhouse, Phillip R. Cobb, W. Scott Barnes, and
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University

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GLOUCESTER COUNTY is in eastern Virginia adjacent to Mobjack Bay and approximately 20 miles north of the Newport News-Hampton Roads metropolitan area. Settlement of the survey area began about 1640, and the county was formed from a part of York County in 1642. The county has an area of about 225 square miles, or 144,000 acres. Woodland covers about 65 percent of the acreage.

Although farming and wood-related industries have been the main land use, urban development from the metropolitan area of Newport News is expanding in certain areas of the county. Most of the farms in the county produce small grains, corn, and soybeans. A few raise hogs and cattle. The fishing industry is a major part of the local economy. Blue crabs, oysters, and several species of fish are harvested and processed in the county.

General nature of the county

This section provides general information about the climate and physiography, relief, and drainage of Gloucester County.

Climate

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

Table 1 gives data on temperature and precipitation for the survey area as recorded at Williamsburg, Virginia, in the period 1951 to 1976. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 41 degrees F, and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred at Williamsburg on January 22, 1970, is 1 degree. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Williamsburg, on June 26, 1952, is 104 degrees.

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

Of the total annual precipitation, 26 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 9.95 inches at Williamsburg on September 1, 1975. Thunderstorms occur on about 40 days each year, and most occur in summer.

Average seasonal snowfall is 9 inches. The greatest snow depth at any one time during the period of record was 19 inches. On an average of 3 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in March.

Physiography, relief, and drainage

Gloucester County lies entirely within the Atlantic Coastal Plain. The elevation of the county ranges from about sea level to 140 feet above sea level.

Generally, the Coastal Plain consists of both wet, flat land and well drained, rolling areas. The eastern part of the county is poorly drained and has an average elevation of less than 10 feet. The remaining part of the county is dissected by narrow, well drained ridges and wet stream bottoms and is between elevations of 40 and 140 feet. A few large wet flats are along US-17.

Long, narrow flood plains are along the small streams of the survey area. These streams are subject to short periods of high water. All streams empty into saltwater, which borders the county on the north, east, and south.

How this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

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

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "Soil maps for detailed planning."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers and woodland managers, engineers, planners, developers and builders, home buyers, and others.

General soil map for broad land use planning

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

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

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

Descriptions of map units

1. Sulfaquents-Fluvaquents

Deep, poorly drained and very poorly drained soils that are flooded by tides and that have a mixed sandy, loamy, and clayey substratum; in saltwater marshes

This unit makes up about 5 percent of the county. The soils are in areas, known locally as low saltwater marshes and high saltwater marshes, along Mobjack Bay and the York River. The low marshes are flooded during each high tide. The high marshes are flooded only during very high tides or storm tides.

Sulfaquents make up about 82 percent of this unit. They are in low saltwater marshes and are poorly drained and very poorly drained. Layers of organic material are on the surface and throughout the substratum of many areas of these soils.

Fluvaquents make up about 14 percent of the unit. They are in high saltwater marshes and are poorly drained.

Minor soils make up about 4 percent of the unit. These are mainly Ochraquults and Lumbee, Pamlico, and Portsmouth soils. These soils are poorly drained and very poorly drained. They are on slightly higher areas between the marshes and uplands and are not flooded by tides.

This unit is used mainly as wildlife habitat and as spawning grounds for many species of saltwater fish and blue crabs.

2. Lumbee-Lumbee Variant-Kalmia

Deep, poorly drained and well drained soils that have a dominantly loamy subsoil; at an elevation of less than 20 feet

This unit makes up about 10 percent of the county. It is on broad, low-lying flats near Guinea Neck and Ware Neck. The soils have a loamy surface layer and subsoil and a sandy substratum. Slopes range from 0 to 4 percent.

Poorly drained Lumbee soils make up about 55 percent of the unit and poorly drained Lumbee Variant soils about 11 percent. Both are on flats that extend to the water's edge in many places. Slopes are 0 to 2 percent.

Well drained Kalmia soils make up about 9 percent of the unit. The soils are mainly in narrow bands between the Lumbee and Lumbee Variant soils and areas of water. Slopes are 0 to 4 percent.

Minor soils make up about 25 percent of this unit. These are moderately well drained Johns, Johns Variant, and Pactolus soils; poorly drained Osier soils; and very poorly drained Pamlico and Portsmouth soils. The Johns,

Johns Variant, and Pactolus soils are on flats and in narrow bands between Lumbee and Lumbee Variant soils and water. The Osier soils are mainly in bands between flats and escarpments or higher lying uplands. The Pamlico and Portsmouth soils are on low-lying flats.

This unit is used mainly for cultivated crops and woodland. About half of the acreage has been cleared. Wetness of the soils is the main limitation for most uses. Large areas have been tile drained, but artificial drainage systems are often limited by a lack of outlets.

3. Meggett-Dogue

Deep, poorly drained and moderately well drained soils that have a dominantly clayey subsoil; at an elevation of less than 20 feet

This unit makes up about 12 percent of the county. It is on broad, low-lying flats mainly near Robins Neck, Saddlers Neck, and Zanoni Neck. The soils mainly have a loamy surface layer, a clayey subsoil, and a loamy substratum. Slopes range from 0 to 6 percent.

Poorly drained Meggett soils make up about 69 percent of the unit and moderately well drained Dogue soils about 16 percent. The Dogue soils are in narrow bands between the Meggett soils and saltwater.

Minor soils make up about 15 percent of this unit. These are moderately well drained Johns and Johns Variant soils, well drained Kalmia soils, somewhat poorly drained Okeetee soils, and very poorly drained Pamlico and Portsmouth soils. The Johns, Johns Variant, and Kalmia soils are in bands between flats and saltwater. The Okeetee, Pamlico, and Portsmouth soils are on flats.

This unit is used mainly for cultivated crops and woodland. More than half of the acreage is cleared. Wetness limits planting and harvesting, but open-ditch drainage systems are generally effective.

4. Suffolk-Eunola-Kenansville

Deep, well drained and moderately well drained soils that have a dominantly loamy subsoil; at an elevation of 30 to 50 feet

This unit makes up about 18 percent of the county. It is on broad ridges, mild side slopes, and upland flats. Slopes mainly range from 0 to 10 percent. Along some larger drainageways and streams, however, the slopes are as much as 50 percent.

Suffolk soils make up about 29 percent of the unit. They are well drained and have a loamy surface layer and subsoil and a sandy substratum. They are on broad ridges and mild slopes. Slopes range from 0 to 10 percent.

Eunola soils make up about 13 percent of the unit. They are moderately well drained and have a loamy surface layer and subsoil and a sandy substratum. They are on flats mainly near the Piankatank and York Rivers. Slopes range from 0 to 2 percent.

Kenansville soils make up about 10 percent of the unit. They are well drained and have a sandy surface layer, a loamy subsoil, and a sandy substratum. They are on broad ridges. Slopes range from 0 to 4 percent.

Minor soils make up about 48 percent of this unit. These are well drained to somewhat excessively drained Alaga and Rumford soils; well drained and moderately well drained Hapludults and Psamments; moderately well drained Craven, Kenansville Variant, and Pactolus soils; somewhat poorly drained and poorly drained Haplaquepts and Ochraquults; and poorly drained Fluvaquents. The Alaga, Kenansville Variant, and Pactolus soils and Haplaquepts and Ochraquults are on broad flats. The Rumford and Craven soils are on broad ridges and mild slopes. The Hapludults and Psamments are on steeper slopes mainly along drainageways and streams. The Fluvaquents are on stream bottoms.

This unit is used mainly for cultivated crops, woodland, and urban development. The Eunola soils and other soils with a seasonal high water table respond well to artificial drainage where outlets are available.

5. Emporia-Hapludults-Wrightsboro

Deep, well drained and moderately well drained soils that have a dominantly loamy or clayey subsoil; at an elevation of mainly more than 50 feet

This unit makes up about 29 percent of the county. It is on broad ridges, mild to steep slopes, and upland flats. Slopes are commonly 0 to 6 percent but are as much as 50 percent in places along larger drainageways and streams.

Emporia soils make up about 30 percent of the unit. They are well drained and have a loamy surface layer and subsoil. These Emporia soils are on broad ridges with slopes of 0 to 6 percent.

Hapludults make up about 27 percent of the unit. They are well drained and moderately well drained and have a sandy or loamy surface layer, a loamy or clayey subsoil, and a sandy, loamy, or clayey substratum. Hapludults are along larger drainageways and streams. In places they are intermingled with Psamments. Slopes range from 6 to 50 percent.

Wrightsboro soils make up about 16 percent of the unit. They are moderately well drained and have a loamy surface layer and subsoil. These Wrightsboro soils are on upland flats. Slopes are mainly 0 to 2 percent.

Minor soils make up about 27 percent of the unit. These are well drained Caroline, Ochlockonee, and Ochlockonee Variant soils; well drained and moderately well drained Psamments; moderately well drained Craven soils; somewhat poorly drained and poorly drained Ochraquults; and poorly drained Fluvaquents. The Caroline and Craven soils are on ridges. The Ochlockonee and Ochlockonee Variant soils are on toe slopes below mild to steep slopes. The Psamments are intermingled with Hapludults on mild to steep slopes. Ochraquults are on upland flats. Fluvaquents are on stream bottoms.

This unit is used mainly for woodland, but some areas have been cleared and are used for cultivated crops.

The soils do not respond well to tile drainage because of moderately slow permeability of the subsoil. A seasonal high water table and moderately slow permeability limit these soils for community development.

6. Kempsville-Hapludults-Eunola

Deep, well drained and moderately well drained soils that have a dominantly loamy or clayey subsoil; at all elevations

This unit makes up about 26 percent of the county. It is on broad ridges, mild to steep slopes, and upland flats. Slopes are commonly 0 to 6 percent but are as much as 50 percent in places along larger drainageways and streams.

Kempsville soils make up about 32 percent of this unit. They are well drained and are loamy throughout. These Kempsville soils are on broad ridges with slopes of 0 to 6 percent.

Hapludults make up about 16 percent of the unit. They are well drained and moderately well drained and have a sandy or loamy surface layer, a loamy or clayey subsoil, and a sandy, loamy, or clayey substratum. Hapludults are on mild to steep slopes along larger drainageways and streams. In places they are intermingled with Psamments. Slopes range from 6 to 50 percent.

Eunola soils make up about 9 percent of the unit. They are moderately well drained and have a loamy surface layer and subsoil and a sandy substratum. These Eunola soils are on upland flats with slopes of 0 to 2 percent.

Minor soils make up about 43 percent of the unit. These are well drained Kenansville, Ochlockonee, Ochlockonee Variant, and Suffolk soils; well drained and moderately well drained Psamments; moderately well drained Craven soils; somewhat poorly drained and poorly drained Haplaquepts and Ochraquults; and poorly drained Fluvaquents. The Craven, Kenansville, and Suffolk soils are on ridges and mild slopes. The Ochlockonee and Ochlockonee Variant soils are on toe slopes below mild to steep slopes. The Psamments are intermingled with Hapludults on mild to steep slopes. The Haplaquepts and Ochraquults are on upland flats. The Fluvaquents are on stream bottoms.

This unit is used mainly for woodland, but some large areas have been cleared and are used for cultivated crops. Many of the soils are well suited to farming or urban uses.

Soil maps for detailed planning

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

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

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil, a brief description of the soil profile, and a listing of the principal hazards and limitations to be considered in planning management.

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Dogue fine sandy loam, 0 to 2 percent slopes, is one of several phases in the Dogue series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Psamments-Hapludults complex, sloping, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Pamlico and Portsmouth soils is an undifferentiated group in this survey area.

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

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

Soil descriptions

1B—Alaga loamy sand, 0 to 4 percent slopes. This soil is nearly level and gently sloping and is well drained and somewhat excessively drained. The soil is on broad flats and terraces at an elevation of less than 50 feet. The areas are oval and range from 5 to 40 acres.

Typically, the surface layer of this soil is brown loamy sand about 9 inches thick. The substratum is yellowish brown loamy sand and pale brown sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Pactolus soils and well drained and somewhat excessively drained Rumford soils. The Pactolus soils are in slightly concave areas and at the heads of small drainageways. The Rumford soils are throughout the map unit. Included soils make up about 15 percent of the map unit.

The permeability of this Alaga soil is rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight, but soil blowing is a moderate hazard in unprotected areas. The surface layer is very friable and easily tilled through a wide range of moisture conditions. Roots in this soil extend to a depth of 60 inches or more. The soil is medium acid to very strongly acid throughout unless limed.

This soil is moderately well suited to farming. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. If the soil is cultivated, using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil help to add organic matter to the soil and control soil blowing.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures on this soil. The low available water capacity limits the selection of grasses and legumes for pastures.

The potential for trees on this soil, especially for loblolly pine, is moderately high. Most areas are wooded. Drought during the growing season restricts the survival of seedlings, and losses exceed 50 percent in some years. The soil is soft, thus limiting the use of heavy timber equipment.

The sandy, rapidly permeable substratum limits the soil for nonfarm use, but much of the acreage has been urbanized. The sandy texture makes excavations in the soil unstable. The sandy texture and the rapid permeability limit the soil as a site for septic tank absorption fields, sewage lagoons, and sanitary landfills.

The capability subclass is IIIs.

2B—Caroline loam, 0 to 4 percent slopes. This soil is well drained and is nearly level and gently sloping. It is generally in long and narrow areas at the ends of ridges. The areas range from 5 to 15 acres and are at the highest elevations in the county.

Typically, the surface layer of this soil is brown loam about 14 inches thick. The subsoil is brown and yellowish red clay about 38 inches thick. The substratum extends to a depth of 60 inches or more. It is brown sandy clay loam mottled with gray, brown, and red.

Included with this soil in mapping are small areas of moderately well drained Craven soils and well drained Emporia soils. The Craven soils are in concave areas on ridge crests and at the heads of small drainageways. The Emporia soils are throughout the map unit. Included soils make up about 15 percent of this map unit.

The permeability of this Caroline soil is moderately slow, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is slight to moderate. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are extremely acid to very strongly acid unless limed. Roots in this soil extend to a depth of 60 inches or more.

This soil is well suited to farming, and much of the acreage is used for cultivated crops. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures.

The potential for trees on this soil, especially for loblolly pine, yellow-poplar, and upland oaks, is moderately high. Much of the acreage is wooded. The rate of seedling survival is generally high if competing vegetation is controlled.

The shrink-swell potential in the subsoil, low strength, the clayey texture, and slow permeability limit this soil for nonfarm use. The low strength and moderate shrink-swell potential limit the soil as a building site. The clayey texture limits excavations and restricts vehicular traffic when the soil is wet. Slow permeability especially limits the soil as a site for septic tank absorption fields.

The capability subclass is IIe.

3A—Craven silt loam, 0 to 2 percent slopes. This soil is nearly level and moderately well drained. It is on broad flats on terraces at an elevation of 20 to 50 feet. The areas are rectangular and range from 5 acres to about 30 acres.

Typically, the surface layer of this soil is brown silt loam about 9 inches thick. The subsoil is about 44 inches thick. It is brown clay loam in the upper part and gray clay in the lower part. The substratum is gray sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola soils and poorly drained and somewhat poorly drained Ochraquults. The Eunola soils are in round or oval, convex areas throughout the map unit. Ochraquults are in concave areas at the heads of and along drainageways. Included soils make up about 15 percent of the map unit.

The permeability of this Craven soil is slow, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 60 inches, but root growth is somewhat restricted by the clayey texture of the subsoil at a depth of about 24 inches. The soil has a seasonal water table at a depth of 2 to 3 feet during winter and early spring.

Although wetness makes alfalfa short lived and restricts tillage in early spring, the soil is well suited to and used for farming. The clayey subsoil and a lack of outlets limit drainage. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Grazing during periods of seasonal wetness compacts the surface layer of the soil and damages the grasses and legumes.

The potential of this soil for trees, especially loblolly pine and Virginia pine, is moderately high. Much of the acreage is wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

The seasonal high water table, slow permeability, moderate shrink-swell potential, clayey texture, and low strength of the soil are the main limitations for nonfarm use. The slow permeability and seasonal high water table limit the soil as a site for sanitary landfills and septic systems, and the low strength and moderate shrink-swell potential limit the soil as a building site. The clayey subsoil limits excavations and restricts vehicular traffic when the soil is wet.

The capability subclass is IIw.

3B—Craven silt loam, 2 to 6 percent slopes. This soil is gently sloping and moderately well drained. The soil is on terraces at an elevation of 20 to 50 feet. Areas of the soil are rectangular and range from 5 to 30 acres.

Typically, the surface layer of this soil is brown silt loam about 9 inches thick. The subsoil is about 44 inches thick. It is brown clay loam in the upper part and gray clay in the lower part. The substratum is gray sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola soils and poorly drained and somewhat poorly drained Ochraquults. The Eunola soils are on round and oval, convex areas throughout the map unit. Ochraquults are in slightly concave areas at the heads of and along drainageways. Included soils make up about 15 to 20 percent of this map unit.

The permeability of this Craven soil is slow, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 60 inches, but root growth is somewhat restricted by the clayey texture of the subsoil at a depth of about 24 inches. The soil has a seasonal water table at a depth of 2 to 3 feet during winter and early spring.

Although wetness makes alfalfa short lived and restricts tillage in early spring, the soil is well suited to and used for farming. The clayey subsoil and a lack of outlets limit drainage. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer of the soil, damages the grasses and legumes, and increases erosion.

The potential of this soil for trees, especially loblolly pine and Virginia pine, is moderately high. Much of the acreage is wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

The seasonal high water table, slow permeability, moderate shrink-swell potential, clayey texture, and low strength of the soil are the main limitations for nonfarm use. The slow permeability and seasonal high water table limit the soil as a site for sanitary landfills and septic systems, and the low strength and moderate shrink-swell potential limit the soil as a building site. The clayey subsoil limits excavations and restricts vehicular traffic when the soil is wet.

The capability subclass is IIIe.

4A—Dogue fine sandy loam, 0 to 2 percent slopes. This soil is nearly level and moderately well drained. It is in bands near areas of saltwater. The areas of this soil range from 3 to 50 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 11 inches thick. The subsoil is about 37 inches thick. It is yellowish brown clay loam and sandy clay loam and has gray mottles in the lower part. The substratum is brown and green sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola and Johns soils, poorly drained Meggett soils, and somewhat poorly drained Okeetee soils. The Eunola and Johns soils are on round and oval, convex areas throughout the map unit. The Meggett and Okeetee soils are in concave areas at the heads of and along drainageways. Included soils make up about 15 percent of the map unit.

The permeability of this Dogue soil is moderately slow, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 60 inches. The soil has a seasonal water table at a depth of 2 to 3 feet during winter and early spring.

Although wetness makes alfalfa short lived and restricts tillage in early spring, the soil is well suited to and used for farming. The clayey subsoil and a lack of outlets limit drainage. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Grazing during periods of seasonal wetness compacts the surface layer of the soil and damages the grasses and legumes.

The potential of this soil for trees is high, especially for loblolly pine, sweetgum, yellow-poplar, and upland oaks. Much of the acreage is wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

The seasonal high water table, slow permeability, moderate shrink-swell potential, and low strength of the soil are the main limitations for nonfarm use. The slow permeability and seasonal high water table limit the soil as a site for sanitary landfills and septic systems, and the low strength and moderate shrink-swell potential limit the soil as a building site.

The capability subclass is IIw.

4B—Dogue fine sandy loam, 2 to 6 percent slopes. This soil is gently sloping and moderately well drained. It is in bands near areas of saltwater. The areas of this soil range from 3 to 50 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 11 inches thick. The subsoil is about 37 inches thick. It is yellowish brown clay loam and sandy clay loam and has gray mottles in the lower part. The substratum is brown and green sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola and Johns soils, poorly drained Meggett soils, and somewhat poorly drained Okeetee soils. The Eunola and Johns soils are throughout the map unit. The Meggett and Okeetee soils are in concave areas at the heads of and along drainageways. Included soils make up about 15 percent of the map unit.

The permeability of this Dogue soil is moderately slow, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 60 inches. The soil has a seasonal high water table at a depth of 2 to 3 feet during winter and early spring.

Although wetness makes alfalfa short lived and restricts tillage in early spring, the soil is well suited to and used for farming. The clayey subsoil and a lack of outlets limit drainage. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Grazing during periods of seasonal wetness compacts the surface layer of the soil and damages the grasses and legumes.

The potential of this soil for trees is high, especially for loblolly pine, sweet gum, yellow-poplar, and upland oaks. Much of the acreage is wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

The seasonal high water table, slow permeability, moderate shrink-swell potential, and low strength of the soil are the main limitations for nonfarm use. The slow permeability and seasonal high water table limit the soil as a site for sanitary landfills and septic systems, and the low strength and moderate shrink-swell potential limit the soil as a building site.

The capability subclass is IIe.

5A—Emporia sandy loam, 0 to 2 percent slopes. This soil is nearly level and well drained. It is in long, narrow areas on ridges. The areas range from 3 to 20 acres.

Typically, the surface layer of this soil is brown sandy loam about 14 inches thick. The subsoil extends to a depth of 60 inches or more. It is brown clay loam and sandy clay loam and has gray mottles in the lower part.

Included with this soil in mapping are small areas of well drained Kempsville soils and moderately well drained Wrightsboro soils. The Kempsville soils are throughout the map unit. The Wrightsboro soils are in concave areas at the heads of and along drainageways. Included soils make up about 15 percent of the map unit.

The permeability of this Emporia soil is moderate in the upper part of the subsoil and moderately slow in the lower part. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are commonly strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 60 inches. The soil has a seasonal water table at a depth of 3 to 4-1/2 feet during the winter and early spring.

This soil is well suited to farming, and much of the acreage is farmed. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures on this soil.

The potential for trees on this soil is moderately high, especially for loblolly pine, sweetgum, and upland oaks. Many areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

The seasonal high water table, moderate shrink-swell potential, and moderately slow permeability in the lower part of the subsoil limit this soil for nonfarm use. The seasonal high water table limits the soil as a site for sanitary landfills and sewage lagoons and, along with the moderately slow permeability, is a limitation for septic tank absorption fields. The shrink-swell potential limits the soil as a building site.

The capability class is I.

5B—Emporia sandy loam, 2 to 6 percent slopes. This soil is gently sloping and well drained. It is in long, narrow areas on ridges. The areas range from 3 to 20 acres.

Typically, the surface layer of this soil is brown sandy loam about 14 inches thick. The subsoil extends to a depth of 60 inches or more. It is brown clay loam and sandy clay loam and has gray mottles in the lower part.

Included with this soil in mapping are small areas of well drained Kempsville soils and moderately well drained Wrightsboro soils. Both are in concave areas at the heads of and along drainageways. Included soils make up about 15 percent of the map unit.

The permeability of this Emporia soil is moderate in the upper part of the subsoil and moderately slow in the lower part. Available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are commonly strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 60 inches. The soil has a seasonal water table at a depth of 2-1/2 to 4 feet during the winter and early spring.

This soil is well suited to farming, and much of the acreage is farmed. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures.

The potential for trees on this soil is moderately high, especially for loblolly pine, sweetgum, and upland oaks. Many areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

The seasonal high water table, moderate shrink-swell potential, and moderately slow permeability in the lower part of the subsoil limit this soil for nonfarm use. The seasonal high water table limits the soil as a site for sanitary landfills and sewage lagoons and, along with the moderately slow permeability, is a limitation for septic tank absorption fields. The shrink-swell potential limits the soil as a building site.

