SOIL SURVEY OF

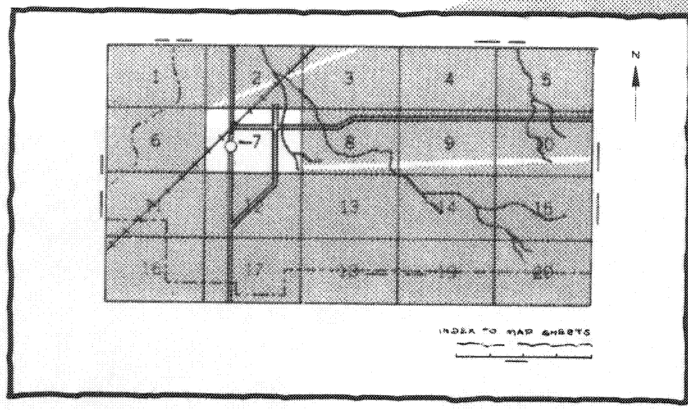
Guilford County, North Carolina

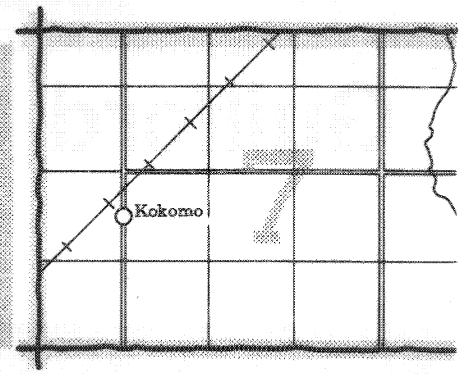
United States Department of Agriculture
Soil Conservation Service

In cooperation with
Board of Commissioners, Guilford County, North Carolina, and
North Carolina Agricultural Experiment Station

HOW TO U

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





2. Note the number of the
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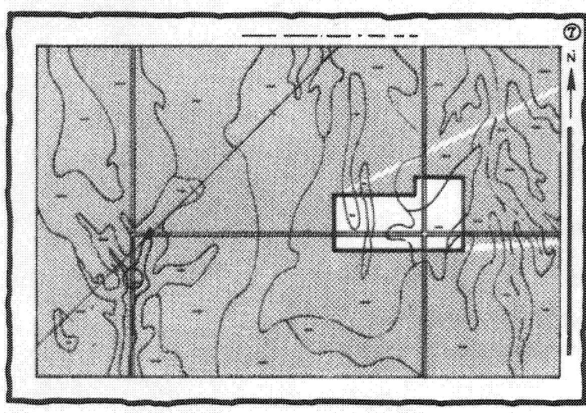
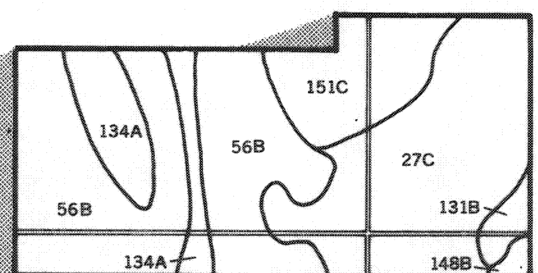