The capability subclass is IIe.

6—Eunola fine sandy loam. This soil is nearly level and moderately well drained. It is on broad flats throughout the county. The areas of this soil are oval or rectangular. They range from 3 to 100 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is brown fine sandy loam about 9 inches thick. The subsoil is about 41 inches thick. It is yellowish brown sandy clay loam in the upper part and gray sandy clay loam with gray mottles in the lower part. The substratum extends to a depth of 60 inches or more. It is gray sandy loam with pockets of sandy clay loam.

Included with this soil in mapping are small areas of well drained Kempsville and Suffolk soils and poorly drained and somewhat poorly drained Haplaquepts and Ochraquults. The Kempsville and Suffolk soils are in convex, slightly higher areas throughout the map unit. Haplaquepts and Ochraquults are in low, concave areas at the heads of and along drainageways. Included soils make up about 10 to 20 percent of the map unit.

The permeability of this Eunola soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed. The soil has a seasonal high water table at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Although wetness makes alfalfa short lived and restricts tillage and harvesting, the soil is well suited to farming, and much of the acreage is farmed. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is high, especially for loblolly pine, sweetgum, and yellow-poplar. Many areas are wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

A few areas of this soil are urbanized. The seasonal high water table is the main limitation of the soil for nonfarm use. It especially limits the soil as a site for sanitary landfills, sewage lagoons, and septic systems and as a building site.

The capability subclass is IIw.

7—Fluvaquents, frequently flooded. These soils are nearly level and poorly drained. They are in long and narrow, low-lying areas along small freshwater streams. The areas of these soils range from 10 to 300 acres. They are frequently flooded. Slopes range from 0 to 2 percent.

Generally, the surface layer of these soils is gray fine sandy loam, sandy loam, and loam about 10 inches thick. The underlying layers extend to a depth of 60 inches or more. They are commonly gray sandy loam to silty clay.

Included with these soils in mapping are small areas, generally less than 1 acre each, of poorly drained and very poorly drained Sulfaquents. Sulfaquents are along the lower courses of streams adjacent to tidal water. Included soils make up about 5 percent of the map unit.

The permeability of Fluvaquents is moderately slow to slow, and available water capacity is moderate. Surface runoff is very slow. Roots in these soils extend to a depth of 20 to 30 inches. The surface layer and underlying layers are commonly strongly acid to very strongly acid. The soils have a seasonal high water table between the surface and a depth of 1 foot during the winter and spring and commonly at a depth of 20 to 30 inches during the rest of the year.

These soils are used mostly for woodland. The high water table and the hazard of flooding limit the soils for most other uses.

The capability subclass is VIIw.

8—Fluvaquents, saline. These soils are nearly level and poorly drained. They are along the lower courses of small streams next to areas of saltwater and are frequently flooded by very high tides. The areas range from 3 to 50 acres. Slopes range from 0 to 2 percent.

Generally, the surface layer of these soils is black to gray sandy loam or loam about 10 inches thick. The underlying layers extend to a depth of 60 inches or more. They are commonly gray and stratified and range from sandy loam to silty clay.

Included with these soils in mapping are small, low-lying areas of poorly drained and very poorly drained Sulfaquents. Included soils make up about 10 to 15 percent of this map unit.

The permeability of Fluvaquents is moderately slow to slow, and available water capacity is moderate. Surface runoff is very slow. Roots in these soils extend to a depth of about 20 inches. The water table is between the surface and a depth of 1 foot year around.

These soils are used mainly for wildlife habitat. Wetness and flooding limit the soils for most other uses.

The capability subclass is VIIIw.

9C—Hapludults, sloping. These soils are sloping and well drained and moderately well drained. They are on side slopes of drainageways and streams. The areas are commonly long and winding and range from 5 to 75 acres. Slopes are 6 to 15 percent. Seeps and springs are common at the lower edges of the slopes.

Generally, the surface layer of these soils is brown loamy sand, fine sandy loam, sandy loam, or loam about 10 inches thick. The subsoil is 20 to 40 inches thick and is commonly brown sandy loam, sandy clay loam, sandy clay, or clay. Some areas of these soils have gray mottles at a depth of more than 20 inches. The substratum extends to a depth of 60 inches or more. It ranges from brown to gray sand and loamy sand to clay.

Included with these soils in mapping are well drained and moderately well drained Psamments in small areas throughout the map unit. Included soils make up about 10 to 15 percent of the map unit.

The permeability of Hapludults is moderate to slow, and available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are extremely acid to strongly acid unless limed. The root zone extends to a depth of 40 to 60 inches.

Slope makes these soils unsuited to cultivated crops, but the soils are moderately well suited to hay and pasture. Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures.

The potential for trees on these soils is moderately high, especially for loblolly pine, yellow-poplar, and upland oaks. Most areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

Slope, low strength, and the shrink-swell potential and slow permeability of the subsoil are the main limitations of these soils for nonfarm use. Slope limits the soils as a site for sanitary landfills and sewage lagoons and, along with the slow permeability, limits the soils as a site for septic systems. The shrink-swell potential and slope are the main limitations of the soils as a building site.

The capability subclass is VIe.

9D—Hapludults, steep. These soils are moderately steep and steep and are well drained and moderately well drained. They are in long and winding areas on side slopes of streams. The areas range from 5 to 75 acres. Slopes are 15 to 30 percent. Seeps and springs are common at the lower edges of the slopes.

Generally, the surface layer of these soils is brown loamy sand, fine sandy loam, sandy loam, and loam about 10 inches thick. The subsoil is 20 to 40 inches thick. It is commonly brown sandy loam, sandy clay loam, sandy clay, or clay. Some areas of these soils have gray mottles at a depth of more than 20 inches. The substratum extends to a depth of 60 inches or more. It ranges from brown to gray sand and loamy sand to clay.

Included with these soils in mapping are small areas of well drained and moderately well drained Psamments in areas throughout the map unit. Included soils make up about 10 to 15 percent of the map unit.

The permeability of Hapludults is moderate to slow, and available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The subsoil has a moderate shrink-swell potential. The surface layer and subsoil are commonly extremely acid to strongly acid. Roots in this soil extend to a depth of about 40 to 60 inches.

Slope makes these soils unsuited to cultivated crops or hay and poorly suited to pasture. Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, and deferred grazing help to increase the carrying capacity of pastures.

The potential for trees on this soil is moderately high, especially for yellow-poplar and upland oaks. Most areas are wooded. Seedlings survive and grow well if competing vegetation is controlled. Slope limits the safe operation of heavy timber equipment.

Slope, low strength, and the shrink-swell potential and slow permeability of the subsoil are the main limitations of these soils for nonfarm use. Slope limits the soils as a site for sanitary landfills and sewage lagoons and, along with the slow permeability, limits the soils as a site for septic systems. The shrink-swell potential and slope are the main limitations of the soils as a building site.

The capability subclass is VIIe.

10—Johns sandy loam. This soil is nearly level and moderately well drained. It is mostly long, narrow areas near Guinea Neck and Ware Neck. The areas range from 3 to 30 acres. Slopes are 0 to 2 percent.

Typically, the surface layer of ths soil is grayish brown sandy loam about 8 inches thick. The subsoil is about 28 inches thick. It is brown and gray sandy clay loam in the upper part and gray sandy loam in the lower part. The substratum is brown loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola soils, well drained Kalmia soils, and poorly drained Lumbee soils. The Eunola and Kalmia soils are in areas throughout the map unit. The Lumbee soils are at the heads of and along drainageways. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this Johns soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed. A seasonal water table is at a depth of 1-1/2 to 3 feet during winter and early spring.

Although wetness makes alfalfa short lived and restricts tillage and harvesting, the soil is well suited to farming, and much of the acreage is farmed. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is high, especially for loblolly pine, sweetgum, oaks, and yellow-poplar. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

The seasonal high water table and the sandy texture of the substratum limit this soil for nonfarm use. However, some areas are used for urban development. The seasonal high water table limits use of the soil as a building site or for septic tank absorption fields and, along with the sandy substratum, is a limitation for landfills, sewage lagoons, and excavations.

The capability subclass is IIw.

11—Johns Variant loamy sand. This soil is nearly level and moderately well drained. It is on broad flats at an elevation of less than 20 feet. The areas are oval or rectangular. They range from 3 to 50 acres. Slopes are 0 to 2 percent.

Typically, the surface layer of this soil is brown loamy sand about 12 inches thick. The subsoil is 20 inches thick. It is mostly yellowish brown sandy loam with grayish mottles in the lower part. The substratum extends to a depth of 60 inches or more. It is yellowish brown loamy sand with gray mottles.

Included with this soil in mapping are small areas of poorly drained Lumbee Variant soils and well drained to somewhat excessively drained Rumford soils. The Lumbee Variant soils are in concave areas, at the heads of and along drainageways, and along the edges of the map unit. The Rumford soils are in round, convex areas throughout the map unit. Included soils make up 10 to 15 percent of the map unit.

The permeability of this Johns Variant soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed. A seasonal water table is at a depth of 1 to 2 feet during winter and early spring.

Although wetness makes alfalfa short lived and restricts tillage and harvesting, the soil is well suited to farming, and much of the acreage is farmed. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is high, especially for loblolly pine, sweetgum, and yellow-poplar. Many areas are wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

The seasonal high water table and the sandy texture of the substratum limit this soil for nonfarm use. The seasonal high water table limits use of the soil as a building site or for septic tank absorption fields and, along with the sandy substratum, is a limitation for landfills, sewage lagoons, and excavations.

The capability subclass is IIw.

12B—Kalmia sandy loam, 0 to 4 percent slopes. This soil is nearly level and gently sloping and is well drained. It is in long, narrow areas at an elevation of less than 20 feet. The areas range from 3 to 25 acres.

Typically, the surface layer of this soil is brown sandy loam about 13 inches thick. The subsoil is mostly yellowish brown sandy clay loam about 20 inches thick. The substratum is mostly yellowish brown loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Johns soils and well drained to somewhat excessively drained Rumford soils. The Johns soils are in concave areas at the heads of drainageways and along the edges of the map unit. The Rumford soils are in areas throughout the map unit. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this Kalmia soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is well suited to farming, and many areas are used for cultivated crops. The soil is somewhat droughty during the growing season, but crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures.

The potential for trees on this soil is high, especially for loblolly pine, yellow-poplar, sweetgum, and upland oaks. Seedlings survive and grow well if competing vegetation is controlled.

Some areas of this soil are used for urban development, but the sandy texture of the substratum is a limitation for nonfarm use. The texture limits the soil as a site for sanitary landfills, sewage lagoons, and septic tank absorption fields and makes excavations in the soil unstable.

The capability subclass is IIe.

13A—Kempsville fine sandy loam, 0 to 2 percent slopes. This soil is nearly level and well drained. It is in long, narrow areas on ridges at elevations generally above 50 feet. The areas range from 3 to 200 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 18 inches thick. The subsoil is brown sandy clay loam and sandy loam about 35 inches thick. The substratum is stratified yellowish brown sandy loam, loamy sand, and sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Emporia and Suffolk soils and moderately well drained Eunola soils. The Emporia and Suffolk soils are in areas throughout the map unit. The Eunola soils are in concave areas at the heads of and along drainageways. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this Kempsville soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is very well suited to farming, and much of the acreage is farmed. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures.

The potential for trees on this soil is moderately high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Many areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

The moderately permeable subsoil and the sandy texture of the substratum are the main limitations of the soil for nonfarm use. The sandy substratum limits the use of the soil for sanitary landfills and sewage lagoons. The moderate permeablility of the subsoil is a limitation for septic tank absorption fields.

The capability class is I.

13B—Kempsville fine sandy loam, 2 to 6 percent slopes. This soil is gently sloping and well drained. It is in long, narrow areas on ridges at an elevation generally above 50 feet. The areas range from 3 to 200 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 18 inches thick. The subsoil is brown sandy clay loam and sandy loam about 35 inches thick. The substratum is stratified yellowish brown sandy loam, loamy sand, and sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Emporia and Suffolk soils and moderately well drained Eunola soils. The Emporia and Suffolk soils are in areas throughout the map unit. The Eunola soils are in concave areas at the heads of and along drainageways. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this Kempsville soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is well suited to farming, and much of the acreage is farmed. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures.

The potential for trees on this soil is moderately high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Many areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

The moderately permeable subsoil and the sandy texture of the substratum are the main limitations of this soil for nonfarm uses. The sandy substratum limits the use of the soil for sanitary landfills and sewage lagoons. The moderate permeability of the subsoil is a limitation for septic tank absorption fields.

The capability subclass is IIe.

14B—Kenansville loamy fine sand, 0 to 4 percent slopes. This soil is nearly level and gently sloping and is well drained. It is in oval or rectangular areas on broad flats. The areas range from 3 to 50 acres.

Typically, the surface layer of this soil is brown loamy fine sand about 9 inches thick. The subsurface layer is light yellowish brown loamy fine sand and sandy loam 24 inches thick. The subsoil is brown sandy clay loam and sandy loam 21 inches thick. The substratum is light yellowish brown loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Kenansville Variant soils, well drained to somewhat excessively drained Rumford soils, and well drained Suffolk soils. The Kenansville Variant soils are in concave areas and at the heads of and along drainageways. The Rumford and Suffolk soils are in areas throughout the map unit. Included soils make up about 15 to 20 percent at the map unit.

The permeability of this Kenansville soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight, but soil blowing is a hazard in unprotected areas. The surface layer is very friable and easily tilled through a wide range of moisture conditions. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is moderately well suited to farming. Much of the acreage is used for cultivated crops. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control soil blowing.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures.

The potential for trees on this soil is moderately high, especially for loblolly pine. Many areas are wooded. Seedlings are often damaged by drought, and losses exceed 50 percent in some years. The soil is soft, thus limiting the use of timber equipment.

The sandy texture and moderately rapid permeability of the subsoil and substratum limit the soil for nonfarm use. However, some areas are used for urban development. The texture and permeability of the subsoil and substratum especially limit the soil as a site for sanitary landfills, sewage lagoons, and septic systems. The sandy texture also makes excavations in the soil unstable.

The capability subclass is IIs.

15—Kenansville Variant loamy sand. This soil is nearly level and moderately well drained. It is in oval or rectangular areas on broad flats mostly between elevations of 40 to 80 feet. Slopes are 0 to 2 percent.

Typically, the surface layer of this soil is grayish brown loamy sand about 14 inches thick. The subsurface layer is pale brown loamy sand about 17 inches thick. The subsoil is strong brown and light gray sandy loam 26 inches thick. Gray mottles are at a depth of more than 40 inches. The substratum is light gray loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola soils and well drained Kenansville soils throughout the map unit. Included soils make up about 15 to 20 percent of the map unit.

The permeability of this Kenansville Variant soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight, but soil blowing is a hazard in unprotected areas. The surface layer is very friable and easily tilled through a wide range of moisture conditions. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed. A seasonal water table is at a depth of 2 to 4 feet during winter and early spring.

This soil is moderately well suited to farming, and much of the acreage is farmed. Alfalfa is short lived because of seasonal wetness. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help control soil blowing.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil.

The potential for trees on this soil is high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Many areas are wooded. Seedlings are often damaged by drought, and losses exceed 50 percent in some years. The soil is soft, thus limiting the use of timber equipment.

The seasonal high water table and the sandy texture of the soil are the main limitations for nonfarm use. They especially limit the soil as a site for sanitary landfills, sewage lagoons, and septic tank absorption fields. The high water table also limits the soil as a building site, and the sandy texture makes excavations unstable.

The capability subclass is IIw.

16—Lumbee sandy loam. This soil is nearly level and poorly drained. It is on broad flats mostly near Guinea Neck and Ware Neck. The areas of this soil are rectangular and range from 5 to 300 acres. Slopes are 0 to 2 percent.

Typically, the surface layer of this soil is grayish brown sandy loam about 9 inches thick. The subsoil is mostly gray sandy clay loam 20 inches thick. The substratum is light brownish gray and light yellowish brown loamy sand and sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Johns soils and poorly drained Lumbee Variant and Meggett soils. The Johns soils are in slightly higher, convex, oval or elongated areas commonly along the outer edges of the map unit. The Lumbee Variant and Meggett soils are throughout the map unit. Included soils make up about 15 to 20 percent of the map unit.

The permeability of this Lumbee soil is moderate, and available water capacity is low. Surface runoff is very slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed. A seasonal water table is between the surface and a depth of 1 foot during the winter and early spring.

This soil is moderately well suited to farming, and many areas are farmed, but drainage is needed. The seasonal high water table makes alfalfa short lived and interferes with tillage and harvesting. Many areas lack suitable drainage outlets, and the soil is droughty during the growing season in some years. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures on this soil. Grazing during periods of wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is high, especially for loblolly pine, sweetgum, and willow oak. Many areas are wooded. Control of competing vegetation is necessary for seedling survival. The soil is soft when wet, thus limiting the use of timber equipment.

The seasonal high water table and the sandy texture of the substratum are the main limitations of this soil for nonfarm use. They especially limit the soil as a site for sanitary landfills, sewage lagoons, and septic tank absorption fields. The high water table also limits the soil as a building site, and the sandy texture makes excavations unstable.

The capability subclass in drained areas is IIIw; in undrained areas VIw.

17—Lumbee Variant sandy loam. This soil is nearly level and poorly drained. It is on broad flats at elevations of less than 10 feet. Most areas are near Guinea Neck. The areas range from 3 to 200 acres. Slopes are 0 to 2 percent.

Typically, the surface layer of this soil is dark grayish brown sandy loam about 8 inches thick. The subsoil is mostly gray sandy loam about 22 inches thick. The substratum is light gray fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Johns Variant soils and poorly drained Lumbee soils. The Johns Variant soils are on slightly higher, convex, oval or elongated areas commonly along the outer edges of the map unit. The Lumbee soils are throughout the map unit. Included soils make up about 15 to 20 percent of the map unit.

The permeability of this Lumbee Variant soil is moderately rapid, and available water capacity is low. Surface runoff is very slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed. A seasonal water table is between the surface and a depth of 1 foot during winter and early spring.

This soil is moderately well suited to farming, and many areas are farmed, but drainage is needed. The seasonal high water table makes alfalfa short lived and interferes with tillage and harvesting. Many areas lack suitable drainage outlets, and in dry years the soil is droughty in places during the growing season. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is high, especially for loblolly pine, sweetgum, and willow oak. Many areas are wooded. Control of competing vegetation is necessary for seedling survival. The soil is soft when wet, thus limiting the use of timber equipment.

The seasonal high water table and the sandy texture of the substratum are the main limitations of the soil for nonfarm use. They especially limit the soil as a site for sanitary landfills, sewage lagoons, and septic tank absorption fields. The high water table also limits the soil as a building site, and the sandy texture makes excavations unstable.

The capability subclass in drained areas is IIIw; in undrained areas VIw.

18—Meggett sandy loam. This soil is nearly level and poorly drained. It is on terraces at an elevation of less than 20 feet (fig. 1). The areas of this soil are long and narrow. They range from 10 to 2,000 acres. Slopes are 0 to 2 percent.

Figure 1.—An area of Meggett sandy loam.

Typically, the surface layer of this soil is grayish brown and light brownish gray sandy loam about 10 inches thick. The subsoil is mostly gray sandy clay and clay about 38 inches thick. The substratum extends to a depth of 60 inches or more. It is a mixture of yellowish brown sandy loam and shell fragments.

Included with this soil in mapping are small areas of moderately well drained Dogue soils, poorly drained Lumbee soils, and somewhat poorly drained Okeetee soils. Included soils make up about 15 to 20 percent of the map unit.

The permeability of this soil is slow, and available water capacity is moderate. Surface runoff is very slow. The erosion hazard is slight. The surface layer is friable and easily tilled. It is commonly strongly acid to very strongly acid unless limed. The subsoil has a moderate shrink-swell potential. It is slightly acid to mildly alkaline. Roots in this soil extend to a depth of about 30 inches. The soil has a seasonal water table between the surface and a depth of 1 foot during the winter and spring and at a depth of about 30 inches for the rest of the year.

This soil is moderately well suited to farming, and many areas are farmed, but drainage is needed. The seasonal high water table makes alfalfa short lived and interferes with tillage and harvesting. Many areas lack suitable drainage outlets. Crops respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to improve the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces desirable grasses and legumes.

The potential for trees on this soil is very high, especially for loblolly pine, sweetgum, and willow oak. Much of the acreage is wooded. Control of competing vegetation is necessary for seedling survival. The soil is soft when wet, thus limiting the use of timber equipment. Trees on this soil blow over readily because of the limited rooting depth.

The seasonal high water table is the main limitation of the soil for nonfarm use. It especially limits the soil as a site for sanitary landfills, sewage lagoons, and septic tank absorption fields and as a building site.

The capability subclass in drained areas is IIIw; in depressional areas VIIw.

19—Ochlockonee-Ochlockonee Variant complex. This complex consists of nearly level, well drained soils that are so intermingled that it was not practical to map them separately. The complex is in long, narrow areas at the base of sloping to steep uplands. The areas range from 3 to 20 acres. Slopes are 0 to 2 percent. The complex is about 40 percent Ochlockonee sandy loam, 30 percent Ochlockonee Variant sandy loam, and 30 percent other soils.

Typically, the surface layer of the Ochlockonee soil is brown sandy loam about 22 inches thick. The substratum extends to a depth of 60 inches or more. The upper part is dark yellowish brown sandy loam, and the lower part brown loamy sand.

Typically, the surface layer of the Ochlockonee Variant soil is dark grayish brown sandy loam about 10 inches thick. The substratum is brown sandy clay loam and sandy loam to a depth of 60 inches or more.

Included in this complex in mapping are small areas of poorly drained Fluvaquents and well drained and moderately well drained Hapludults and Psamments.

The permeability of the major soils of this complex is moderate, and available water capacity is low to moderate. Surface runoff is medium. The surface layer is friable and easily tilled. Roots in these soils extend to a depth of about 60 inches. The surface layer and substratum are commonly strongly acid or very strongly acid unless limed. A seasonal water table is at a depth of 3 to 4 feet during winter and early spring.

This complex is moderately well suited to farming, and many areas are farmed. The soils are somewhat droughty during the growing season, and crop response to lime and fertilizer is limited by the low to moderate available water capacity. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to improve the carrying capacity of pastures on these soils.

The potential for trees on these soils is very high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Much of the acreage is wooded. Seedlings survive and grow well if competing vegetation is controlled.

The seasonal high water table and the permeability and sandy texture of the substratum are the main limitations of these soils for nonfarm use. The seasonal high water table and the permeability limit the soil as a site for sanitary landfills, sewage lagoons, and septic systems. The sandy texture makes excavations in the soils unstable.

The capability subclass is IIe.

20—Ochraquults, nearly level. These soils are nearly level and poorly drained and somewhat poorly drained. They are on broad flats and terraces at an elevation of more than 20 feet. Areas of these soils are oval or rectangular. They range from 10 to 1,000 acres.

Generally, the surface layer of these soils is grayish brown fine sandy loam to loam 5 to 15 inches thick. The subsoil is 30 to 40 inches thick. It ranges from gray to light olive brown and from clay loam and sandy clay loam to clay. The substratum extends to a depth of 60 inches or more. It is generally gray clay loam, sandy clay loam, or clay.

Included with these soils in mapping are small areas of moderately well drained Wrightsboro soils on slightly higher, convex, oval or elongated areas along the outer parts of the map unit. These included soils make up about 5 to 10 percent of the unit.

The permeability of Ochraquults is moderate in the upper part of the subsoil and moderately slow to slow in the lower part. Available water capacity is moderate. The erosion hazard is slight. Surface runoff is very slow. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of 20 to 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed. A seasonal water table is between the surface and a depth of 1 foot during winter and spring and is mainly at a depth of about 30 to 40 inches during the rest of the year.

The high water table makes these soils poorly suited to farming. It interferes with tillage and harvesting. Drainage helps control the wetness, but suitable outlets are difficult to locate. Crops respond well to applications of lime and fertilizer. If these soils are cultivated, using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soils add organic matter to the soils and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures on these soils. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on these soils is high, especially for loblolly pine, sweetgum, and willow oak. Most areas are wooded. Control of competing vegetation is necessary for seedling survival. The soils are soft when wet, thus limiting the use of timber equipment during periods of wetness. Trees on these soils are blown over readily because of the wetness and limited rooting depth.

The seasonal high water table is the main limitation of these soils for nonfarm use. It especially limits the soils as a site for sanitary landfills, septic systems, and sewage lagoons and as a building site.

The capability subclass is IIIw.

21—Ochraquults-Haplaquepts complex. This complex consists of nearly level, poorly drained and somewhat poorly drained soils that are so intermingled that it was not practical to map them separately. The complex is in oval or rectangular areas at an elevation of more than 20 feet. The areas range from 5 to 200 acres. Slopes are 0 to 2 percent. The complex is about 60 percent Ochraquults, 30 percent Haplaquepts, and 10 percent other soils.

Generally, the surface layer of the Ochraquults is grayish brown and ranges from fine sandy loam to loam 5 to 15 inches thick. The subsoil is 30 to 40 inches thick. It ranges from gray to light olive brown clay loam and sandy clay loam to clay. The substratum is generally gray clay loam, sandy clay loam, or clay to a depth of 60 inches or more.

Generally, the surface layer of the Haplaquepts is grayish brown loamy fine sand to sandy loam 5 to 15 inches thick. The subsoil is mostly gray and ranges from sandy loam to sandy clay loam 20 to 30 inches thick. The substratum extends to a depth of 60 inches or more. It is gray and ranges from loamy sand to sandy clay loam.

Included with this complex in mapping are small, narrow areas of moderately well drained Eunola soils.

The permeability of the major soils of this complex is moderate to slow. Surface runoff is very slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in these soils extend to a depth of about 30 inches. The surface layer and subsoil are commonly extremely acid to strongly acid unless limed. A seasonal water table is between the surface and a depth of 1 foot during winter and spring and is mainly at a depth of 30 to 40 inches for the rest of the year.

The high water table makes these soils poorly suited to farming, but much of the acreage is farmed. Wetness interferes with tillage and harvesting. Drainage helps control the wetness, but suitable outlets are difficult to locate in these soils. Crops respond well to applications of lime and fertilizer. If the soils are cultivated, using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soils and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures on these soils. Grazing during periods of wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on these soils is high, especially for loblolly pine, sweetgum, and willow oak. Many areas are wooded. Control of competing vegetation is needed for seedling survival. These soils are soft when wet, thus limiting the use of timber equipment. Trees blow over readily on these soils because of the wetness and limited rooting depth.

The seasonal water table is the main limitation of these soils for nonfarm use. It especially limits the soils as a site for sanitary landfills, sewage lagoons, and septic tank absorption fields and as a building site.

The capability subclass is IIIw.

22—Okeetee sandy loam. This soil is nearly level and somewhat poorly drained. It is in long, narrow areas at an elevation of less than 20 feet. The areas range from 3 to 30 acres. Slopes are 0 to 2 percent.

Typically, the surface layer of this soil is dark grayish brown sandy loam about 6 inches thick. The subsoil is about 35 inches thick. It is brown sandy clay loam and clay with grayish mottles. The substratum extends to a depth of 60 inches or more. It is light brownish gray sandy loam in the upper part. The lower part consists of shell fragments mixed with loamy material.

Included with this soil in mapping are small, narrow areas of moderately well drained Dogue soils and poorly drained Meggett soils. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this Okeetee soil is slow, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 40 inches. The soil has a seasonal high water table at a depth of 6 inches to 1 foot during the winter and spring.

Although wetness makes alfalfa short lived and restricts tillage and harvesting, the drained areas of the soil are moderately well suited to farming, and much of the acreage is farmed. Some areas of the soil lack suitable outlets. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, drainage, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is very high, especially for loblolly pine, Virginia pine, sweetgum, yellow-poplar, and oaks. Many areas are wooded. Control of competing vegetation is necessary for seedling survival. The soil is soft when wet, thus limiting the use of timber equipment during periods of seasonal wetness.

The seasonal high water table is the main limitation of the soil for nonfarm use. It especially limits the soil as a site for sanitary landfills, sewage lagoons, and septic systems and as a building site.

The capability subclass is IIw in drained areas; IVw in undrained areas.

23—Osier loamy fine sand. This soil is nearly level and poorly drained. It is in long, narrow areas at the base of escarpments and near areas of water. The areas of soil range from 3 to 25 acres and are frequently flooded. Slopes are 0 to 2 percent.

Typically, the surface layer of this soil is black loamy fine sand about 8 inches thick. The substratum is light brownish gray and light gray loamy fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of poorly drained Lumbee Variant soils and moderately well drained Pactolus soils. The Lumbee Variant soils are along the edges of the map unit next to escarpments and uplands. The Pactolus soils are along the edges of the map unit near areas of water. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this Osier soil is rapid, and available water capacity is low. Surface runoff is very slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Root growth is restricted by the water table to a depth of about 30 inches. The surface layer and substratum are commonly very strongly acid to extremely acid unless limed. A seasonal water table is between the surface and a depth of 1 foot during winter and spring.

Drained areas of this soil are moderately well suited to farming, but suitable outlets are difficult to locate. Wetness interferes with tillage and harvesting. The drained areas are droughty during the growing season in dry years, and crop response to lime and fertilizer is limited by the low available water capacity. If the soil is cultivated, using minimum tillage, cover crops, and grasses and legumes in the cropping system and returning crop residue to the soil add organic matter to the soil.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is moderately high, especially for loblolly pine. Most areas are wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft, thus limiting the use of timber equipment. Trees on this soil blow over readily because of the wetness and limited rooting depth.

The seasonal high water table and the rapid permeability and sandy texture of the soil are the main limitations for nonfarm use. The seasonal high water table limits the soil as a building site and as a site for septic tank absorption fields and, along with the permeability of the substratum, is a limitation for sanitary landfills and sewage lagoons. The sandy texture makes excavations in the soil unstable.

The capability subclass is IIIw in drained areas; Vw in undrained areas.

24B—Pactolus loamy sand, 0 to 4 percent slopes. This soil is nearly level and very gently sloping and is moderately well drained. It is on terraces at an elevation of less than 50 feet. The areas range from 3 to 40 acres.

Typically, the surface layer of this soil is dark brown loamy sand about 11 inches thick. The substratum is light yellowish brown and light gray loamy sand and sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained and somewhat excessively drained Alaga soils and poorly drained Osier soils. Included soils make up about 10 to 15 percent of the map unit.

The permeability of this Pactolus soil is rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight, but soil blowing is a moderate hazard in unprotected areas. The surface layer is friable and easily tilled through a wide range of moisture conditions. Roots in this soil extend to a depth of about 60 inches. The surface layer and substratum are commonly strongly acid or very strongly acid unless limed. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

This soil is moderately well suited to farming, and most of the acreage is farmed. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control soil blowing. Drainage helps control wetness in some areas.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to improve the carrying capacity of pastures on this soil. The droughty condition of the soil is a concern when selecting grasses and legumes for pastures and in planning lime and fertilizer applications. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is moderately high, especially for loblolly pine. Seedlings survive and grow well if competing vegetation is controlled, but they are often damaged by drought. The soil is soft, thus limiting the use of timber equipment.

The seasonal high water table and the sandy texture and rapid permeability of the substratum are the main limitations of this soil for nonfarm use. The seasonal high water table limits use of the soil as a buiding site or as a site for septic systems and, along with the rapid permeability, is a limitation for sanitary landfills and sewage lagoons. The sandy texture makes excavations in the soil unstable.

The capability subclass is IIIs.

25—Pamlico and Portsmouth soils. This unit consists of nearly level, very poorly drained soils in depressional areas. Slopes are 0 to 2 percent. The areas of this unit are long and narrow and range from about 3 to 20 acres. The total acreage of the unit is about 50 percent Pamlico soils, 30 percent Portsmouth soils, and 20 percent other soils. Some units consist mainly of Pamlico soils, some of Portsmouth soils, and some of both. The soils were mapped together because they have no major differences in use and management.

Typically, the surface layer of the Pamlico soils is black peat about 4 inches thick. The subsurface layer is black and dark brown muck about 14 inches thick. The substratum is light gray sand to a depth of 60 inches or more.

Typically, the surface layer of the Portsmouth soils is dark gray and grayish brown sandy loam about 15 inches thick. The subsoil is gray sandy clay loam and sandy loam about 15 inches thick. The substratum is light gray loamy sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of poorly drained Lumbee, Lumbee Variant, Meggett, and Osier soils. These soils are commonly on slightly higher areas at the edges of the map unit.

The permeability of the Pamlico and Portsmouth soils is moderate, and available water capacity is low. Surface runoff is very slow, and water is ponded on the surface of some areas. Roots in these soils extend to a depth of about 20 inches. The surface layer and underlying layers are commonly extremely acid to strongly acid. The soils have a seasonal water table between the surface and a depth of 1 foot from winter to early summer and at a depth of 2 to 3 feet for the rest of the year.

The high water table makes these soils generally unsuitable for farming. Drainage is needed to control the wetness, but outlets are very difficult to locate in these soils.

The potential for trees on these soils is moderately high, especially for water-tolerant hardwoods and, on some sites, loblolly pine. Most areas are wooded. Wetness severely limits the use of timber equipment, and seedlings are often damaged or destroyed by water on the surface. Trees blow over readily on these soils because of the wetness and shallow rooting depth.

The high water table limits these soils for most nonfarm uses.

The capability subclass is IVw in drained areas; VIIw in undrained areas.

26A—Psamments, nearly level. These soils are nearly level and well drained and moderately well drained. They are in sand pits, borrow areas, or small fill areas. The areas are rectangular and range from 3 to 35 acres. Slopes are mostly 0 to 2 percent.

Generally, these soils consist of brown and yellow loamy sand and sand 60 inches thick or more.

Included with these soils in mapping are small wet spots and small areas with water on the surface.

The permeability in these soils is rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight. The soils are commonly extremely acid to strongly acid. Many areas have a seasonal high water table at a depth of 2 to 3 feet during winter and spring.

The seasonal high water table, rapid permeability, sandy texture, and location limit these soils for most uses. A few areas have been planted to pine, and a few of the filled areas are used for building sites.

The capability subclass is VIIw.

27C—Psamments-Hapludults complex, sloping. This complex consists of sloping, well drained and moderately well drained soils that are so intermingled that it was not practical to map them separately. The complex is in long, narrow areas along drainageways and streams. The areas range from 5 to 50 acres. Slopes are 6 to 15 percent. Psamments make up about 50 percent of the complex, Hapludults about 40 percent, and other soils about 10 percent.

Generally, the surface layer of the Psamments is pale brown loamy fine sand or sand about 8 to 20 inches thick. The substratum extends to a depth of 60 inches or more. It is yellowish red to yellowish brown loamy sand and sand. In places, gray mottles are at a depth of about 20 to 40 inches.

Generally, the surface layer of the Hapludults is pale brown sandy loam and loamy sand about 6 to 36 inches thick. The subsoil ranges from 14 to 44 inches thick and is mostly yellowish brown sandy loam and sandy clay loam. In places, gray mottles are in the subsoil at a depth of 30 to 40 inches. The substratum is mostly sandy loam and loamy sand to a depth of 60 inches or more.

Included with this complex in mapping are small, narrow areas of well drained Kempsville and Suffolk soils generally along the upper slopes of the map unit.

The permeability of the major soils of this complex is moderately slow to rapid, and available water capacity is low to moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled, and the underlying layers have a low to moderate shrink-swell potential. The surface layer and underlying layers are commonly extremely acid to strongly acid unless limed. Seeps and springs are common at the lower edges of slopes of this complex. In places, a seasonal water table is at a depth of 2 to 4 feet during winter and spring.

This complex is not suited to cultivated crops but is moderately well suited to hay and pasture. The soils are droughty during the growing season, and response to lime and fertilizer is limited by the low to moderate available water capacity.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on these soils. The droughty condition of the soils is a concern when selecting grasses and legumes for pasture and planning lime and fertilizer applications.

The potential for trees on these soils is moderately high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Most areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

Slope, extremes in permeability, the sandy texture of the substratum, and the moderate shrink-swell potential limit these soils for nonfarm use. Slope is a major limitation for landfills, sewage lagoons, septic tank absorption fields, and building sites. The parts of the unit with rapid permeability are further limited for sewage lagoons and sanitary landfills; the parts with moderately slow permeability are limited for septic tank absorption fields. The shrink-swell potential also limits these soils as a building site, and the sandy texture makes excavations in these soils unstable.

The capability subclass is VIe.

27D—Psamments-Hapludults complex, steep. This complex consists of moderately steep and steep, well drained and moderately well drained soils that are so intermingled that it was not practical to map them separately. The complex is in long, narrow areas along streams. The areas range from 5 to 50 acres. Slopes range from 15 to 50 percent. Psamments make up about 60 percent of the complex, Hapludults about 30 percent, and other soils about 10 percent.

Generally, the surface layer of the Psamments is brown loamy fine sand, loamy sand, and sand about 8 to 20 inches thick. The substratum extends to a depth of about 60 inches or more. It is yellowish red to yellowish brown loamy sand and sand. In places, gray mottles are at a depth of 20 to 40 inches.

Generally, the surface layer of the Hapludults is pale brown sandy loam and loamy sand about 6 to 36 inches thick. The subsoil ranges from 14 to 44 inches thick and is mostly yellowish brown sandy loam and sandy clay loam. In places, gray mottles are in the subsoil at a depth of 30 to 40 inches. The substratum is mostly sandy loam and loamy sand to a depth of 60 inches or more.

Included with this complex in mapping are small areas of soils with slopes of more than 50 percent and wet soils at the base of slopes. Also included are small severely eroded areas and small sand pits and borrow pits.

The permeability of the major soils of this complex is moderately slow to rapid, and available water capacity is low to moderate. Surface runoff is rapid. The erosion hazard is very severe. The underlying layers have a low to moderate shrink-swell potential. Roots in these soils extend to a depth of about 60 inches. The surface layer and underlying layers are commonly extremely acid to strongly acid. Seeps and springs are common at the lower edges of slopes of this complex.

Slope and droughty conditions during the growing season make this complex unsuitable for cultivated crops or hay and poorly suited to pasture. Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, and deferred grazing help to improve the carrying capacity of pastures on these soils. The droughty condition of the soils is a concern when selecting grasses and legumes for pastures.

The potential for trees on these soils is moderately high, especially for yellow-poplar and upland oaks. Most areas are wooded. Seedlings survive and grow well if competing vegetation is controlled. Slope limits the safe operation of heavy timber equipment.

Slope is the main limitation of these soils for most nonfarm uses. It especially limits the soils as a site for sanitary landfills and septic tank absorption fields and as a building site.

The capability subclass is VIIe.

28A—Rumford loamy fine sand, 0 to 2 percent slopes. This soil is nearly level and well drained and somewhat excessively drained. It is in oval or rectangular areas on broad flats. The areas range from 3 to 50 acres in size.

Typically, the surface layer of this soil is dark brown loamy fine sand about 7 inches thick (fig. 2). The subsoil is strong brown and yellowish red fine sandy loam about 35 inches thick. The substratum is stratified yellowish red, brownish yellow, and strong brown fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained and somewhat excessively drained Alaga soils and well drained Suffolk soils throughout the map unit. They make up about 10 to 15 percent of the unit.

The permeability of this Rumford soil is moderately rapid, and available water capacity is low to moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is very friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is very well suited to farming, and much of the acreage is used for cultivated crops. The soil is somewhat droughty during the growing season, and crop response to lime and fertilizer is limited by the low to moderate available water capacity. Using minimum tillage

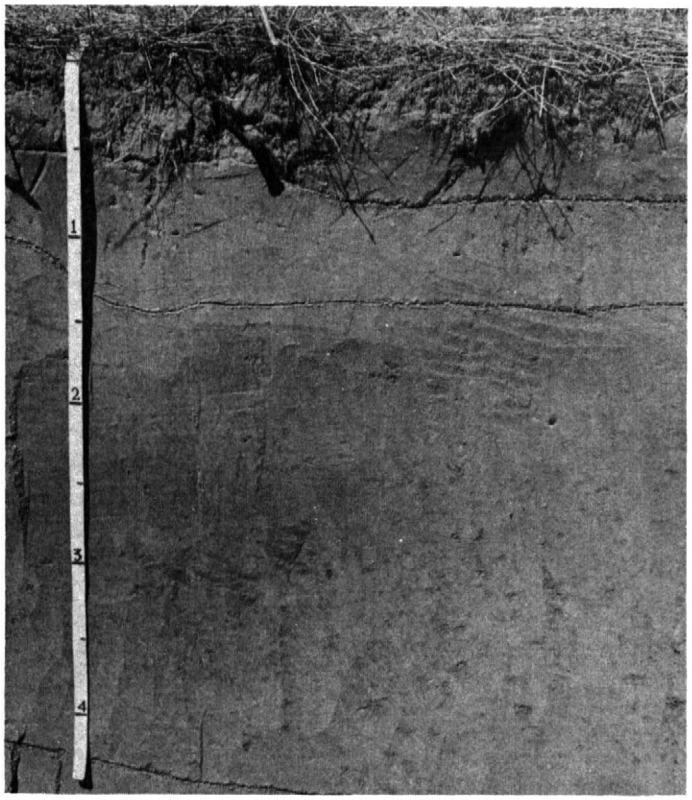

Figure 2.—A typical profile of Rumford loamy fine sand, 0 to 2 percent slopes. The increments on the marker are in feet.

and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil. The droughty condition of the soil is a concern when selecting grasses and legumes for pasture and in planning lime and fertilizer applications.

The potential for trees on this soil is moderately high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Seedlings survive and grow well if competing vegetation is controlled.

Many areas of this soil are used for urban development. The main limitations for nonfarm use are the moderately rapid permeability and sandy texture of the substratum. The permeability limits use for sanitary landfills and sewage lagoons, and the sandy texture makes excavations unstable.

The capability class is I.

28B—Rumford loamy fine sand, 2 to 6 percent slopes. This soil is gently sloping and well drained and somewhat excessively drained. It is in oval or rectangular, broad areas. The areas range from 3 to 50 acres.

Typically, the surface layer of this soil is dark brown loamy fine sand about 7 inches thick. The subsoil is strong brown and yellowish red fine sandy loam about 35 inches thick. The substratum is stratified yellowish red, brownish yellow, and strong brown fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained and somewhat excessively drained Alaga soils and well drained Suffolk soils throughout the map unit. They make up about 10 to 15 percent of the unit.

The permeability of this Rumford soil is moderately rapid, and available water capacity is low to moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is very friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is well suited to farming, and much of the acreage is used for cultivated crops. The soil is somewhat droughty during the growing season, and crop response to lime and fertilizer is limited by the low to moderate available water capacity. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil. The droughty condition of the soil is a concern when selecting grasses and legumes for pasture and in planning lime and fertilizer applications.

The potential for trees on this soil is moderately high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Seedlings survive and grow well if competing vegetation is controlled.

Many areas of this soil are used for urban development. The main limitations for nonfarm use are the moderately rapid permeability and sandy texture of the substratum. The permeability limits use for sanitary landfills and sewage lagoons, and the sandy texture makes excavations unstable.

The capability subclass is IIe.

28C—Rumford loamy fine sand, 6 to 10 percent slopes. This soil is sloping and well drained and somewhat excessively drained. It is in oval or rectangular, broad areas. The areas range from 3 to 50 acres.

Typically, the surface layer of this soil is dark brown loamy fine sand about 7 inches thick. The subsoil is strong brown and yellowish red fine sandy loam about 35 inches thick. The substratum is stratified yellowish red, brownish yellow, and strong brown fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained and somewhat excessively drained Alaga soils and well drained Suffolk soils throughout the map unit. They make up about 10 to 15 percent of the unit.

The permeability of this Rumford soil is moderately rapid, and available water capacity is low to moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is very friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is moderately well suited to farming, and much of the acreage is used for cultivated crops. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low to moderate available water capacity. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil. The droughty condition of the soil is a concern when selecting grasses and legumes for pasture and in planning lime and fertilizer applications.

The potential for trees on this soil is moderately high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Seedlings survive and grow well if competing vegetation is controlled.

Many areas of this soil are used for urban development. The main limitations for nonfarm use are slope and the moderately rapid permeability and sandy texture of the substratum. The permeability limits use for sanitary landfills and sewage lagoons, and the sandy texture makes excavations unstable. The slope is also a limitation for sewage lagoons and limits the soil for septic tank absorption fields and as a building site.

The capability subclass is IIIe.

29A—Suffolk fine sandy loam, 0 to 2 percent slopes. This soil is nearly level and well drained. It is on broad flats at an elevation of more than 20 feet. The areas of this soil are oval or rectangular and range from 3 to 200 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 10 inches thick. The subsoil is mostly strong brown sandy clay loam and sandy loam about 31 inches thick. The substratum is strong brown and reddish yellow loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola soils, well drained Kempsville soils, and well drained and somewhat excessively drained Rumford soils. These soils make up about 10 to 15 percent of the map unit.

The permeability of this Suffolk soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is very well suited to farming. Some areas are used for cultivated crops, which respond well to applications of lime and fertilizer. Using minimum tillage and use of cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil.

The potential for trees on this soil is high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Some areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

The permeability and sandy texture of the substratum limit this soil for nonfarm use, especially for sanitary landfills and sewage lagoons. Many areas, however, are used for urban development. The sandy texture makes excavations in the soil unstable.

The capability class is I.

29B—Suffolk fine sandy loam, 2 to 6 percent slopes. This soil is gently sloping and well drained. It is in broad areas at an elevation of more than 20 feet. The areas are oval or rectangular and range from 3 to 200 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 10 inches thick. The subsoil is mostly strong brown sandy clay loam and sandy loam about 31 inches thick. The substratum is strong brown and reddish yellow loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Eunola soils, well drained Kempsville soils, and well drained and somewhat excessively drained Rumford soils. These soils make up about 10 to 15 percent of the map unit.

The permeability of this Suffolk soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is well suited to farming. Some areas are used for cultivated crops, which respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil.

The potential for trees on this soil is high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Some areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

The permeability and sandy texture of the substratum limit this soil for nonfarm use, especially for sanitary landfills and sewage lagoons. Many areas, however, are used for urban development. The sandy texture makes excavations on the soil unstable.

The capability subclass is IIe.

29C—Suffolk fine sandy loam, 6 to 10 percent slopes. This soil is sloping and well drained. It is in long, narrow areas on escarpments throughout the county. The areas range from 3 to 30 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 10 inches thick. The subsoil is mostly strong brown sandy clay loam and sandy loam about 31 inches thick. The substratum is strong brown and reddish yellow loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained and somewhat excessively drained Rumford soils and well drained and moderately well drained Hapludults and Psamments. These soils make up about 15 to 20 percent of the map unit.

The permeability of this Suffolk soil is moderate, and available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled. Roots in this soil extend to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless limed.

This soil is moderately well suited to farming. Some areas are used for cultivated crops, which respond well to applications of lime and fertilizer. Using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures on this soil.

The potential for trees on this soil is high, especially for loblolly pine, Virginia pine, yellow-poplar, and upland oaks. Some areas are wooded. Seedlings survive and grow well if competing vegetation is controlled.

Slope and the permeability and sandy texture of the substratum limit this soil for nonfarm use. Many areas, however, are used for urban development. Slope limits the soils for septic tank absorption fields and, along with the permeability, is a limitation for sewage lagoons. The permeability is also a limitation for landfills, and the sandy texture makes excavations in the soil unstable.

The capability subclass is IIIe.

30—Sulfaquents, frequently flooded. These soils are nearly level and are poorly drained and very poorly drained. They are mainly along areas of saltwater at an elevation slightly above sea level and are flooded daily by tidal water. Some large areas are commonly dissected by meandering drainageways. The areas of the soil range from 3 to 400 acres. Slopes are 0 to 2 percent.

Generally, these soils have a surface layer of black or dark gray organic material or gray sandy loam. The substratum extends to a depth of 60 inches or more. It is commonly gray and stratified and ranges from sand and fine sand to clay. Thin layers of organic material are common throughout the substratum.

Included with these soils in mapping are small, slightly higher areas of poorly drained Fluvaquents. They make up about 10 to 15 percent of the map unit.

The tidal flooding makes these soils unsuitable for most uses other than wetland wildlife habitat.

The capability subclass is VIIIw.

31A—Wrightsboro fine sandy loam, 0 to 2 percent slopes. This soil is nearly level and moderately well drained. It is in oval or rectangular areas on broad flats at an elevation of more than 50 feet. The areas range from 3 to 200 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 12 inches thick. The subsoil is mostly yellowish brown loam, clay loam, and sandy clay loam about 35 inches thick. Gray mottles are at a depth of more than 22 inches. The substratum is gray sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Emporia soils and poorly drained and somewhat poorly drained Ochraquults. These soils make up about 10 to 15 percent of the map unit.

The permeability of this Wrightsboro soil is moderately slow, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are commonly strongly acid to very strongly acid unless limed. The roots in this soil extend to a depth of about 60 inches. The soil has a seasonal water table at a depth of 2 to 3 feet during winter and spring.

This soil is well suited to farming, although wetness makes alfalfa short lived and interferes with tillage and harvesting. Crops respond well to drainage and to applications of lime and fertilizer. If the soil is cultivated, using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and improve tilth.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to improve the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces desirable grasses and legumes.

The potential for trees on this soil is high, especially for loblolly pine, sycamore, yellow-poplar, sweetgum, and oaks. Most areas are wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment.

The seasonal high water table and moderately slow permeability are the main limitations of this soil for nonfarm use. The water table limits the soil as a site for sanitary landfills and sewage lagoons and as a building site. The water table and the permeability limit the soil for septic tank absorption fields.

The capability subclass is IIw.

31B—Wrightsboro fine sandy loam, 2 to 6 percent slopes. This soil is gently sloping and moderately well drained. It is in oval or rectangular, broad areas at an elevation of more than 50 feet. The areas range from 3 to 200 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 12 inches thick. The subsoil is mostly yellowish brown loam, clay loam, and sandy clay loam about 35 inches thick. Gray mottles are at a depth of more than 22 inches. The substratum is gray sandy clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Emporia soils and poorly drained and somewhat poorly drained Ochraquults. These soils make up about 10 to 15 percent of the map unit.

The permeability of this Wrightsboro soil is moderately slow, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled, and the subsoil has a moderate shrink-swell potential. Both are commonly strongly acid to very strongly acid unless limed. Roots in this soil extend to a depth of about 60 inches. The soil has a seasonal water table at a depth of 2 to 3 feet during the winter and spring.

This soil is well suited to farming, although wetness makes alfalfa short lived and interferes with tillage and harvesting. Crops respond well to drainage and to applications of lime and fertilizer. If the soil is cultivated, using minimum tillage and cover crops, including grasses and legumes in the cropping system, and returning crop residue to the soil add organic matter to the soil and help to control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to improve the carrying capacity of pastures on this soil. Grazing during periods of seasonal wetness compacts the surface layer and reduces the desirable grasses and legumes.

The potential for trees on this soil is high, especially for loblolly pine, sycamore, yellow-poplar, sweetgum, and oaks. Most areas are wooded. Seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of timber equipment.

The seasonal high water table and moderately slow permeability are the main limitations of this soil for nonfarm use. The water table limits the soil as a site for sanitary landfills and sewage lagoons and as a building site. The water table and the permeability limit the soil for septic tank absorption fields.

The capability subclass is IIe.

Use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Soil maps for detailed planning." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

According to the 1974 Census of Agriculture, more than 14,000 acres of cropland are in Gloucester County. The sandy soils and ample rainfall in the county result in the need for balanced fertilizer and lime applications on all cropland. Most soils are easily eroded by water and wind. The use of small grains as winter cover crops and no-till farming help to control these types of erosion.

Gloucester County has several small commercial horticultural and specialty-crop operations. The production of daffodil bulbs, for example, covers about 100 acres of well drained, sandy soils. Apples, peaches, cantaloupes, watermelons, and sweet corn are some of the specialty crops grown. Several commercial nurseries and greenhouses in the county grow azaleas, rhododendrons, boxwood, holly, dogwood, poinsettias, chrysanthemums, and roses.

The limited number of pastures and hayfields generally consist of a mixture of Kentucky-31 tall fescue and ladino clover; some orchardgrass is mixed with the tall fescue or clover. Most fields require annual applications of a complete mixed fertilizer and applications of agricultural limestone every 3 to 5 years.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

Land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

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

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

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

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

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Woodland management and productivity

Woodland covers about 91,000 acres, or 65 percent, of Gloucester County, and most of that is second-growth hardwoods and pines. The dominant species are white oak, southern red oak, hickory, sweetgum, yellow-poplar, loblolly pine, and Virginia pine. Some of the woodland is used to produce commercial timber and other raw wood products. Much of the woodland, however, is used for wildlife habitat, recreation, and esthetic purposes.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *s*, sandy texture; and *o*, limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, and s.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on the soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe,* that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Site index is listed for trees that woodland managers generally favor to grow for wood crop production. Such trees are the most important species with regard to growth rate, quality, value, and marketability. The site index is also listed for tree species that commonly occur on the soil, regardless of potential value or growth.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

The abundance of water resources in Gloucester County provides opportunities for fishing, boating, and other water-related sports. Some of the major recreation areas in the county are Chesapeake Bay, Mobjack Bay, Dragon Swamp, and the tidal rivers.

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife habitat

Gloucester County's mixture of marshes, farmland, and woodland attracts a wide variety of wildlife, including shorebirds, songbirds, and game species. White-tailed deer, for example, are abundant throughout the county. Wild turkeys inhabit the area along the Dragon Swamp, and gray squirrels are common in the large tracts of woodland. The cropfields, pastures, and abandoned fields offer habitat for bobwhite quail, mourning doves, and cottontail rabbits. The tidal marshes that bound the county on three sides attract geese, ducks, and shorebirds.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, soybeans, millet, sunflowers, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are tall fescue, lespedeza, lovegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are broomsedge, foxtail, millet, ragweed, goldenrod, beggarweed, and pokeweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and viburnum. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive, shrub lespedeza, blueberry, bush honeysuckle, and crabapple.

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

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

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

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

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

Engineering

H. Tillman Marshall, conservation engineer, assisted in the preparation of this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building site development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper tranches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

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

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

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

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

Soil properties

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

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

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering index properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and chemical properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

In table 14, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and water features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Formation of the soils

Soils are formed through the interaction of five major factors: parent material, climate, plant and animal life, relief, and time. The relative influence of each factor varies from place to place, and in some places one factor dominates the formation of a soil and determines most of its properties and characteristics. This section describes the five major factors and the influence of each on the soils of Gloucester County.

Parent material

Soils inherit many chemical and physical properties from their parent material. For example, beaches and point bars in stream channels are sandy, and thus the soils developed from these deposits will also be sandy. In places where water movement is less active or where the wind has sorted and carried the material, silt deposition takes place; Craven soils formed under such conditions. In Gloucester County the common types of deposits are rich in sand or dominated by clay, such as the parent material of the Caroline soils.

The minerals in a soil provide the initial storehouse of plant nutrients. Some soils are innately fertile and others infertile. Most of the soils in Gloucester County that are used for agriculture contain about 90 percent quartz in the sand-size particles. These soils are naturally acid and low in fertility, but crops respond well to fertilizer treatments. Sea shells provide very large amounts of calcium and tend to maintain an alkaline condition in the soil. The Meggett soils are influenced by buried sea shells and are alkaline at a depth of more than 30 inches.

Climate

Gloucester County has a humid, mild climate with a peak summer rainfall. This type of climate causes strong weathering and leaching in soils. Calcium, magnesium, and potassium are removed from the soil. This results in soils with more acidity and lower natural fertility. A secondary result is that phosphorus becomes tied up with iron and aluminum in acid soils and is not available for crops. Farmers use liming and balanced fertilization to reverse this process.

The moist conditions in the county tend to accelerate weathering of silicate and aluminous minerals, which results in the creation of more clay. The clay is translocated from the surface layer to the subsoil. Maximum clay content in most soils is in the subsoil. In the Craven soils, for example, up to three times as much clay is in the subsoil as in the surface layer. The permeability of the subsoil is lower as a result.

Plant and animal life

Living organisms of all types influence soil formation. Vegetation adds organic matter to the soil through leaf fall and plant roots. The roots also create large soil voids in which water and air can circulate. Many soil nutrients are stored in organic matter. Additionally, this organic matter supplies food for bacteria, fungi, earthworms, and ants, which aid in improving soil structure or tilth, an essential soil property for air and water movement.

Organisms also create organic compounds that influence soil formation. Many organic acids are created that break down minerals, releasing nutrients such as phosphorus and potassium. Fungi commonly dominate in pine needle litter. These fungi may create water repellency if the litter becomes dry. Water beads on the litter as it does on a waxed metal surface, and the movement of water into the soil is hindered.

Man also influences soil formation. Poor land management can cause erosion, compaction of the soil, and depletion of the natural soil fertility. Proper tillage, fertilization, and soil loss management, on the other hand, can change the soil into a more productive medium for plant growth. Man also can mine the soil or alter the soil for construction purposes. Many leveling and compacting activities are carried on during construction. One important but often overlooked outcome of large scale construction is the change of water infiltration into the soil by increased runoff. The additional runoff needs to be removed properly to prevent severe erosion or flooding.

Relief and time

Gloucester County can be separated into four major geologic landscape surfaces: (1) the Princess Anne surface—an area mainly east of U.S. Routes 14 and 17 and at an elevation between sea level and 20 feet above sea level; (2) the Yorktown surface—an area along the York and Piankatank Rivers and between elevations of 20 and 50 feet above sea level; (3) the Wicomico surface—an area in the central part of the county between elevations of 50 and 120 feet above sea level; and (4) the Sunderland surface—a small area in the northwestern corner of the county that is more than 120 feet above sea level.

Each surface is separated from the next by escarpments that vary from nearly level to steep. The escarpment between the Princess Anne surface and the Yorktown surface, for instance, is gently sloping, but the escarpment between the Princess Anne and Wicomico surfaces is steep.

The greater the elevation of the surface, the older the surface is, the longer it has been exposed to soil formation, and the more potential it has for runoff. Therefore, the Princess Anne surface contains less well developed soils and less weathered minerals than the older, higher surfaces and is not as dissected. Much of the land area in the upland is well drained and has a large percentage of steep side slopes. The Wicomico surface has highly dissected areas with narrow ridges and has large, flat areas with wet soils.

Each surface has a group of soils uniquely associated with it. For instance, Lumbee, Meggett, and Dogue soils are on the Princess Anne; Rumford, Suffolk, and Eunola soils are on the Yorktown; Kempsville, Suffolk, Emporia, and Wrightsboro soils are on the Wicomico; and the steeper Emporia soils are on the Sunderland.

Because of the higher relief and steep topography, water erosion is more of a problem on the Sunderland surface and parts of the Wicomico surface than on other terrace surfaces. The side slopes tend to bevel the older surface. These steep surfaces have very rapid runoff. The soils are thinner and younger than the associated summits. On these steep side slopes, trees are dominant, and on the summit a mixture of woodland and cropland occurs.

In areas of low relief, the soils often are poorly drained. The subsoil in these soils tends to be gray or drab with reddish or yellowish splotches of color. These splotches of color are called mottles. Meggett and Pactolus soils exhibit such mottles. Mottles are caused by low soil oxygen content during water saturation. Iron, which is a common soil material, occurs in two forms. The red or yellow form is associated with freely available oxygen and is highly insoluble. The grayish form, associated with oxygen-deficient conditions, is more soluble. This form is created in water-saturated soils. The iron is mobilized and moves to soil areas with more oxygen. The iron is then fixed in place as reddish mottles. Mottles clearly indicate the top of the seasonal high water table, even when periods of dry weather lower the water table.

Soil series and morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Soil maps for detailed planning."

Alaga series

The Alaga series consists of well drained to somewhat excessively drained soils that formed in sandy sediments of marine origin. Alaga soils are on broad flats of the Coastal Plain. Slopes range from 0 to 4 percent.

Alaga soils are commonly near Pactolus and Rumford soils. Alaga soils are better drained than Pactolus soils and do not have the argillic horizon of the Rumford soils.

Typical pedon of Alaga loamy sand, 0 to 4 percent slopes, 250 feet west of U.S. Highway 17, 200 feet south of State Route 1303, near the junction of 17 and 1303:

Ap—0 to 9 inches; dark brown (10YR 4/3) loamy sand; weak fine granular structure; loose; many fine roots; medium acid; abrupt smooth boundary.

C1—9 to 23 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; loose; common fine roots; medium acid; gradual smooth boundary.

C2—23 to 35 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual smooth boundary.

C3—35 to 60 inches; pale brown (10YR 6/3) sand; single grain; loose; few to common fine roots; very strongly acid.

The sandy horizons are more than 60 inches thick. Reaction is medium acid to very strongly acid throughout unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 and 3. It is loamy sand or sand.

The C horizon has hue of 7.5YR through 2.5Y, value of 5 through 8, and chroma of 3 through 8. It is loamy sand, loam, fine sand, sand, or fine sand.

Caroline series

The Caroline series consists of well drained soils that formed in loamy and clayey marine sediments. Caroline soils are on ridgetops on the Coastal Plain. Slopes range from 0 to 4 percent.

Caroline soils are commonly near Craven and Emporia soils. Caroline soils are better drained than Craven soils and have more clay in the subsoil than Emporia soils.

Typical pedon of Caroline loam, 0 to 4 percent slopes, 2,000 feet east of New Hope Church on U.S. Highway 33, 100 feet north of Highway 33, 100 feet east of road to sand pit:

A1—0 to 3 inches; grayish brown (10YR 5/2) loam; moderate medium granular structure; friable; many fine and medium roots; extremely acid; abrupt wavy boundary.

A2—3 to 14 inches; very pale brown (10YR 7/4) loam; moderate medium granular structure; friable; many fine and medium roots; extremely acid; gradual smooth boundary.

B21t—14 to 24 inches; yellowish brown (10YR 5/6) clay; weak fine subangular blocky structure; firm, sticky, plastic; many fine and medium roots; common thin clay films; extremely acid; gradual smooth boundary.

B22t—24 to 34 inches; strong brown (7.5YR 5/6) clay; moderate fine subangular blocky structure; firm, sticky, plastic; few fine and medium roots; many thin clay films; very strongly acid; clear smooth boundary.

B23t—34 to 39 inches; yellowish red (5YR 5/6) clay; common medium prominent very pale brown (10YR 7/4) mottles; strong fine subangular blocky structure; firm, sticky, plastic; few fine roots; many thin clay films; very strongly acid; gradual smooth boundary.

B3t—39 to 52 inches; yellowish red (5YR 5/6) clay; many medium prominent light gray (10YR 7/1) and yellowish brown (10YR 5/6) mottles; strong medium subangular blocky structure; firm, sticky, plastic; few fine roots; many thin clay films; very strongly acid; gradual smooth boundary.

C—52 to 60 inches; strong brown (7.5YR 5/6) sandy clay loam; many medium distinct gray (10YR 5/1), yellowish brown (10YR 5/6), and red (2.5YR 5/6) mottles; massive; firm, sticky, slightly plastic; very strongly acid.

The solum is 45 to 60 inches thick. Reaction ranges from extremely acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 7.5YR, value of 4 through 7, and chroma of 2 through 6. It is loam or very fine sandy loam.

The B horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 6 through 8. Mottles with chroma of 2 or less are commonly below a depth of 34 inches. The B horizon is clay, sandy clay, or heavy clay loam.

The C horizon is sandy clay loam, sandy loam, or sandy clay.

The Caroline series in this survey area is a taxadjunct. In this survey area, the soils are classified as clayey, mixed, thermic Typic Hapludults.

Craven series

The Craven series consists of moderately well drained soils that formed in loamy and clayey sediments of marine origin. Craven soils are on broad flats or intermediate terraces of the Coastal Plain. Slopes range from 0 to 6 percent.

Craven soils are commonly near Eunola soils and Ochraquults. Craven soils have more clay in the subsoil than Eunola soils and are not as poorly drained as Ochraquults.

Typical pedon of Craven silt loam, 2 to 6 percent slopes, 150 feet north of Continental Telephone Company building on State Route 605, 1,500 feet west along fence, and 150 feet south:

A1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

A2—3 to 9 inches; yellowish brown (10YR 5/4) silt loam; moderate medium granular structure; friable; many fine and medium roots; very strongly acid; gradual smooth boundary.

B21t—9 to 12 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; many fine and medium roots; few thin clay films; very strongly acid; abrupt smooth boundary.

B22t—12 to 24 inches; yellowish brown (10YR 5/6) heavy clay loam; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and medium roots; thick continuous clay films; very strongly acid; gradual wavy boundary.

B23tg—24 to 41 inches; light gray (10YR 7/1) clay; many fine prominent strong brown (7.5YR 5/8) mottles; strong medium subangular blocky structure; firm, sticky, plastic; common fine roots; many moderately thick clay films; very strongly acid; clear wavy boundary.

B24tg—41 to 53 inches; light gray (10YR 7/1) clay; few fine prominent yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; very firm, very sticky, plastic; few fine roots; few thin clay films; very strongly acid; abrupt smooth boundary.

Cg—53 to 62 inches; light gray (10YR 6/1) sandy clay loam; pockets of clay; many coarse distinct brownish yellow (10YR 6/8) mottles; massive; friable, slightly sticky, slightly plastic; very strongly acid.

The solum is 40 to 60 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. It is silt loam or loam.

The B horizon has hue of 10YR or 2.5Y, value of 5 through 7 and chroma of 1 through 6. High-chroma mottles are in the B horizon below a depth of 24 inches. The B horizon is clay, heavy clay loam, or clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 through 8, and chroma of 1 through 8. It is sandy clay loam or sandy loam with pockets or thin layers of clay.

Dogue series

The Dogue series consists of moderately well drained soils that formed in loamy and clayey sediments of marine origin. Dogue soils are in narrow bands near saltwater. The areas are at an elevation of less than 20 feet and are east of U.S. Highways 14 and 17. Slopes range from 0 to 6 percent.

Dogue soils are commonly near Eunola, Johns, Meggett, and Okeetee soils. Dogue soils have mcre clay in the subsoil than Eunola or Johns soils. Dogue soils are not as poorly drained as the Meggett or Okeetee soils.

Typical pedon of Dogue fine sandy loam, 0 to 2 percent slopes, 1,000 feet east of State Route 629, 200 feet south of Wilson's Creek, in an open field:

Ap—0 to 11 inches; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.

B21t—11 to 15 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; strongly acid; clear smooth boundary.

B22t—15 to 24 inches; yellowish brown (10YR 5/6) heavy clay loam; weak medium subangular blocky structure; firm, sticky, plastic; common fine roots; thick continuous clay films; strongly acid; gradual smooth boundary.

B23t—24 to 36 inches; yellowish brown (10YR 5/6) heavy clay loam; common medium distinct gray (10YR 5/1) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; common fine roots; few thin clay films; strongly acid; gradual smooth boundary.

B3—36 to 48 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium distinct gray (10YR 5/1) mottles; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; strongly acid; gradual smooth boundary.

C—48 to 60 inches; strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), and green (5G 4/2) sandy loam; massive; friable, slightly sticky, slightly plastic; strongly acid.

The solum is 40 to 60 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 2 or 3. It is fine sandy loam or sandy loam.

The B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 4 through 8. Mottles with chroma of 2 or less are below a depth of about 24 inches. The B horizon is heavy clay loam, clay, or sandy clay loam.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 1 through 6. It is sandy loam, sandy clay loam, or greensand.

Emporia series

The Emporia series consists of well drained soils that formed in loamy sediments of marine origin. Emporia soils are on ridgetops of the Coastal Plain. Slopes are 0 to 6 percent.

Emporia soils are commonly near Ochraquults and Wrightsboro soils. Emporia soils are not as poorly drained as Ochraquults and are better drained than Wrightsboro soils.

Typical pedon of Emporia sandy loam, 0 to 2 percent slopes, 1 mile southwest of Pinero, 3/4 mile south of State Route 607, at end of logging road, 50 feet north of road:

A1—0 to 3 inches; brown (10YR 5/3) sandy loam; moderate medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A2—3 to 14 inches; pale brown (10YR 6/3) sandy loam; moderate medium granular structure; friable; many fine and medium roots; strongly acid; gradual wavy boundary.

B21t—14 to 35 inches; strong brown (7.5YR 5/6) clay loam; few medium faint yellowish brown (10YR 5/6) mottles in lower 11 inches; moderate medium subangular blocky structure; firm, sticky, slightly plastic; common fine and medium roots; few thin clay films; medium acid; gradual smooth boundary.

B22t—35 to 41 inches; strong brown (7.5YR 5/6) sandy clay loam; few medium faint yellowish brown (10YR 5/6) mottles and few medium distinct red (2.5YR 4/6) mottles; weak thick platy structure parting to weak fine subangular blocky; firm, slightly sticky, slightly plastic; common fine roots; few thin clay films; medium acid; gradual smooth boundary.

B23t—41 to 48 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct light gray (10YR 7/2) mottles and common coarse prominent red (10YR 4/6) mottles; weak thick platy structure parting to weak fine angular blocky; very firm, sticky, slightly plastic; few fine roots; few thin clay films; strongly acid; gradual smooth boundary.

B3—48 to 60 inches; yellowish brown (10YR 5/6) sandy clay loam; many coarse prominent red (10YR 4/6) mottles and common medium distinct gray (10YR 6/1) mottles; weak very thick platy structure parting to weak medium angular blocky; firm, compact in place; slightly sticky, slightly plastic; few fine roots; strongly acid.

The solum is 40 to 60 inches thick or more. Reaction ranges from medium acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 8. It is sandy loam or loam.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. The lower part has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 4 through 8. Mottles with chroma of 2 or less are below a depth of 36 inches. The B horizon is clay loam or sandy clay loam.

The C horizon is sandy clay loam, clay loam, or clay.

Eunola series

The Eunola series consists of moderately well drained soils that formed in sandy and loamy sediments of marine origin. Eunola soils are on flats at middle elevations of the Coastal Plain. Slopes range from 0 to 2 percent.

Eunola soils are commonly near Haplaquepts and Ochraquults and Kempsville and Suffolk soils. Eunola soils are not as poorly drained as Haplaquepts or Ochraquults and are less well drained than Kempsville or Suffolk soils.

Typical pedon of Eunola fine sandy loam, 0 to 2 percent slopes, 5,000 feet west of Pinero on State Route 607, 500 feet south of State Route 607:

A1—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A2—3 to 9 inches; light yellowish brown (10YR 6/4) fine sandy loam; moderate medium granular structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.

B21t—9 to 27 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few thin clay films; strongly acid; gradual smooth boundary.

B22t—27 to 34 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct light gray (10YR 7/1) and light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few thin clay films; strongly acid; gradual smooth boundary.

B3tg—34 to 50 inches; gray (10YR 6/1) sandy clay loam; common fine prominent light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few thin clay films; strongly acid; gradual wavy boundary.

Cg—50 to 60 inches; light gray (10YR 7/1) sandy loam; pockets of sandy clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles; massive; friable; strongly acid.

The solum is 40 to 60 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 4. It is fine sandy loam, sandy loam, or loamy sand.

The B horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 through 8. It is sandy clay loam or heavy sandy loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 through 6. It is sandy loam or loamy sand with pockets of sandy clay loam.

Fluvaquents

Fluvaquents consist of poorly drained soils that formed in sandy, loamy, and clayey alluvium. Some areas of Fluvaquents are on long, winding bottomlands along small freshwater streams. Some are in bands between areas of Sulfaquents and uplands. Slopes range from 0 to 2 percent.

Fluvaquents are commonly near Hapludults, Psamments, and Sulfaquents. They are more poorly drained than Hapludults or Psamments. Fluvaquents are not covered by daily tides, as are the Sulfaquents.

Because of the variability of Fluvaquents, a typical pedon is not given. Fluvaquents are commonly more than 60 inches thick and are strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 2 through 5, and chroma of 1 or 2. It is mainly fine sandy loam, sandy loam, or loam and is generally less than 10 inches thick. A thin black organic layer is on the surface or within the A horizon in some pedons.

The C horizon is neutral or has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 0 through 2. Many pedons have mottles with hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 3 through 8. Layers of the C horizon range from sandy loam to silty clay. Some pedons have pockets and thin layers of black or dark gray organic matter in the C horizon, and some have layers of shell fragments.

Haplaquepts

Haplaquepts consist of somewhat poorly drained soils that formed in sandy and loamy sediments of marine origin. Haplaquepts are on broad flats on the Coastal Plain at elevations above 20 feet. Slopes range from 0 to 2 percent.

Haplaquepts are commonly near Ochraquults and Eunola and Suffolk soils. They do not have the argillic horizon of the Ochraquults and are more poorly drained than Eunola or Suffolk soils.

Because of the variability of Haplaquepts, a typical pedon is not given. Haplaquepts are commonly more than 60 inches thick and are strongly acid to extremely acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 through 4 and is generally 5 to 15 inches thick. It is loamy fine sandy, loamy sand, fine sandy loam, or sandy loam.

The B horizon is neutral or has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 0 through 2. It is generally 20 to 30 inches thick. The B horizon in some pedons has high-chroma mottles. The horizon is mainly sandy loam or sandy clay loam.

The C horizon ranges from loamy sand to sandy clay loam.

Hapludults

Hapludults consist of well drained and moderately well drained soils that formed in sandy, loamy, and clayey sediments of marine origin. Hapludults are on side slopes on the Coastal Plain. Slopes are dominantly 6 to 30 percent but range to 45 percent.

Hapludults are at positions where the soils are in a complex pattern, and it was not practical to map them separately or at a level of classification below the great group.

Because of the variability of Hapludults, a typical pedon is not given. Hapludults have a solum that ranges from 30 inches to more than 60 inches in thickness. The soils are extremely acid to strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 and 3. It is commonly loamy sand, fine sandy loam, sandy loam, or loam and averages about 10 inches in thickness.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 7, and chroma of 2 through 6. In places, the B horizon has mottles with chroma of 2 or less at a depth of 20 to 40 inches. The horizon ranges from sandy loam to clay. It ranges from 20 inches to more than 40 inches in thickness.

The C horizon has hue of 5YR through 2.5Y, value of 4 through 7, and chroma of 1 through 8. It ranges from sand and loamy sand to clay.

Johns series

The Johns series consists of moderately well drained soils that formed in sandy and loamy sediments of marine origin. Johns soils are on terraces at an elevation of less than 20 feet. Slopes range from 0 to 2 percent.

Johns soils are commonly near Eunola, Kalmia, and Lumbee soils. Johns soils have a thinner solum than the Eunola soils, are not as well drained as the Kalmia soils, and are not as poorly drained as the Lumbee soils.

Typical pedon of Johns sandy loam, 225 feet southeast of the junction of U.S. Highway 17 and State Route 1205, 50 feet east of U.S. Highway 17:

Ap—0 to 8 inches; dark grayish brown (10YR 4/3) sandy loam; moderate fine granular structure; very friable; many fine roots; strongly acid; clear wavy boundary.

B21t—8 to 19 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; few thin clay films; strongly acid; gradual smooth boundary.

B22t—19 to 25 inches; brown (10YR 5/3) sandy clay loam; many medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common thin clay films; strongly acid; gradual smooth boundary.

B23t—25 to 33 inches; gray (10YR 5/1) sandy clay loam; many medium faint (10YR 5/3) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; many thin clay films; strongly acid; gradual smooth boundary.

B3g—33 to 36 inches; gray (10YR 5/1) sandy loam; many medium faint brown (10YR 5/3) mottles; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; common fine roots; few thin clay films; strongly acid; clear smooth boundary.

C1—36 to 43 inches; grayish brown (10YR 5/2) loamy sand; common fine faint yellowish brown (10YR 5/4) mottles; single grain; loose; few fine roots; strongly acid; clear smooth boundary.

C2—43 to 60 inches; yellowish brown (10YR 5/4) loamy sand; common medium faint grayish brown (10YR 5/2) mottles; single grain; loose; few fine roots; strongly acid.

The solum is 25 to 37 inches thick. Reaction ranges from strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. It is loamy sand or sandy loam.

The B horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 through 6. Mottles with chroma of 2 or less are below a depth of 18 inches. The B horizon is sandy clay loam or heavy sandy loam.

The C horizon has hue of 10YR, value or 5 or 6, and chroma of 1 through 6. It is loamy sand or sand.

Johns Variant

The Johns Variant consists of moderately well drained soils that formed in sandy sediments of marine origin. Johns Variant soils are on broad flats below an elevation of 20 feet. Slopes range from 0 to 2 percent.

Johns Variant soils are commonly near Lumbee Variant and Rumford soils. They are not as poorly drained as Lumbee Variant soils and are not as well drained as Rumford soils.

Typical pedon of Johns Variant loamy sand, in vacant lot, 1/3 mile south of State Route 649, 3/4 mile southeast of Achilles, 1/2 mile west of State Route 1101:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; loose; many fine roots; medium acid; clear wavy boundary.

A2—7 to 12 inches; pale brown (10YR 6/3) loamy sand; few fine distinct yellowish red (5YR 5/6) mottles; moderate medium granular structure; very friable; many fine roots; medium acid; gradual smooth boundary.

B21t—12 to 19 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; few thin clay films; many fine roots; medium acid; gradual smooth boundary.

B22t—19 to 25 inches; yellowish brown (10YR 5/6) sandy loam; few medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin clay films; many fine roots; medium acid; gradual smooth boundary.

B23t—25 to 32 inches; light yellowish brown (10YR 6/4) sandy loam; many medium distinct yellowish brown (10YR 5/6) mottles and common fine distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; many fine roots; few thin clay films; medium acid; gradual smooth boundary.

C—32 to 60 inches; yellowish brown (10YR 5/6) loamy sand; common medium distinct light gray (10YR 7/2), light yellowish brown (10YR 6/4), and red (2.5YR 5/6) mottles; single grain; loose; common fine roots; strongly acid.

The solum is 20 to 40 inches thick. Reaction ranges from strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 or 3. It is loamy sand, loamy fine sand, or sandy loam.

The B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 6. Mottles with chroma of 2 or less are below a depth of 18 inches. The B horizon is sandy loam and has thin layers of sandy clay loam in some pedons.

The C horizon is loamy sand or sand.

Kalmia series

The Kalmia series consists of well drained soils that formed in sandy and loamy sediments of marine origin. Kalmia soils are in bands along areas of saltwater and at an elevation of less than 20 feet. Slopes are 0 to 4 percent.

Kalmia soils are commonly near Johns and Rumford soils. Kalmia soils are better drained than the Johns soils, have a thinner solum than Rumford soils, and have more clay in the argillic horizon than either of those soils.

Typical pedon of Kalmia sandy loam, 0 to 4 percent slopes, 225 feet southeast of the junction of U.S. Highway 17 and State Route 1205, 250 feet east of U.S. Highway 17:

Ap—0 to 7 inches; dark brown (10YR 4/3) sandy loam; moderate medium granular structure; very friable; many fine roots; strongly acid; gradual smooth boundary.

A2—7 to 13 inches; pale brown (10YR 6/3) heavy sandy loam; weak medium subangular blocky structure; very friable; common fine roots; strongly acid; gradual smooth boundary.

B21t—13 to 17 inches; yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4) light sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; few thin clay films; very strongly acid; gradual smooth boundary.

B22t—17 to 33 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; many thin clay films; very strongly acid; gradual smooth boundary.

C—33 to 72 inches; light yellowish brown (10YR 6/4), brownish yellow (10YR 6/6), and white (10YR 8/2) loamy sand and sand; single grain; loose; few fine roots; strongly acid.

The solum is 20 to 37 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. It is sandy loam or loamy sand.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. It is heavy sandy loam or sandy clay loam.

The C horizon is loamy sand and sand.

Kempsville series

The Kempsville series consists of well drained soils that formed in loamy sediments of marine origin. The Kempsville soils are on ridges at an elevation of more than 50 feet. Slopes range from 0 to 6 percent.

Kempsville soils are commonly near Emporia, Eunola, and Suffolk soils. Kempsville soils have brittleness in 20 to 60 percent of the mass in the lower part of the argillic horizon, which those soils do not have. In addition, Kempsville soils do not have the seasonal high water table of Emporia soils and are better drained than Eunola soils.

Typical pedon of Kempsville fine sandy loam, 2 to 6 percent slopes, 100 feet west of State Route 603, 1-1/2 miles north of the junction of State Routes 605 and 603:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

A2—4 to 18 inches; light yellowish brown (10YR 6/4) fine sandy loam; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.

B21t—18 to 34 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few thin clay films; very strongly acid; gradual smooth boundary.

B22t—34 to 53 inches; yellowish brown (10YR 5/4) sandy loam; many medium faint pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) mottles; friable, nonsticky, nonplastic; 35 percent brittle; common fine roots; few thin clay films; very strongly acid; clear smooth boundary.

C—53 to 70 inches; yellowish brown (10YR 5/6) layers of sandy loam, loamy sand, and sandy clay loam; common medium faint light yellowish brown (10YR 6/4) mottles; massive; single grain; friable, nonsticky, nonplastic; few fine roots; very strongly acid.

The solum is 40 to 60 inches thick. Reaction ranges from strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is fine sandy loam or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. The B22t horizon has pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) mottles. The mass of the B22t horizon is 20 to 60 percent brittle. The B horizon is sandy clay loam, heavy sandy loam, and sandy loam.

The C horizon is loamy sand, sandy loam, and sandy clay loam.

Kenansville series

The Kenansville series consists of well drained soils that formed in sandy sediments of marine origin. Kenansville soils are on ridgetops on the Coastal Plain. Slopes range from 0 to 4 percent.

Kenansville soils are commonly near Rumford and Suffolk soils. Kenansville soils have a sandy surface layer over 20 inches thick, which Rumford and Suffolk soils do not have.

Typical pedon of Kenansville loamy fine sand, 0 to 4 percent slopes, 2/3 mile southwest of the junction of State Routes 636 and 635, 300 feet south of the end of State Route 635, 300 feet west of Timberneck Creek:

Ap—0 to 9 inches; brown (10YR 4/3) loamy fine sand; weak fine granular structure; loose; many fine and medium roots; very strongly acid; gradual smooth boundary.

A2—9 to 29 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; gradual smooth boundary.

A3—29 to 33 inches; light yellowish brown (10YR 6/4) sandy loam; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

B2t—33 to 42 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; few thin clay films; very strongly acid; clear irregular boundary.

B3—42 to 54 inches; yellowish brown (10YR 5/6) sandy loam; pockets of pale brown (10YR 6/3) sand; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; few fine roots; very strongly acid; clear irregular boundary.

C—54 to 60 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; loose; few fine roots; very strongly acid.

The solum is 40 to 60 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR, value of 4 through 6, and chroma of 1 through 4. It is 20 to 40 inches thick. The A horizon is loamy fine sand or loamy sand.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. It is sandy loam, fine sandy loam, or sandy clay loam.

The C horizon has hue of 10YR, value of 5 through 7, and chroma of 2 through 8. It is loamy sand or sand.

Kenansville Variant

The Kenansville Variant consists of moderately well drained soils that formed in sandy marine sediments. Kenansville Variant soils are on broad flats between elevations of 40 to 80 feet. Slopes range from 0 to 2 percent.

Kenansville Variant soils are commonly near Eunola, Kenansville, and Suffolk soils and Haplaquepts and Ochraquults. Kenansville Variant soils have a sandy surface layer, which Eunola and Suffolk soils and

Haplaquepts and Ochraquults do not have. Kenansville Variant soils are less well drained than Suffolk soils, are not as poorly drained as Haplaquepts or Ochraquults, and are not as well drained as Kenansville soils.

Typical pedon of Kenansville Variant loamy sand, 3,700 feet southeast of the junction of State Routes 616 and 618, south of Sassafras, 300 feet northwest of 618:

Ap—0 to 14 inches; grayish brown (10YR 5/2) loamy sand; weak fine granular structure; loose; many fine, medium, and coarse roots; slightly acid; clear wavy boundary.

A2—14 to 31 inches; pale brown (10YR 6/3) loamy sand; weak fine granular structure; loose; common fine, medium, and coarse roots; slightly acid; clear smooth boundary.

B21t—31 to 40 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; common fine and medium roots; sand grains coated and bridged with clay; medium acid; gradual smooth boundary.

B22t—40 to 51 inches; strong brown (7.5YR 5/6) sandy loam; many coarse distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; friable, nonsticky, nonplastic; common fine and medium roots; sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

B3tg—51 to 57 inches; light gray (10YR 7/1) sandy loam; many medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, nonsticky, nonplastic; 40 percent weakly brittle; common fine and medium roots; sand grains coated and bridged with clay; medium acid; gradual smooth boundary.

Cg—57 to 63 inches; light gray (10YR 7/1) loamy sand; many medium distinct strong brown (7.5YR 5/6) mottles; single grain; very friable, nonsticky, nonplastic; few fine and medium roots; medium acid.

The solum is 40 to 60 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR, value of 3 through 6, and chroma of 2 through 4. It is 20 to 40 inches thick. The A horizon is loamy sand or loamy fine sand.

The B horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 1 through 6. The B3tg horizon is commonly light gray or gray (10YR 7/1, 6/1) and is weakly brittle in 15 to 45 percent of the mass of the horizon. The B horizon is sandy loam or sandy clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 through 6. It is loamy sand or sandy loam.

Lumbee series

The Lumbee series consists of poorly drained soils that formed in sandy sediments of marine origin. Lumbee soils are on broad flats on the Coastal Plain at an elevation of less than 20 feet. Slopes range from 0 to 2 percent.

Lumbee soils are commonly near Johns, Lumbee Variant, and Meggett soils. They are more poorly drained than Johns soils, have more clay in the subsoil than Lumbee Variant soils, and have less clay in the subsoil than Meggett soils.

Typical pedon of Lumbee sandy loam, 700 feet north of State Route 216, on Haywood Road, at Bena:

A1—0 to 9 inches; grayish brown (2.5Y 5/2) sandy loam; few fine faint gray (2.5Y 6/1) and light yellowish brown (2.5Y 6/4) mottles; moderate medium granular structure; very friable; many fine roots; strongly acid; clear wavy boundary.

B2tg—9 to 24 inches; gray (2.5Y 6/1) sandy clay loam; many fine faint grayish brown (2.5Y 5/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few thin clay films; very strongly acid; gradual smooth boundary.

B3tg—24 to 29 inches; gray (2.5Y 6/1) light sandy clay loam; few fine faint light yellowish brown (2.5Y 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few thin clay films; very strongly acid; clear smooth boundary.

C1g—29 to 42 inches; light brownish gray (2.5YR 6/2) loamy sand and sand; common medium faint light yellowish brown (2.5Y 6/4) mottles; single grain; loose; few fine roots; strongly acid; clear smooth boundary.

C2—42 to 60 inches; light yellowish brown (2.5Y 6/4) sand; few fine faint light brownish gray (2.5Y 6/2) mottles; single grain; loose; few fine roots; strongly acid.

The solum is 25 to 40 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 2.5Y or 10YR, value of 3 through 6, and chroma of 1 or 2. It is sandy loam or loamy sand.

The B horizon is neutral or has hue of 2.5Y or 10YR, value of 5 through 7, and chroma of 0 through 2. It is sandy clay loam or heavy sandy loam.

The C horizon is neutral or has hue of 2.5Y or 10YR, value of 4 through 6, and chroma of 0 through 4. It is loamy sand or sand.

Lumbee Variant

The Lumbee Variant consists of poorly drained soils that formed in sandy sediments of marine origin. Lumbee Variant soils are on broad flats on the Coastal Plain below an elevation of 10 feet. Slopes are 0 to 2 percent.

Lumbee Variant soils are commonly near Johns, Johns Variant, Lumbee, and Osier soils. They are more poorly drained than Johns or Johns Variant soils; have less clay in the subsoil than Lumbee soils; and have an argillic horizon, which the Osier soils do not have.

Typical pedon of Lumbee Variant sandy loam, 2,500 feet southwest of the junction of State Routes 649 and 1102, near Achilles:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) sandy loam; moderate medium granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

B21tg—8 to 14 inches; light brownish gray (10YR 5/2) sandy loam; many medium faint yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable, nonsticky, nonplastic; common fine and medium roots; few thin clay films; very strongly acid; gradual smooth boundary.

B22tg—14 to 24 inches; gray (10YR 5/1) sandy loam; many medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; few thin clay films; very strongly acid; gradual smooth boundary.

B3g—24 to 30 inches; gray (10YR 6/1) sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; few fine roots; very strongly acid; clear smooth boundary.

Cg—30 to 60 inches; light gray (10YR 7/1) fine sand; common medium faint very pale brown (10YR 7/3) mottles and common medium distinct yellowish brown (10YR 5/4) mottles; single grain; loose; very strongly acid.

The solum is 20 to 40 inches thick. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or loamy sand.

The B horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 or 2. It is sandy loam or loam.

The C horizon is loamy sand, sand, or fine sand.

Meggett series

The Meggett series consists of poorly drained soils that formed in loamy and clayey sediments of marine origin. Meggett soils are on broad flats on terraces at an elevation of less than 20 feet. Slopes range from 0 to 2 percent.

Meggett soils are commonly near Dogue, Lumbee, and Okeetee soils. They are more poorly drained than Dogue or Okeetee soils and have more clay in the subsoil than Lumbee soils.

Typical pedon of Meggett sandy loam, 2,000 feet north of the junction of State Routes 641 and 655, along farm road:

Ap—0 to 7 inches; grayish brown (10YR 5/2) sandy loam; moderate medium granular structure; friable; many fine roots; very strongly acid; clear smooth boundary.

A2—7 to 10 inches; light brownish gray (10YR 6/2) heavy sandy loam; many medium faint light yellowish brown (10YR 6/4) mottles; weak medium granular structure; friable; many fine roots; very strongly acid; clear smooth boundary.

B21tg—10 to 23 inches; gray (10YR 6/1) sandy clay; many medium prominent brownish yellow (10YR 6/3) mottles; weak fine subangular blocky structure; firm, sticky, plastic; common fine roots; few thin clay films; slightly acid; gradual smooth boundary.

B22tg—23 to 35 inches; gray (10YR 5/1) clay; common coarse distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak fine subangular blocky; very firm, sticky, plastic; few fine roots; few thin clay films; slightly acid; gradual smooth boundary.

B23tg—35 to 41 inches; gray (10YR 5/1) sandy clay; many coarse distinct brownish yellow (10YR 6/8) mottles; weak coarse prismatic structure parting to weak fine subangular blocky; firm, sticky, plastic; few fine roots; few thin clay films; slightly acid; gradual smooth boundary.

B3g—41 to 48 inches; gray (10YR 5/1) sandy clay; pockets of sandy clay loam; many medium distinct brownish yellow (10YR 6/8) mottles; massive; mildly alkaline; clear smooth boundary.

IIC—48 to 60 inches; yellowish brown (10YR 5/4) sandy loam; massive; 60 percent shell fragments; mildly alkaline.

The solum is 40 to 60 inches thick. Reaction of the A horizon is strongly acid to very strongly acid. The B horizon is slightly acid to mildly alkaline. The C horizon is mildly alkaline.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 or 2. It is sandy loam.

The B horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 through 8. It is sandy clay, clay, or sandy clay loam.

The C horizon is commonly sandy loam and 10 to 90 percent shell fragments.

Ochlockonee series

The Ochlockonee series consists of well drained soils that formed in alluvium washed from surrounding uplands. Ochlockonee soils are on toe slopes below sloping to steep uplands. Slopes range from 0 to 2 percent. Ochlockonee soils in this survey area are mapped only in complex with Ochlockonee Variant soils.

Ochlockonee soils are commonly near Ochlockonee Variant soils and Fluvaquents, Hapludults, and Psamments. Ochlockonee soils are not as poorly drained as Fluvaquents and do not have the argillic horizon that

Hapludults have. They have buried horizons, which Psamments do not have, and they have less clay throughout than Ochlockonee Variant soils.

Typical pedon of Ochlockonee sandy loam, in an area of Ochlockonee-Ochlockonee Variant complex, 2,500 feet west of the junction of State Routes 198 and 673, 50 feet south of telephone pole, 100 feet east of drainage ditch:

Ap—0 to 5 inches, dark brown (10YR 4/3) sandy loam; moderate medium granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

A2—5 to 22 inches, pale brown (10YR 6/3) sandy loam; weak fine granular structure; very friable; many fine roots; very strongly acid; gradual smooth boundary.

C1—22 to 35 inches, dark yellowish brown (10YR 4/4) sandy loam; massive; friable; common fine roots; very strongly acid; clear smooth boundary.

Ab—35 to 41 inches, dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; loose; common fine roots; very strongly acid; clear smooth boundary.

C2—41 to 52 inches, pale brown (10YR 6/3) loamy sand; single grain; loose; common fine roots; very strongly acid; clear smooth boundary.

Ab—52 to 62 inches, dark grayish brown (10YR 4/2) loamy sand; single grain; loose; few fine roots; very strongly acid.

Buried horizons are in most pedons, commonly below a depth of 30 inches. Reaction is strongly acid to very strongly acid throughout unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 4. It is sandy loam or loamy sand.

The C horizon, including the buried horizons, has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 2 through 6. Mottles with chroma of 2 or less are in some pedons below a depth of 30 inches. The C horizon is loamy sand or sandy loam in some pedons and has thin layers of sandy clay loam.

Ochlockonee Variant

The Ochlockonee Variant consists of well drained soils that formed in alluvium washed from surrounding uplands. Ochlockonee Variant soils are on toe slopes below sloping to steep uplands. Slopes range from 0 to 2 percent. Ochlockonee Variant soils in this survey area are mapped only in complex with Ochlockonee soils.

Ochlockonee Variant soils are commonly near Ochlockonee soils and Fluvaquents, Hapludults, and Psamments. Ochlockonee soils are not as poorly drained as Fluvaquents and do not have the argillic horizon that Hapludults have. They have more clay in the substratum than Psamments and more clay throughout than Ochlockonee soils.

Typical pedon of Ochlockonee Variant sandy loam, in an area of Ochlockonee-Ochlockonee Variant complex, 2,500 feet west of the junction of State Routes 198 and 673, 50 feet south of telephone pole, 50 feet east of drainage ditch:

A1—0 to 10 inches, dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

C1—10 to 30 inches, yellowish brown (10YR 5/4) light sandy clay loam; massive; friable; many fine roots; strongly acid; clear smooth boundary.

Ab—30 to 42 inches, dark brown (10YR 4/3) heavy sandy loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

C2—42 to 60 inches, pale brown (10YR 6/3) sandy loam; massive; friable; few fine roots; strongly acid.

Buried horizons are in most pedons, commonly below a depth of 28 inches. Reaction is strongly acid to very strongly acid throughout unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 4. It is sandy loam or loamy sand.

The C horizon, including the buried horizons, has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 6. Mottles with chroma of 2 or less are in some pedons below a depth of 30 inches. The C horizon is sandy clay loam, heavy sandy loam, or sandy loam.

Ochraquults

Ochraquults consist of poorly drained soils that formed in sandy, loamy, and clayey sediments of marine origin. Ochraquults are on broad flats on the Coastal Plain at an elevation of more than 20 feet. Slopes range from 0 to 2 percent.

Ochraquults are commonly near Eunola and Suffolk soils. Ochraquults are more poorly drained than those soils.

Because of the variability of Ochraquults, a typical pedon is not given. They have a solum that is more than 60 inches thick. They are strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 through 4. It ranges from fine sandy loam to loam. The A horizon ranges from 5 to 15 inches in thickness but is commonly 6 to 12 inches.

The B horizon is neutral or has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 0 through 2. High-chroma mottles are in the B horizon of most pedons. The B horizon ranges from clay loam and sandy clay loam to clay. The B horizon is commonly 30 to 40 inches thick or more.

The C horizon is neutral or has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 0 through 2. It is sandy clay loam, clay loam or clay but ranges to loamy sand and sand in some pedons.

Okeetee series

The Okeetee series consists of somewhat poorly drained soils that formed in loamy and clayey sediments of marine origin. Okeetee soils are on broad flats below an elevation of 20 feet. Slopes range from 0 to 2 percent.

Okeetee soils are commonly near Dogue and Meggett soils. Okeetee soils are more poorly drained than Dogue soils and are not as poorly drained as Meggett soils.

Typical pedon of Okeetee sandy loam, 1/4 mile north of the junction of State Routes 629 and 614:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

B21t—6 to 13 inches; olive brown (2.5Y 4/4) sandy clay loam; few medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; few thin clay films; very strongly acid; gradual smooth boundary.

B22tg—13 to 28 inches; grayish brown (10YR 5/2) clay; grayish brown (2.5Y 5/2) ped coatings; many medium faint yellowish brown (10YR 5/6) and brown (10YR 4/3) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; few thin clay films; very strongly acid; gradual smooth boundary.

B23tg—28 to 34 inches; brown (10YR 4/3) sandy clay loam; grayish brown (2.5Y 5/2) ped coatings; common fine distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, slightly sticky, slightly plastic; few fine roots; few thin clay films; very strongly acid; clear smooth boundary.

B3t—34 to 41 inches; yellowish brown (10YR 5/6) sandy clay; many medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin clay films; strongly acid; clear smooth boundary.

C1—41 to 46 inches; light brownish gray (10YR 6/2) sandy loam; many medium distinct yellowish brown (10YR 5/6) mottles and many medium faint pale brown (10YR 6/3) mottles; massive; very friable, nonsticky, nonplastic; slightly acid; clear smooth boundary.

C2—46 to 60 inches; shell bed.

The solum is 40 to 60 inches thick. Reaction of the solum ranges from strongly acid to very strongly acid unless the soil is limed. The C horizon is slightly acid to mildly alkaline.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 3. It is sandy loam.

The B horizon has hue of 2.5Y or 10YR, value of 4 through 6, and chroma of 1 through 6. Mottles with chroma of 2 or less are throughout the B horizon. The B horizon is sandy clay loam, sandy clay, or clay.

The C horizon is shell beds filled with sandy loam or greenish gray (5GY 5/1, 6/1) loamy sand or sand.

Osier series

The Osier series consists of poorly drained soils that formed in sandy sediments of marine origin. Osier soils are below an elevation of 50 feet in bands at the base of escarpments or along areas of saltwater. Slopes range from 0 to 2 percent.

Osier soils are commonly near Lumbee Variant and Pactolus soils. Osier soils do not have the argillic horizon that Lumbee Variant soils have, and they are more poorly drained than Pactolus soils.

Typical pedon of Osier loamy fine sand, 200 feet south of the end of State Route 689 at Zanoni, 20 feet east of road:

A1—0 to 8 inches; black (10YR 2/1) loamy fine sand; weak medium subangular blocky structure; very friable; many fine roots; very strongly acid; clear wavy boundary.

C1g—8 to 13 inches; light brownish gray (2.5Y 6/2) loamy fine sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grain; loose; common fine roots; extremely acid; gradual wavy boundary.

C2g—13 to 26 inches; light gray (2.5Y 7/2) loamy fine sand; common fine distinct yellowish brown (10YR 5/6) mottles; single grain; loose; common fine roots; extremely acid; gradual wavy boundary.

C3g—26 to 60 inches; light gray (2.5Y 7/2) loamy fine sand; many medium distinct yellowish brown (10YR 5/6) and light yellowish brown (10YR 6/4) mottles; single grain; loose; few fine roots; very strongly acid.

The sandy horizons are more than 60 inches thick. Reaction ranges from very strongly acid to extremely acid.

The A horizon has hue of 10YR or 2.5Y, value of 2 through 4, and chroma of 1 or 2. It is loamy fine sand, loamy sand, or sand.

The C horizon is neutral or has hue of 2.5Y or 10YR, value of 5 through 7, and chroma of 0 through 2. High-chroma mottles are throughout the horizon. The C horizon is loamy fine sand, loamy sand, or sand.

Osier soils in this survey area are a taxadjunct to Osier soils in other survey areas. In this survey area they are classified as siliceous, thermic Humaqueptic Psammaquents.

Pactolus series

The Pactolus series consists of moderately well drained soils that formed in sandy sediments of marine origin. Pactolus soils are on broad flats on terraces below an elevation of 50 feet. Slopes range from 0 to 4 percent.

Pactolus soils are commonly near Alaga and Osier soils. They are not as well drained as Alaga soils and are not as poorly drained as Osier soils.

Typical pedon of Pactolus loamy sand, 0 to 4 percent slopes, 800 feet northwest of the junction of State Routes 682 and 616:

Ap—0 to 11 inches; dark brown (10YR 4/3) loamy sand; moderate fine granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.

C1—11 to 17 inches; light yellowish brown (2.5Y 6/4) loamy sand; single grain; very friable; few fine roots; strongly acid; gradual smooth boundary.

C2—17 to 24 inches; light yellowish brown (2.5YR 5/4) loamy sand; common medium distinct light gray (2.5Y 7/2) and yellowish brown (10YR 5/6) mottles; single grain; very friable; few fine roots; strongly acid; gradual smooth boundary.

C3—24 to 31 inches; light gray (2.5Y 7/2) loamy sand; common medium distinct yellowish brown (10YR 5/4) mottles; single grain; very friable; few fine roots; strongly acid; gradual smooth boundary.

C4—31 to 60 inches; light gray (2.5Y 7/2) sand; pockets of yellowish brown (10YR 5/6) light sandy clay loam; single grain; loose; few fine roots; strongly acid.

The sandy horizons are 60 inches thick or more. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 1 through 3. It is loamy sand or loamy fine sand.

The C horizon has hue of 2.5Y or 10YR, value of 5 through 7, and chroma of 1 through 6. Mottles with chroma of 2 or less are at a depth of more than 16 inches. The C horizon is loamy sand, loamy fine sand, or sand.

Pamlico series

The Pamlico series consists of very poorly drained soils that formed in organic material and sandy sediments. Pamlico soils are in depressional areas on broad flats at an elevation of less than 20 feet. Slopes range from 0 to 2 percent. Pamlico soils are mapped only in association with Portsmouth soils.

Pamlico soils are commonly near Lumbee, Lumbee Variant, and Osier soils. Pamlico soils are more poorly drained than those soils and have a thick organic surface layer that those soils do not have.

Typical pedon of Pamlico peat, in an area of Pamlico and Portsmouth soils, 100 feet east of U.S. Highway 17, 300 yards north of the junction of U.S. Highway 17 and State Route 216:

Oi—0 to 4 inches; black (10YR 2/1) peat (fibric material); 75 percent fibers of leaves, twigs, and roots; extremely acid; gradual wavy boundary.

Oa1—4 to 15 inches; black (10YR 2/1) muck (sapric material); 25 percent fiber; massive; sticky; common fine and medium roots; very strongly acid; gradual wavy boundary.

Oa2—15 to 18 inches; very dark brown (10YR 2/2) muck (sapric material); 25 percent fiber; massive; sticky; common fine and medium roots; very strongly acid; clear smooth boundary.

IICg—18 to 60 inches; light gray (10YR 7/1) sand; single grain; loose; few fine roots; very strongly acid.

The sandy horizons are 60 inches thick or more. Reaction ranges from extremely acid to strongly acid.

The Oa horizon has hue of 10YR or 2.5Y, value of 1 through 3, and chroma of 1 or 2. It is 16 to 26 inches thick.

The C horizon has hue of 10YR through 5Y, value of 6 through 8, and chroma of 1 or 2. It is sand or loamy sand.

Portsmouth series

The Portsmouth series consists of very poorly drained soils that formed in loamy sediments. Portsmouth soils are in depressional areas on broad flats at an elevation of less than 20 feet. Slopes range from 0 to 2 percent. Portsmouth soils are mapped only in association with Pamlico soils.

Portsmouth soils are commonly near Lumbee and Lumbee Variant soils. Portsmouth soils are more poorly drained than those soils and have a thick, dark A horizon, which those soils do not have.

Typical pedon of Portsmouth sandy loam, in an area of Pamlico and Portsmouth sandy loam, 200 yards north of the junction of State Routes 216 and 699, at Bena:

A1—0 to 12 inches; very dark gray (10YR 3/1) sandy loam; moderate medium granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.

A2—12 to 15 inches; grayish brown (2.5Y 5/2) sandy loam; moderate medium granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.

B2tg—15 to 26 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common fine faint gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; strongly acid; gradual smooth boundary.

B3tg—26 to 30 inches; light gray (N 7/0) sandy loam; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; strongly acid; gradual smooth boundary.

Cg—30 to 60 inches; light gray (N 7/0) loamy sand; single grain; loose; very strongly acid.

The solum is 25 to 40 inches thick. Reaction is strongly acid to very strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 2 through 6, and chroma of 1 through 3. It is sandy loam or loamy sand.

The B horizon is neutral or has hue of 2.5Y or 10YR, value of 4 through 7, and chroma of 0 through 2. It is sandy clay loam, heavy sandy loam, or sandy loam.

The C horizon is neutral or has hue of 2.5Y or 10YR, value of 4 through 7, and chroma of 0 through 2. It is loamy sand or sand.

Psamments

Psamments consist of well drained and moderately well drained soils that formed in sandy sediments of marine origin. These soils are on side slopes along drainageways and streams or are on terrace breaks. Some of these soils are in sandpits and borrow areas or in small fill areas. Slopes range from 0 to 50 percent.

Psamments are commonly near Kempsville, Rumford, and Suffolk soils. Psamments do not have an argillic horizon, which all of those soils have.

Because of the variability of Psamments, a typical pedon is not given. Psamments have a solum that ranges from 10 inches to more than 60 inches thick. They are extremely acid to very strongly acid throughout.

The A horizon mainly has hue of 7.5YR or 10YR, value of 3 through 7, and chroma of 2 through 6. It ranges from loamy fine sand to sand. The A horizon ranges from 4 to 20 inches in thickness but is commonly 6 to 14 inches thick.

The C horizon has hue of 2.5YR through 2.5Y, value of 4 through 7, and chroma of 3 through 8. Mottles with chroma of 2 or less are in some pedons below a depth of 20 inches. The C horizon is commonly loamy sand or sand.

Rumford series

The Rumford series consists of well drained to somewhat excessively drained soils that formed in sandy sediments of marine origin. Rumford soils are on broad flats and mild slopes at all elevations on the Coastal Plain. Slopes range from 0 to 10 percent.

Rumford soils are commonly near Alaga, Kenansville, and Suffolk soils. Rumford soils have an argillic horizon, which Alaga soils do not have. They do not have the thick A horizon typical of the Kenansville soils. Rumford soils have less clay in the subsoil than Suffolk soils.

Typical pedon of Rumford loamy fine sand, 0 to 2 percent slopes, 100 feet south of State Route 1240, 1/4 mile west of U.S. Highway 17, 1 mile north of George P. Coleman Memorial Bridge:

Ap1—0 to 1 inch; very dark grayish brown (10YR 3/2) loamy fine sand; moderate fine granular structure; loose; many fine and medium roots; common fine pores; strongly acid; clear smooth boundary.

Ap2—1 to 7 inches; dark brown (10YR 4/3) loamy fine sand; moderate fine granular structure; loose; many fine and medium roots; common fine pores; strongly acid; clear smooth boundary.

B1—7 to 11 inches; strong brown (7.5YR 5/6) loamy fine sand; weak medium subangular blocky structure; very friable, nonsticky, nonplastic; many fine and medium roots; common fine pores; strongly acid; gradual smooth boundary.

B21t—11 to 31 inches; yellowish red (5YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; many fine and medium roots; many fine pores; sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

B22t—31 to 42 inches; yellowish red (5YR 4/6) heavy fine sandy loam; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; many fine pores; sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

C—42 to 72 inches; yellowish red (5YR 4/6), brownish yellow 10YR 6/6), and strong brown (7.5YR 5/8) fine sand; single grain; loose; few fine roots; strongly acid.

The solum is 30 to 55 inches thick. Reaction ranges from strongly acid to very strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 through 4. It is loamy fine sand, loamy sand, or sandy loam.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. It is loamy fine sand, fine sandy loam, sandy loam, or sandy clay loam.

The C horizon has hue of 5YR through 10YR, value of 4 through 7, and chroma of 2 through 8. It is loamy sand, loamy fine sand, fine sand, or sand.

Suffolk series

The Suffolk series consists of well drained soils that formed in sandy and loamy sediments of marine origin. The soils are on broad flats and mild slopes on the Coastal Plain at an elevation above 20 feet. Slopes range from 0 to 10 percent.

Suffolk soils are commonly near Eunola, Kempsville, and Rumford soils. Suffolk soils are better drained than Eunola soils, do not have brittleness in the lower part of the argillic horizon as Kempsville soils have, and have more clay in the subsoil than Rumford soils.

Typical pedon of Suffolk fine sandy loam, 2 to 6 percent slopes, 1,000 feet west of the junction of State Routes 613 and 699, on State Route 699, 100 feet from corner of field:

A1—0 to 2 inches; dark brown (10YR 3/3) fine sandy loam; moderate fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.
A2—2 to 10 inches; very pale brown (10YR 7/4) fine sandy loam; moderate fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.
Bt—10 to 14 inches; brownish yellow (10YR 6/6) heavy fine sandy loam; weak fine subangular blocky structure; very friable, slightly sticky, nonplastic; common fine and medium roots; few thin clay films; strongly acid; gradual smooth boundary.
B2t—14 to 37 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots; common thin clay films; strongly acid; gradual smooth boundary.
B3—37 to 41 inches; strong brown (7.5YR 5/8) sandy loam; weak fine subangular blocky structure; very friable, nonsticky, nonplastic; few fine and medium roots; strongly acid; gradual smooth boundary.
C1—41 to 52 inches; strong brown (7.5YR 5/8) loamy sand; single grain; loose; strongly acid; gradual smooth boundary.
C2—52 to 64 inches; strong brown (7.5YR 5/8) and reddish yellow (5YR 6/6) loamy sand; single grain; loose; 5 percent rounded quartz pebbles up to 1/2 inch in diameter; very strongly acid.

The solum is 35 to 50 inches thick. Reaction ranges from strongly acid to very strongly acid. The C horizon in some pedons is 2 to 10 percent rounded quartz pebbles up to 1/2 inch in diameter.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 7, and chroma of 3 through 6. It is fine sandy loam, sandy loam, or loamy sand.

The B horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 6 through 8. It is sandy clay loam, clay loam, or sandy loam.

The C horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 6 through 8. It is loamy sand, sand, or sandy loam.

Sulfaquents

Sulfaquents consist of poorly drained and very poorly drained soils that formed in alluvium. The soils are in saltwater marshes that are flooded daily by tides. Slopes range from 0 to 2 percent.

Sulfaquents are commonly near Fluvaquents. Fluvaquents are flooded only during abnormally high tides or storm tides.

Because of the variability of Sulfaquents, a typical pedon is not given. The soils are more than 60 inches thick.

The A horizon is neutral or has hue of 10YR through 5Y, value of 2 through 4, and chroma of 0 or 1. It is mostly organic material but ranges to sandy loam.

The C horizon is neutral or has hue of 10YR through 5Y, value of 3 through 6, and chroma of 0 or 1. It ranges from fine sand and sand to clay. Many pedons have thin layers of organic material; some of these layers range up to 40 inches in thickness.

Wrightsboro series

The Wrightsboro series consists of moderately well drained soils that formed in loamy sediments of marine origin. Wrightsboro soils are on broad flats on the Coastal Plain at an elevation above 30 feet. Slopes range from 0 to 6 percent.

Wrightsboro soils are commonly near Emporia soils and Ochraquults. They are not as well drained as Emporia soils and are not as poorly drained as Ochraquults.

Typical pedon of Wrightsboro fine sandy loam, 0 to 2 percent slopes, 150 feet north of the junction of State Route 628 and U.S. Highway 17, across from Gloucester Intermediate School:

Ap—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; moderate medium granular structure; very friable; many fine roots; strongly acid; clear wavy boundary.
A2—5 to 12 inches; pale brown (10YR 6/3) fine sandy loam; weak fine subangular blocky structure; friable; many fine roots; strongly acid; gradual smooth boundary.
B1t—12 to 15 inches; light yellowish brown (10YR 6/4) loam; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; strongly acid; gradual smooth boundary.
B21t—15 to 24 inches; yellowish brown (10YR 5/4) loam; moderate fine subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; few thin clay films; strongly acid; gradual smooth boundary.
B22t—24 to 33 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; common fine roots; many thin clay films; strongly acid; gradual smooth boundary.
B23t—33 to 40 inches; yellowish brown (10YR 5/4) sandy clay loam; many medium distinct gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; many thin clay films; strongly acid; gradual smooth boundary.
B24tg—40 to 47 inches; gray (10YR 6/1) sandy clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; many moderately thick clay films; strongly acid; gradual smooth boundary.
B25tg—47 to 72 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown

(10YR 5/4) mottles and common medium prominent olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; common thin clay films; strongly acid.

The solum is 40 to 60 inches thick or more. Reaction is strongly acid to very strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 7, and chroma of 1 through 4. It is fine sandy loam, sandy loam, or loam.

The B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 6. Mottles with chroma of 2 or less are below a depth of 20 inches. The B horizon is sandy clay loam, clay loam, or loam. The lower part of the B horizon ranges to clay in some pedons.

Wrightsboro soils in this survey area are a taxadjunct because they have slightly less clay and slightly more silt in the particle-size control section than is defined for this series. In this survey area, Wrightsboro soils are classified as fine-loamy, siliceous, thermic Aquic Hapludults.

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 16, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udults (*Ud*, meaning udic or humid plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that have a udic or humid aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Kempsville series. The texture of the surface layer or of the substratum can differ within a series.

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(3) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962)

(4) United States Department of Agriculture. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436. 754 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

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, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, differences in slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the low lands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-76 at Williamsburg, Virginia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	49.5	28.1	38.8	75	5	107	3.49	2.13	4.70	8	3.9
February---	52.1	29.9	41.0	76	9	117	3.71	2.30	4.97	8	1.9
March------	59.8	36.1	48.0	85	17	280	4.11	2.95	5.16	8	1.6
April------	70.9	45.3	58.1	91	27	543	2.88	1.61	3.91	7	.0
May--------	78.1	54.4	66.3	93	36	815	4.27	2.59	5.78	7	.0
June-------	84.8	62.4	73.6	98	46	1,008	4.43	2.47	6.02	6	.0
July-------	87.9	66.9	77.4	98	53	1,159	5.28	3.01	7.12	8	.0
August-----	86.7	66.2	76.5	97	50	1,132	4.62	2.33	6.48	7	.0
September--	81.2	60.2	70.7	95	43	921	4.45	1.68	6.67	6	.0
October----	71.2	48.8	60.0	88	28	620	3.61	1.21	5.53	5	.0
November---	62.0	38.6	50.3	82	19	314	2.89	1.23	4.25	5	.0
December---	52.1	30.9	41.5	75	9	167	3.55	2.02	4.79	6	1.3
Year-----	69.7	47.3	58.5	99	4	7,183	47.29	39.87	55.01	81	8.7

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-76 at Williamsburg, Virginia]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 29	April 14	May 3
2 years in 10 later than--	March 24	April 9	April 27
5 years in 10 later than--	March 14	March 30	April 16
First freezing temperature in fall:			
1 year in 10 earlier than--	November 6	October 29	October 15
2 years in 10 earlier than--	November 12	November 3	October 20
5 years in 10 earlier than--	November 22	November 12	October 29

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-76 at Williamsburg, Virginia]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	231	206	175
8 years in 10	238	213	182
5 years in 10	253	226	196
2 years in 10	268	240	210
1 year in 10	275	247	217

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1B	Alaga loamy sand, 0 to 4 percent slopes	984	0.7
2B	Caroline loam, 0 to 4 percent slopes	372	0.3
3A	Craven silt loam, 0 to 2 percent slopes	691	0.5
3B	Craven silt loam, 2 to 6 percent slopes	2,750	1.9
4A	Dogue fine sandy loam, 0 to 2 percent slopes	2,305	1.6
4B	Dogue fine sandy loam, 2 to 6 percent slopes	691	0.5
5A	Emporia sandy loam, 0 to 2 percent slopes	505	0.4
5B	Emporia sandy loam, 2 to 6 percent slopes	12,218	8.5
6	Eunola fine sandy loam	6,489	4.5
7	Fluvaquents, frequently flooded	6,168	4.3
8	Fluvaquents, saline	1,008	0.7
9C	Hapludults, sloping	5,526	3.8
9D	Hapludults, steep	7,843	5.4
10	Johns sandy loam	1,202	0.8
11	Johns Variant loamy sand	1,460	1.0
12B	Kalmia sandy loam, 0 to 4 percent slopes	1,906	1.3
13A	Kempsville fine sandy loam, 0 to 2 percent slopes	821	0.6
13B	Kempsville fine sandy loam, 2 to 6 percent slopes	11,664	8.1
14B	Kenansville loamy fine sand, 0 to 4 percent slopes	5,292	3.7
15	Kenansville Variant loamy sand	667	0.5
16	Lumbee sandy loam	8,173	5.7
17	Lumbee Variant sandy loam	1,797	1.2
18	Meggett sandy loam	12,334	8.6
19	Ochlockonee-Ochlockonee Variant complex	1,671	1.2
20	Ochraquults, nearly level	5,083	3.5
21	Ochraquults-Haplaquepts complex	2,798	1.9
22	Okeetee sandy loam	365	0.3
23	Osier loamy fine sand	595	0.4
24B	Pactolus loamy sand, 0 to 4 percent slopes	1,330	0.9
25	Pamlico and Portsmouth soils	379	0.3
26A	Psamments, nearly level	484	0.3
27C	Psamments-Hapludults complex, sloping	4,190	2.9
27D	Psamments-Hapludults complex, steep	8,251	5.7
28A	Rumford loamy fine sand, 0 to 2 percent slopes	833	0.6
28B	Rumford loamy fine sand, 2 to 6 percent slopes	880	0.6
28C	Rumford loamy fine sand, 6 to 10 percent slopes	105	0.1
29A	Suffolk fine sandy loam, 0 to 2 percent slopes	2,365	1.6
29B	Suffolk fine sandy loam, 2 to 6 percent slopes	7,320	5.1
29C	Suffolk fine sandy loam, 6 to 10 percent slopes	363	0.3
30	Sulfaquents, frequently flooded	6,028	4.2
31A	Wrightsboro fine sandy loam, 0 to 2 percent slopes	4,138	2.9
31B	Wrightsboro fine sandy loam, 2 to 6 percent slopes	3,343	2.3
NS	Not surveyed	308	0.2
W	Water	505	0.4
	Total	144,000	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. The estimates were made in 1977. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Soybeans	Wheat	Barley	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Bu	Ton	AUM*
1B------------------------ Alaga	60	12	20	25	25	---	4.0
2B------------------------ Caroline	110	22	40	60	55	2.5	4.0
3A------------------------ Craven	115	23	40	60	55	3.5	5.8
3B------------------------ Craven	105	21	40	55	45	3.5	5.8
4A------------------------ Dogue	125	25	45	60	55	3.5	5.8
4B------------------------ Dogue	115	23	40	55	50	3.5	5.8
5A------------------------ Emporia	110	22	35	55	50	5.0	8.0
5B------------------------ Emporia	100	20	30	50	45	5.0	8.0
6------------------------- Eunola	100	20	35	55	50	5.0	8.0
7**, 8**. Fluvaquents							
9C**, 9D**. Hapludults							
10------------------------ Johns	120	24	45	50	45	5.4	9.0
11------------------------ Johns Variant	95	19	35	45	40	4.0	6.6
12B----------------------- Kalmia	110	22	45	60	55	5.0	8.0
13A----------------------- Kempsville	130	26	45	65	60	3.5	5.8
13B----------------------- Kempsville	130	26	45	65	60	3.5	5.8
14B----------------------- Kenansville	70	14	25	30	25	4.0	6.6
15------------------------ Kenansville Variant	85	17	25	30	25	4.5	7.4
16------------------------ Lumbee	110	22	45	---	---	5.4	9.0
17------------------------ Lumbee Variant	95	19	35	---	---	4.0	6.6
18------------------------ Meggett	130	26	45	---	---	5.0	8.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Soybeans	Wheat	Barley	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Bu	Ton	AUM*
19**:							
Ochlockonee	100	20	34	55	45	4.5	7.4
Ochlockonee Variant	100	22	34	60	50	5.0	8.0
20**. Ochraquults							
21**:							
Ochraquults.							
Haplaquepts.							
22 Okeetee	100	20	35	50	45	4.0	6.6
23 Osier	70	14	---	45	40	2.0	3.0
24B Pactolus	65	13	25	---	---	2.0	3.0
25 Pamlico and Portsmouth	---	---	---	---	---	---	---
26A**. Psamments							
27C, 27D**:							
Psamments.							
Hapludults.							
28A Rumford	100	20	30	50	45	3.5	5.8
28B Rumford	100	20	30	50	45	3.5	5.8
28C Rumford	90	18	25	45	40	3.0	5.0
29A Suffolk	120	24	35	60	55	3.5	5.8
29B Suffolk	120	24	35	60	55	3.5	5.8
29C Suffolk	105	21	30	45	40	3.0	5.0
30**. Sulfaquents							
31A Wrightsboro	125	25	45	55	50	4.5	7.4
31B Wrightsboro	110	22	40	45	40	4.5	7.4

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Wind- throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
1B----------------- Alaga	3s	Slight	Moderate	Moderate	Slight	Loblolly pine------- Longleaf pine-------	80 70	Virginia pine, loblolly pine.
2B----------------- Caroline	3o	Slight	Slight	Slight	Slight	Shortleaf pine------ Virginia pine------- Loblolly pine------- Northern red oak----	70 70 75 70	Loblolly pine, Virginia pine.
3A, 3B------------- Craven	3w	Slight	Moderate	Slight	--------	Loblolly pine------- Longleaf pine------- Water oak-----------	81 67 80	Loblolly pine, Virginia pine.
4A, 4B------------- Dogue	2w	Slight	Moderate	Slight	Slight	Loblolly pine------- Northern red oak---- Sweetgum------------ Yellow-poplar------- Southern red oak----	90 80 90 90 80	Loblolly pine.
5A, 5B------------- Emporia	3w	Slight	Slight	Slight	Slight	Loblolly pine------- Northern red oak----	75 70	Loblolly pine, sweetgum.
6------------------ Euonla	2w	Slight	Moderate	Slight	Slight	Loblolly pine------- Sweetgum------------	90 90	Loblolly pine, sweetgum, yellow-poplar.
10----------------- Johns	2w	Slight	Moderate	Slight	--------	Loblolly pine------- Sweetgum------------	86 90	Loblolly pine.
11----------------- Johns Variant	2w	Slight	Moderate	Moderate	--------	Loblolly pine------- Sweetgum------------	85 85	Loblolly pine.
12B---------------- Kalmia	2o	Slight	Slight	Slight	--------	Loblolly pine------- Sweetgum------------ Yellow-poplar------- Southern red oak---- White oak-----------	88 85 96 --- ---	Loblolly pine, yellow-poplar.
13A, 13B----------- Kempsville	3o	Slight	Slight	Slight	Slight	Northern red oak---- Loblolly pine------- Virginia pine-------	70 73 70	Loblolly pine.
14B---------------- Kenansville	3s	Slight	Moderate	Moderate	--------	Loblolly pine------- Longleaf pine-------	80 65	Loblolly pine.
15----------------- Kenansville Variant	3s	Slight	Moderate	Moderate	--------	Loblolly pine-------	80	Loblolly pine.
16----------------- Lumbee	2w	Slight	Severe	Severe	--------	Loblolly pine------- Pond pine----------- Water tupelo-------- Sweetgum------------ White oak-----------	94 75 70 90 ---	Loblolly pine, sweetgum.
17----------------- Lumbee Variant	2w	Slight	Severe	Moderate	--------	Loblolly pine------- Sweetgum------------	90 90	Loblolly pine.
18----------------- Meggett	1w	Slight	Severe	Severe	Severe	Loblolly pine------- Pond pine-----------	100 75	Loblolly pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
19*:								
Ochlockonee-------	1w	Slight	Moderate	Slight	Slight	Loblolly pine------- Yellow-poplar------- Sweetgum------------	100 100 90	Loblolly pine, yellow-poplar.
Ochlockonee Variant----------	2w	Moderate	Moderate	Slight	Slight	Loblolly pine------- Yellow-poplar-------	100 110	Loblolly pine, yellow-poplar.
22----------------- Okeetee	2w	Slight	Moderate	Moderate	Slight	Loblolly pine------- Longleaf pine------- Sweetgum------------ Water tupelo-------- White oak----------- Southern red oak---- Water oak-----------	90 75 90 --- --- --- ---	Loblolly pine, shortleaf pine, sweetgum, yellow-poplar.
23----------------- Osier	3w	Slight	Severe	Severe	--------	Loblolly pine------- Longleaf pine-------	80 68	Loblolly pine.
24B---------------- Pactolus	3w	Slight	Moderate	Moderate	--------	Loblolly pine------- Longleaf pine-------	84 70	Loblolly pine.
25*:								
Pamlico-----------	4w	Slight	Severe	Severe	--------	Pond pine----------- Baldcypress--------- Water tupelo--------	55 --- ---	Loblolly pine.
Portsmouth--------	2w	Slight	Severe	Severe	Slight	Loblolly pine------- Sweetgum------------ Pin oak-------------	86 90 85	Loblolly pine, sweetgum.
28A, 28B, 28C------ Rumford	3o	Slight	Slight	Slight	Slight	Northern red oak---- Virginia pine------- Loblolly pine-------	65 70 80	Loblolly pine, Virginia pine.
29A, 29B, 29C------ Suffolk	2o	Slight	Slight	Slight	Slight	Loblolly pine------- Longleaf pine------- Northern red oak----	80 70 70	Loblolly pine.
31A, 31B----------- Wrightsboro	2w	Slight	Moderate	Slight	Slight	Loblolly pine------- Longleaf pine------- Sweetgum------------	90 75 90	Loblolly pine, yellow-poplar, sweetgum.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B: Alaga	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.	Moderate: too sandy.
2B: Caroline	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.	Slight.
3A: Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
3B: Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly, slope.	Slight	Slight.
4A: Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
4B: Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, slope, percs slowly.	Slight	Slight.
5A: Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Slight.
5B: Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
6: Eunola	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
7*, 8*. Fluvaquents					
9C*, 9D*. Hapludults					
10: Johns	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
11: Johns Variant	Severe: wetness, too sandy.	Moderate: wetness, too sandy.	Severe: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: too sandy.
12B: Kalmia	Slight	Slight	Moderate: slope.	Slight	Slight.
13A: Kempsville	Slight	Slight	Slight	Slight	Slight.
13B: Kempsville	Slight	Slight	Moderate: slope.	Slight	Slight.
14B: Kenansville	Slight	Slight	Moderate: slope.	Slight	Slight.
15: Kenansville Variant	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: too sandy.	Moderate: too sandy.
16: Lumbee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
17: Lumbee Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
18-------------------- Meggett	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
19*:					
Ochlockonee----------	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
Ochlockonee Variant--	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
20*. Ochraquults					
21*:					
Ochraquults.					
Haplaquepts.					
22-------------------- Okeetee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
23-------------------- Osier	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
24B------------------- Pactolus	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: too sandy.
25*:					
Pamlico--------------	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Portsmouth-----------	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.
26A*. Psamments					
27C*, 27D*:					
Psamments.					
Hapludults.					
28A------------------- Rumford	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
28B------------------- Rumford	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
28C------------------- Rumford	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
29A------------------- Suffolk	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
29B------------------- Suffolk	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
29C------------------- Suffolk	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
30*. Sulfaquents					
31A-------------------- Wrightsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight-----------	Slight.
31B-------------------- Wrightsboro	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight-----------	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1B----------------- Alaga	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
2B----------------- Caroline	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3A----------------- Craven	Good	Good	Good	Good	Good	Poor	Good	Good	Good	Poor.
3B----------------- Craven	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
4A----------------- Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
4B----------------- Dogue	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
5A----------------- Emporia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
5B----------------- Emporia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
6------------------ Eunola	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
7*, 8*. Fluvaquents										
9C*, 9D*. Hapludults										
10----------------- Johns	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
11----------------- Johns Variant	Poor	Fair	Good	Good	Good	Fair	Poor	Fair	Good	Poor.
12B---------------- Kalmia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
13A, 13B----------- Kempsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14B---------------- Kenansville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15----------------- Kenansville Variant	Poor	Fair	Good	Fair	Fair	Poor	Poor	Fair	Fair	Poor.
16----------------- Lumbee	Fair	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor.
17----------------- Lumbee Variant	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
18----------------- Meggett	Poor	Fair	Good	Fair	Good	Good	Good	Fair	Good	Good.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
19*:										
Ochlockonee	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Ochlockonee Variant	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
20*. Ochraquults										
21*: Ochraquults.										
Haplaquepts.										
22 Okeetee	Poor	Fair	Good	Good	Good	Good	Good	Fair	Good	Good.
23 Osier	Very poor.	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
24B Pactolus	Fair	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25*:										
Pamlico	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Portsmouth	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
26A*. Psamments										
27C*, 27D*: Psamments.										
Hapludults.										
28A, 28B, 28C Rumford	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
29A, 29B Suffolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
29C Suffolk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
30*. Sulfaquents										
31A Wrightsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
31B Wrightsboro	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B----------------- Alaga	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty.
2B----------------- Caroline	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
3A, 3B------------- Craven	Severe: wetness, too clayey.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
4A, 4B------------- Dogue	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
5A----------------- Emporia	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Moderate: low strength.	Slight.
5B----------------- Emporia	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: slope, shrink-swell.	Moderate: low strength.	Slight.
6------------------ Eunola	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, low strength.	Moderate: wetness.
7*, 8*. Fluvaquents						
9C*, 9D*. Hapludults						
10----------------- Johns	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, low strength.	Moderate: wetness.
11----------------- Johns Variant	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
12B---------------- Kalmia	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Moderate: low strength.	Slight.
13A---------------- Kempsville	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: low strength.	Slight.
13B---------------- Kempsville	Slight----------	Slight----------	Slight----------	Moderate: slope.	Moderate: low strength.	Slight.
14B---------------- Kenansville	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty.
15----------------- Kenansville Variant	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
16----------------- Lumbee	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
17----------------- Lumbee Variant	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
18 Meggett	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, low strength.	Severe: wetness.
19*:						
Ochlockonee	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Slight.
Ochlockonee Variant	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: low strength.	Slight.
20*. Ochraquults						
21*:						
Ochraquults.						
Haplaquepts.						
22 Okeetee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
23 Osier	Severe: floods, wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
24B Pactolus	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty.
25*:						
Pamlico	Severe: ponding, wetness, cutbanks cave.	Severe: wetness, ponding, low strength.	Severe: wetness, ponding, low strength.	Severe: wetness, ponding, low strength.	Severe: wetness, ponding.	Severe: ponding, wetness, excess humus.
Portsmouth	Severe: wetness, ponding, cutbank cave.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.	Severe: wetness, ponding.
26A*. Psamments						
27C*, 27D*:						
Psamments.						
Hapludults.						
28A Rumford	Slight	Slight	Slight	Slight	Slight	Slight.
28B Rumford	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
28C Rumford	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
29A Suffolk	Slight	Slight	Slight	Slight	Slight	Slight.
29B Suffolk	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
29C Suffolk	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
30*. Sulfaquents						
31A--------------- Wrightsboro	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Slight.
31B--------------- Wrightsboro	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B: Alaga	Slight	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: seepage.
2B: Caroline	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
3A, 3B: Craven	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
4A, 4B: Dogue	Severe: percs slowly, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
5A, 5B: Emporia	Severe: percs slowly, wetness.	Moderate: seepage, wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
6: Eunola	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
7*, 8*. Fluvaquents					
9C*, 9D*. Hapludults					
10: Johns	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor. seepage.
11: Johns Variant	Severe: poor filter, wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: seepage.
12B: Kalmia	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Slight	Fair: too sandy.
13A, 13B: Kempsville	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
14B: Kenansville	Slight	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
15: Kenansville Variant	Severe: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: too sandy.
16: Lumbee	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness.	Poor: wetness, too sandy.
17: Lumbee Variant	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: wetness, too sandy.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
18: Meggett	Severe: wetness, percs slowly.	Severe: wetness.	Severe wetness.	Severe: wetness.	Poor: too clayey, wetness, hard to pack.
19*:					
Ochlockonee	Severe: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: wetness, too sandy.
Ochlockonee Variant	Severe: wetness.	Severe: seepage.	Severe: wetness, seepage.	Severe: seepage.	Fair. wetness.
20*. Ochraquults					
21*:					
Ochraquults.					
Haplaquepts.					
22: Okeetee	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, too clayey.
23: Osier	Severe: floods, poor filter, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness, seepage.
24B: Pactolus	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Fair: seepage, too sandy.
25*:					
Pamlico	Severe: wetness, ponding.	Severe: wetness, ponding, excess humus.	Severe: wetness, ponding.	Severe: wetness, ponding.	Poor: wetness, excess humus, hard to pack.
Portsmouth	Severe: wetness, ponding.	Severe: wetness, seepage.	Severe: wetness, ponding, seepage.	Severe: wetness, ponding, seepage.	Poor: wetness, seepage.
26A*. Psamments					
27C*, 27D*:					
Psamments.					
Hapludults.					
28A, 28B: Rumford	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: too sandy, seepage.
28C: Rumford	Moderate: slope.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: too sandy, seepage, slope.
29A, 29B: Suffolk	Slight	Severe: seepage.	Severe: seepage.	Slight	Good.
29C: Suffolk	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Moderate: slope.	Fair: slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
30*. Sulfaquents					
31A, 31B------------ Wrightsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B Alaga	Good	Probable	Improbable: too sandy.	Fair: too sandy.
2B Caroline	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
3A, 3B Craven	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
4A, 4B Dogue	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
5A, 5B Emporia	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
6 Eunola	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
7*, 8*. Fluvaquents				
9C*, 9D*. Hapludults				
10 Johns	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.
11 Johns Variant	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too sandy.
12B Kalmia	Good	Probable	Improbable: too sandy.	Fair: thin layer.
13A, 13B Kempsville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
14B Kenansville	Good	Probable	Improbable: too sandy.	Fair: too sandy.
15 Kenansville Variant	Fair: wetness.	Improbable: excess fines.	Improbable: too sandy.	Fair: too sandy.
16 Lumbee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
17 Lumbee Variant	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
18 Meggett	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
19*: Ochlockonee	Good	Improbable: excess fines.	Improbable: excess fines.	Fair. thin layer.
Ochlockonee Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
20*. Ochraquults				
21*: Ochraquults.				
Haplaquepts.				
22-------------------- Okeetee	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
23-------------------- Osier	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
24B------------------- Pactolus	Fair: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy.
25*: Pamlico--------------	Poor: wetness, excess humus.	Probable-------------	Improbable: too sandy.	Poor: wetness.
Portsmouth-----------	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: wetness.
26A*. Psamments				
27C*, 27D*: Psamments.				
Hapludults.				
28A, 28B, 28C--------- Rumford	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: thin layer, too sandy.
29A, 29B-------------- Suffolk	Good-----------------	Probable-------------	Improbable: too sandy.	Good.
29C------------------- Suffolk	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: slope.
30*. Sulfaquents				
31A, 31B-------------- Wrightsboro	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
1B Alaga	Seepage	Piping, seepage.	No water	Not needed	Droughty, fast intake.	Droughty.
2B Caroline	Favorable	Low strength	No water	Not needed	Percs slowly, complex slope, erodes easily.	Percs slowly, erodes easily.
3A, 3B Craven	Favorable	Piping	Deep to water, slow refill.	Percs slowly	Erodes easily, percs slowly.	Percs slowly.
4A, 4B Dogue	Slope, seepage.	Hard to pack, low strength.	Deep to water	Wetness, percs slowly.	Slope, percs slowly, erodes easily.	Erodes easily, percs slowly, wetness.
5A, 5B Emporia	Seepage	Shrink-swell	Deep to water	Not needed	Erodes easily, complex slope.	Favorable.
6 Eunola	Seepage	Low strength, piping.	No water	Not needed	Favorable	Favorable.
7*, 8*. Fluvaquents						
9C*, 9D*. Hapludults						
10 Johns	Seepage	Seepage	Deep to water	Cutbanks cave	Wetness	Not needed.
11 Johns Variant	Seepage	Seepage, piping, low strength.	Cutbanks cave	Cutbanks cave	Seepage, droughty.	Not needed.
12B Kalmia	Seepage	Seepage	Deep to water	Not needed	Favorable	Favorable.
13A, 13B Kempsville	Seepage	Favorable	No water	Not needed	Slope	Slope.
14B Kenansville	Seepage	Seepage	Deep to water	Not needed	Fast intake. droughty.	Droughty.
15 Kenansville Variant	Seepage	Piping, seepage.	Deep to water	Not needed	Fast intake, droughty.	Not needed.
16 Lumbee	Seepage	Seepage	Favorable	Poor outlets, cutbanks cave.	Wetness	Not needed.
17 Lumbee Variant	Seepage	Seepage, piping, low strength.	Cutbanks cave	Cutbanks cave	Wetness	Not needed.
18 Meggett	Favorable	Shrink-swell, hard to pack.	Slow refill	Poor outlets	Percs slowly, wetness.	Not needed.
19*: Ochlockonee	Seepage	Seepage, piping, erodes easily.	Deep to water	Deep to water	Droughty	Favorable.
Ochlockonee Variant	Seepage	Piping, erodes easily, low strength.	Deep to water	Favorable	Not needed	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
20*. Ochraquults						
21*: Ochraquults.						
Haplaquepts.						
22----------------- Okeetee	Favorable------	Compressible, shrink-swell, low strength.	Deep to water, slow refill.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, wetness.
23----------------- Osier	Seepage--------	Seepage, unstable fill.	Deep to water	Floods, cutbanks cave.	Floods, seepage.	Not needed.
24B---------------- Pactolus	Seepage--------	Seepage--------	Deep to water	Cutbanks cave	Wetness, fast intake.	Not needed.
25*: Pamlico-----------	Seepage--------	Piping---------	Favorable------	Wetness, poor outlets.	Wetness---------	Not needed.
Portsmouth--------	Seepage--------	Hard to pack, low strength.	Favorable------	Poor outlets, wetness.	Wetness---------	Rooting depth, wetness.
26A*. Psamments						
27C*, 27D*: Psamments.						
Hapludults.						
28A, 28B, 28C----- Rumford	Seepage--------	Seepage, piping.	No water-------	Not needed-----	Droughty, seepage.	Droughty.
29A, 29B, 29C----- Suffolk	Slope, seepage.	Piping, seepage.	Deep to water	Not needed-----	Slope, fast intake.	Slope.
30*. Sulfaquents						
31A, 31B---------- Wrightsboro	Favorable------	Seepage--------	Deep to water	Percs slowly---	Wetness, percs slowly.	Wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1B------------------ Alaga	0-9	Loamy sand------	SM, SW-SM	A-2, A-3	0	100	100	40-70	5-35	---	NP
	9-60	Loamy sand, loamy fine sand, fine sand.	SM, SW-SM	A-2, A-3	0	100	100	50-80	5-35	---	NP
2B------------------ Caroline	0-14	Loam------------	ML, CL-ML	A-4	0	90-100	85-100	80-100	60-90	<30	NP-7
	14-52	Clay loam, clay, silty clay.	CL, CH	A-7	0	90-100	85-100	80-100	60-90	41-70	18-40
	52-60	Clay loam, clay, sandy clay loam.	SM-SC, SC, CL, CH	A-4, A-6, A-7	0	85-100	70-100	55-95	35-90	20-70	5-40
3A, 3B------------- Craven	0-9	Silt loam--------	ML, CL-ML	A-4	0	100	100	75-100	51-70	<25	NP-7
	9-53	Clay, silty clay, clay loam.	CH, MH	A-7	0	100	100	90-100	70-95	51-60	18-35
	53-62	Clay, sandy clay loam, clay loam.	CH, CL, SC	A-7, A-6	0	100	100	80-100	36-85	30-55	11-35
4A, 4B------------- Dogue	0-11	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	95-100	75-100	50-85	20-50	<25	NP-8
	11-48	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-95	40-90	35-60	16-32
	48-60	Stratified sand to sandy clay loam.	SM, SC, SP-SM, SM-SC	A-2, A-4, A-1	0	80-100	60-100	35-70	10-40	<26	NP-8
5A, 5B------------- Emporia	0-14	Sandy loam------	CL-ML, SC, SM, ML	A-2, A-4	0-5	80-100	75-100	50-95	25-65	<25	NP-7
	14-35	Sandy clay loam, sandy loam, clay loam.	SM, SC, ML, CL	A-2, A-4, A-6, A-7	0-5	70-100	65-100	45-95	25-80	20-50	7-20
	35-60	Sandy clay loam, clay loam, clay.	SC, CL, CH	A-2, A-4, A-6, A-7	0-5	70-100	65-100	45-95	30-90	30-65	10-40
6------------------ Eunola	0-9	Fine sandy loam	SM	A-2, A-4	0	100	98-100	60-85	30-50	---	NP
	9-50	Sandy clay loam, sandy clay.	SM, SC, ML, CL	A-4	0	100	98-100	80-95	36-60	15-30	2-10
	50-60	Sandy loam------	SM	A-2, A-4	0	100	98-100	60-70	30-40	---	NP
7*, 8*. Fluvaquents											
9C*, 9D*. Hapludults											
10----------------- Johns	0-8	Sandy loam------	SM, SM-SC	A-2, A-4	---	100	95-100	60-90	15-45	<20	NP-7
	8-36	Sandy clay loam, sandy loam.	SC, SM-SC, CL	A-2, A-4, A-6	---	100	95-100	60-90	30-55	20-35	4-15
	36-60	Sand, loamy sand	SM, SP-SM, SP	A-2, A-3	---	95-100	95-100	51-90	4-25	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
11----------------- Johns Variant	0-12	Loamy sand------	SM	A-2	0	100	100	60-90	20-30	10-20	NP
	12-32	Sandy loam, sandy clay loam.	SM, SC	A-2, A-4	0	100	100	70-95	25-40	12-30	NP-10
	32-60	Loamy sand, sand.	SM, SP-SM	A-2	0	100	100	60-90	12-35	10-20	NP
12B---------------- Kalmia	0-13	Sandy loam------	SM, SM-SC, SC	A-2	0	100	95-100	50-75	15-40	<25	NP-10
	13-33	Sandy clay loam	SC, SM-SC	A-2, A-4, A-6	0	100	95-100	70-90	30-49	20-35	4-15
	33-72	Loamy sand, sand	SM, SP-SM, SP	A-2, A-3	0	100	95-100	50-70	4-25	---	NP
13A, 13B----------- Kempsville	0-18	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-2, A-4	0-5	80-100	75-100	45-90	25-65	<20	NP-7
	18-53	Sandy clay loam, sandy loam.	CL, CL-ML, SC, SM-SC	A-1, A-2, A-4, A-6	0-5	55-100	50-100	35-90	20-70	20-40	5-20
	53-70	Sandy loam, loamy sand, sandy clay loam.	CL, SC, SM, GM	A-1, A-2, A-4	0	55-100	50-100	10-85	5-55	<40	NP-15
14B---------------- Kenansville	0-29	Loamy fine sand	SM	A-1, A-2	0	100	95-100	45-60	10-25	<25	NP-3
	29-54	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2	0	100	95-100	50-65	20-35	<30	NP-10
	54-60	Sand, loamy sand	SP-SM, SM	A-1, A-2, A-3	0	100	95-100	40-60	5-30	---	NP
15----------------- Kenansville Variant	0-31	Loamy sand------	SM	A-1, A-2	0	100	100	40-60	15-25	10-20	NP
	31-57	Sandy loam------	SM	A-2	0	100	100	65-75	20-35	10-20	NP
	57-63	Loamy sand------	SM	A-2	0	100	100	55-65	15-30	10-25	NP
16----------------- Lumbee	0-9	Sandy loam------	SM, SM-SC	A-2, A-4	0	100	85-100	65-90	15-45	<20	NP-7
	9-29	Sandy clay loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	90-100	65-95	30-49	19-35	4-15
	29-60	Loamy sand, sand, fine sand.	SP, SM, SP-SM	A-2, A-3	0	90-100	85-100	50-90	4-25	---	NP
17----------------- Lumbee Variant	0-30	Sandy loam------	SM	A-2, A-4	0	100	95-100	50-70	25-40	12-20	NP-3
	30-60	Fine sand, loamy sand.	SM	A-2	0	95-100	85-100	50-75	15-30	10-20	NP
18----------------- Meggett	0-10	Sandy loam------	SM	A-2, A-4	0	100	90-100	85-100	13-41	---	NP
	10-48	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	85-100	51-90	30-70	20-40
	48-60	Sandy clay, clay loam, sandy loam.	CL, SC, SM	A-4, A-6, A-2	0	90-100	65-100	50-100	40-60	<40	NP-25
19*:											
Ochlockonee--------	0-35	Sandy loam------	SM, ML, SM-SC	A-4	0	100	95-100	95-100	36-80	<26	NP-5
	35-62	Loamy sand, sandy loam.	SM, ML, CL, SC	A-4, A-2	0	100	95-100	85-99	13-80	<32	NP-9

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
19*:											
Ochlockonee											
Variant----------	0-10	Sandy loam------	SM, SC	A-2	0	100	100	60-75	15-35	<26	NP-8
	10-30	Sandy clay loam, sandy loam.	SC, SM-SC	A-4, A-6	0	100	100	70-90	35-50	20-35	4-15
	30-60	Sandy loam, loamy sand.	SM, SC	A-2, A-4	0	100	100	50-75	15-40	<26	NP-8
20*. Ochraquults											
21*: Ochraquults.											
Haplaquepts.											
22----------------- Okeetee	0-6	Sandy loam------	SM, SC, ML, CL	A-2, A-4	0	100	98-100	90-98	30-60	<30	NP-10
	6-41	Clay, sandy clay	CH, CL	A-7	0	100	98-100	90-100	55-85	41-55	20-30
	41-60	Clay, sandy clay, sandy clay loam.	CH, CL, ML	A-4, A-6, A-7	0	100	98-100	90-100	51-80	25-55	8-30
23----------------- Osier	0-8	Loamy fine sand	SM	A-2	0	100	98-100	70-90	13-25	---	NP
	8-60	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	95-100	65-90	5-20	---	NP
24B---------------- Pactolus	0-31	Loamy sand------	SM	A-2	0	100	90-100	51-95	13-30	---	NP
	31-60	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	90-100	51-95	5-30	---	NP
25*:											
Pamlico-----------	0-18	Muck------------	Pt	---	0	---	---	---	---	---	---
	18-60	Loamy sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	70-95	5-20	---	NP
Portsmouth--------	0-15	Sandy loam------	ML, CL, CL-ML	A-4	0	95-100	85-100	70-85	50-85	18-30	NP-8
	15-30	Sandy clay loam, loam, clay loam.	SC, CL	A-2, A-4, A-6	0	95-100	85-100	70-95	35-75	30-50	8-25
	30-60	Fine sand, sand, loamy sand.	SM, SP-SM	A-2, A-3	0	95-100	85-100	45-75	5-35	---	NP
26A*. Psamments											
27C*, 27D*: Psamments.											
Hapludults.											
28A, 28B, 28C------ Rumford	0-11	Loamy fine sand	SM	A-2	0	90-100	85-100	45-75	15-30	<20	NP
	11-42	Fine sandy loam, sandy loam, sandy clay loam.	SM, SC, SM	A-2, A-4, A-6	0	80-100	75-100	55-85	30-50	<34	NP-12
	42-72	Stratified sandy loam to gravelly sand.	SM, SP, GP, GM	A-1, A-2, A-3, A-6	0	50-100	35-100	20-85	2-40	<25	NP-6

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
29A, 29B, 29C------ Suffolk	0-10	Fine sandy loam	SM, SM-SC	A-2, A-4	0	90-100	75-100	50-80	25-50	<25	NP-7
	10-37	Sandy clay loam, clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	90-100	75-100	50-95	25-75	20-40	5-20
	37-64	Loamy sand, fine sandy loam, gravelly sand.	SP, SM, SM-SC	A-1, A-2, A-4	0	75-100	60-100	30-80	3-50	<25	NP-7
30*. Sulfaquents											
31A, 31B----------- Wrightsboro	0-12	Fine sandy loam	SM	A-2, A-4	0	98-100	95-100	51-95	20-50	<25	NP-3
	12-72	Sandy clay loam, loam.	SC, CL	A-6, A-7	0	98-100	95-100	60-95	40-70	30-50	11-25

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
1B--------------- Alaga	0-9	---	---	>6.0	0.05-0.09	4.5-6.0	Low-----------	0.17	5	0.1-1
	9-60	---	---	>6.0	0.05-0.09	4.5-6.0	Low-----------	0.17		
2B--------------- Caroline	0-14	15-25	1.35-1.45	0.6-2.0	0.14-0.20	4.5-6.0	Low-----------	0.43	3	1-3
	14-52	35-55	1.40-1.50	0.06-0.6	0.14-0.22	4.5-5.5	Moderate-----	0.43		
	52-60	15-45	1.40-1.55	0.06-0.6	0.13-0.20	4.5-5.5	Moderate-----	0.43		
3A, 3B----------- Craven	0-9	---	---	0.6-2.0	0.12-0.18	4.5-6.0	Low-----------	0.37	3	1-3
	9-53	---	---	<0.2	0.12-0.15	4.5-5.5	Moderate-----	0.32		
	53-62	---	---	<0.2	0.12-0.15	4.5-5.5	Moderate-----	0.32		
4A, 4B----------- Dogue	0-11	---	---	2.0-6.0	0.08-0.15	3.6-6.5	Low-----------	0.32	4	1-3
	11-48	---	---	0.2-0.6	0.12-0.19	3.6-5.5	Moderate-----	0.28		
	48-60	---	---	0.6-6.0	0.05-0.14	3.6-5.5	Low-----------	0.17		
5A, 5B----------- Emporia	0-14	7-18	1.30-1.40	2.0-6.0	0.08-0.17	4.5-6.5	Low-----------	0.24	5	1-3
	14-35	12-35	1.45-1.55	0.2-2.0	0.08-0.19	4.5-5.5	Moderate-----	0.24		
	35-60	31-40	1.45-1.55	0.06-0.6	0.10-0.16	4.5-5.5	Moderate-----	0.28		
6---------------- Eunola	0-9	---	---	2.0-6.0	0.10-0.14	4.5-5.5	Low-----------	0.28	4	1-2
	9-50	---	---	0.6-2.0	0.12-0.16	4.5-5.5	Low-----------	0.32		
	50-60	---	---	2.0-6.0	0.10-0.14	4.5-5.5	Low-----------	0.24		
7*, 8*. Fluvaquents										
9C*, 9D*. Hapludults										
10--------------- Johns	0-8	---	---	2.0-6.0	0.08-0.14	4.5-5.5	Low-----------	0.20	5	1-2
	8-36	---	---	0.6-2.0	0.12-0.15	4.5-5.5	Low-----------	0.24		
	36-60	---	---	6.0-20	0.03-0.06	4.5-5.5	Low-----------	0.10		
11--------------- Johns Variant	0-12	4-8	---	>6.0	0.07-0.10	5.6-6.0	Low-----------	0.43	4	0.1-1
	12-32	9-14	---	2.0-6.0	0.10-0.16	5.6-6.0	Low-----------	0.49		
	32-60	3-7	---	>6.0	0.06-0.10	5.1-6.0	Low-----------	0.49		
12B-------------- Kalmia	0-13	---	---	2.0-6.0	0.06-0.10	4.5-6.0	Low-----------	0.20	4	1-2
	13-33	---	---	0.6-2.0	0.12-0.16	4.5-5.5	Low-----------	0.24		
	33-72	---	---	6.0-20	0.03-0.06	4.5-5.5	Low-----------	0.10		
13A, 13B--------- Kempsville	0-18	6-11	1.30-1.40	2.0-6.0	0.08-0.15	4.5-5.5	Low-----------	0.28	4	1-3
	18-53	8-20	1.60-1.97	0.6-2.0	0.10-0.16	4.5-5.5	Low-----------	0.17		
	53-70	8-20	1.60-1.75	<0.06	0.05-0.16	4.5-5.5	Low-----------	---		
14B-------------- Kenansville	0-29	---	---	6.0-20	0.04-0.10	4.5-6.0	Low-----------	0.15	5	1-3
	29-54	---	---	2.0-6.0	0.10-0.14	4.5-6.0	Low-----------	0.15		
	54-60	---	---	6.0-20	<0.05	4.5-6.0	Low-----------	0.10		
15--------------- Kenansville Variant	0-31	3-5	1.40-1.50	2.0-6.0	0.06-0.08	5.1-6.5	Low-----------	---	4	0.1-1
	31-57	4-8	1.40-1.50	2.0-6.0	0.06-0.09	5.1-6.5	Low-----------	---		
	57-63	10-19	1.40-1.50	0.6-2.0	0.10-0.14	5.1-6.0	Low-----------	---		
	57-63	8-12	1.40-1.50	2.0-6.0	0.07-0.14	4.5-5.5	Low-----------	---		
16--------------- Lumbee	0-9	---	---	2.0-6.0	0.08-0.12	4.5-5.5	Low-----------	0.24	5	1-3
	9-29	---	---	0.6-2.0	0.12-0.16	4.5-5.5	Low-----------	0.32		
	29-60	---	---	6.0-20	0.03-0.06	4.5-5.5	Low-----------	0.10		
17--------------- Lumbee Variant	0-8	15-20	1.30-1.50	2.0-6.0	0.10-0.12	4.5-5.0	Low-----------	0.24	5	1-3
	8-30	15-20	1.30-1.50	2.0-6.0	0.10-0.12	4.5-5.0	Low-----------	0.24		
	30-60	5-10	1.40-1.60	>6.0	0.05-0.08	4.5-5.0	Low-----------	0.32		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
18--------------- Meggett	0-10	5-20	---	2.0-6.0	0.10-0.15	4.5-6.5	Low-----------	0.24	4	2-8
	10-48	40-60	---	0.06-0.2	0.13-0.18	6.1-8.4	High----------	0.32		
	48-60	25-50	---	0.2-2.0	0.12-0.16	6.1-8.4	Moderate------	0.28		
19*:										
Ochlockonee-----	0-35	---	---	2.0-6.0	0.07-0.14	4.5-5.5	Low-----------	0.20	4	1-2
	35-62	---	---	2.0-6.0	0.06-0.12	4.5-5.5	Low-----------	0.17		
Ochlockonee Variant---------	0-10	5-16	1.25-1.35	2.0-6.0	0.08-0.14	4.5-5.5	Low-----------	---	4	1-2
	10-30	18-30	1.30-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Low-----------	---		
	30-60	5-18	1.35-1.45	2.0-6.0	0.08-0.14	4.5-5.5	Low-----------	---		
20*. Ochraquults										
21*:										
Ochraquults.										
Haplaquepts.										
22--------------- Okeetee	0-6	---	---	2.0-6.0	0.12-0.15	4.5-6.5	Low-----------	0.24	5	0.5-2
	6-41	---	---	0.06-0.2	0.10-0.15	5.1-6.5	Moderate------	0.32		
	41-60	---	---	0.06-0.6	0.10-0.15	5.6-8.4	Moderate------	0.24		
23--------------- Osier	0-8	---	---	6.0-20	0.10-0.15	4.5-6.0	Low-----------	---	5	1-3
	8-60	---	---	6.0-20	0.03-0.10	4.5-6.0	Low-----------	---		
24B-------------- Pactolus	0-31	---	---	6.0-20.	0.05-0.10	4.5-6.0	Low-----------	0.10	5	1-3
	31-60	---	---	6.0-20.	0.03-0.07	4.5-5.5	Low-----------	0.10		
25*:										
Pamlico----------	0-18	---	---	0.6-2.0	0.24-0.26	3.6-4.5	--------------	---	4	8-23
	18-60	---	---	6.0-20	0.03-0.06	3.6-5.5	Low-----------	---		
Portsmouth------	0-15	12-25	1.30-1.40	0.6-2.0	0.14-0.22	3.6-6.5	Low-----------	0.28	4	8-23
	15-30	12-30	1.40-1.50	0.6-2.0	0.13-0.19	3.6-5.5	Low-----------	0.28		
	30-60	2-8	1.45-1.55	>6.0	0.04-0.08	3.6-5.5	Low-----------	0.17		
26A*. Psamments										
27C*, 27D*:										
Psamments.										
Hapludults.										
28A, 28B, 28C---- Rumford	0-11	---	---	>6.0	0.06-0.12	3.6-5.5	Low-----------	0.24	4	1-2
	11-42	---	---	2.0-6.0	0.12-0.15	4.5-6.0	Low-----------	0.17		
	42-72	---	---	>2.0	0.04-0.10	4.5-5.5	Low-----------	0.17		
29A, 29B, 29C---- Suffolk	0-10	6-10	1.35-1.45	2.0-6.0	0.12-0.15	5.1-7.3	Low-----------	0.28	4	1-3
	10-37	10-33	1.40-1.50	0.6-2.0	0.12-0.20	4.5-5.5	Low-----------	0.28		
	37-64	4-10	1.40-1.50	>2.0	0.04-0.10	4.5-5.5	Low-----------	0.17		
30*. Sulfaquents										
31A, 31B--------- Wrightsboro	0-12	---	---	2.0-6.0	0.10-0.15	4.5-6.0	Low-----------	0.28	4	1-2
	12-40	---	---	0.6-2.0	0.12-0.20	4.5-6.0	Low-----------	0.32		
	40-72	---	---	.06-0.2	0.18-0.20	4.5-6.0	Moderate------	0.43		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
1B------------------ Alaga	A	None--------	---	---	>6.0	---	---	Low------	Moderate.
2B------------------ Caroline	C	None--------	---	---	>6.0	---	---	High-----	High.
3A, 3B------------ Craven	C	None--------	---	---	2.0-3.0	Apparent	Dec-Mar	High-----	High.
4A, 4B------------ Dogue	C	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	High-----	High.
5A, 5B------------ Emporia	C	None--------	---	---	3-4.5	Perched	Nov-Apr	Moderate	High.
6------------------ Eunola	C	None--------	---	---	1.5-2.5	Apparent	Nov-Mar	Low------	High.
7*, 8*. Fluvaquents									
9C*, 9D*. Hapludults									
10---------------- Johns	C	None--------	---	---	1.5-3.0	Apparent	Nov-Apr	Moderate	High.
11---------------- Johns Variant	C	None--------	---	---	1.0-2.0	Apparent	Dec-Apr	High-----	Moderate.
12B--------------- Kalmia	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
13A, 13B---------- Kempsville	B	None--------	---	---	>6.0	---	---	Low------	Moderate.
14B--------------- Kenansville	A	None--------	---	---	>6.0	---	---	Low------	High.
15---------------- Kenansville Variant	C	None--------	---	---	2-4	Apparent	Dec-Apr	Moderate	High.
16---------------- Lumbee	D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
17---------------- Lumbee Variant	D	None--------	---	---	0-1.0	Apparent	Dec-Apr	High-----	High.
18---------------- Meggett	D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	Moderate.
19*:									
Ochlockonee------	B	None--------	---	---	3.0-4.0	Apparent	Dec-Apr	Low------	High.
Ochlockonee Variant---------	C	None--------	---	---	3.0-4.0	Apparent	Dec-Apr	Low------	High.
20*. Ochraquults									

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
21*:									
Ochraquults.									
Haplaquepts.									
22---------------- Okeetee	D	None--------	---	---	0.5-1.0	Apparent	Nov-Apr	High-----	High.
23---------------- Osier	D	Frequent----	Brief-----	Dec-Apr	0-1.0	Apparent	Nov-Mar	High-----	High.
24B--------------- Pactolus	C	None--------	---	---	1.5-2.5	Apparent	Jan-Mar	Low------	High.
25*:									
Pamlico----------	D	---	---	---	0-1.0	Apparent	Nov-Jul	High-----	High.
Portsmouth-------	D	---	---	---	0-1.0	Apparent	Nov-Jul	High-----	High.
26A*. Psamments									
27C*, 27D*:									
Psamments.									
Hapludults.									
28A, 28B, 28C----- Rumford	B	None--------	---	---	>6.0	---	---	Low------	High.
29A, 29B, 29C----- Suffolk	B	None--------	---	---	>6.0	---	---	Moderate	High.
30*. Sulfaquents									
31A, 31B---------- Wrightsboro	C	None--------	---	---	2.0-3.0	Apparent	Dec-Feb	Moderate	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alaga	Thermic, coated Typic Quartzipsamments
*Caroline	Clayey, mixed, thermic Typic Paleudults
Craven	Clayey, mixed, thermic Aquic Hapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Emporia	Fine-loamy, siliceous, thermic Typic Hapludults
Eunola	Fine-loamy, siliceous, thermic Aquic Hapludults
Johns	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Aquic Hapludults
Johns Variant	Coarse-loamy, siliceous, thermic Aquic Hapludults
Kalmia	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Typic Hapludults
Kempsville	Fine-loamy, siliceous, thermic Typic Hapludults
Kenansville	Loamy, siliceous, thermic Arenic Hapludults
Kenansville Variant	Loamy, siliceous, thermic Arenic Hapludults
Lumbee	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Typic Ochraquults
Lumbee Variant	Coarse-loamy, siliceous, thermic Typic Ochraquults
Meggett	Fine, mixed, thermic Typic Albaqualfs
Ochlockonee	Coarse-loamy, siliceous, acid, thermic Typic Udifluvents
Ochlockonee Variant	Fine-loamy, siliceous, acid, thermic Typic Udifluvents
Okeetee	Fine, mixed, thermic Aeric Ochraqualfs
*Osier	Siliceous, thermic Typic Psammaquents
Pactolus	Thermic, coated Aquic Quartzipsamments
Pamlico	Sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists
Portsmouth	Fine-loamy, mixed, thermic Typic Umbraquults
Rumford	Coarse-loamy, siliceous, thermic Typic Hapludults
Suffolk	Fine-loamy, siliceous, thermic Typic Hapludults
*Wrightsboro	Fine-loamy, siliceous, thermic Aquic Paleudults

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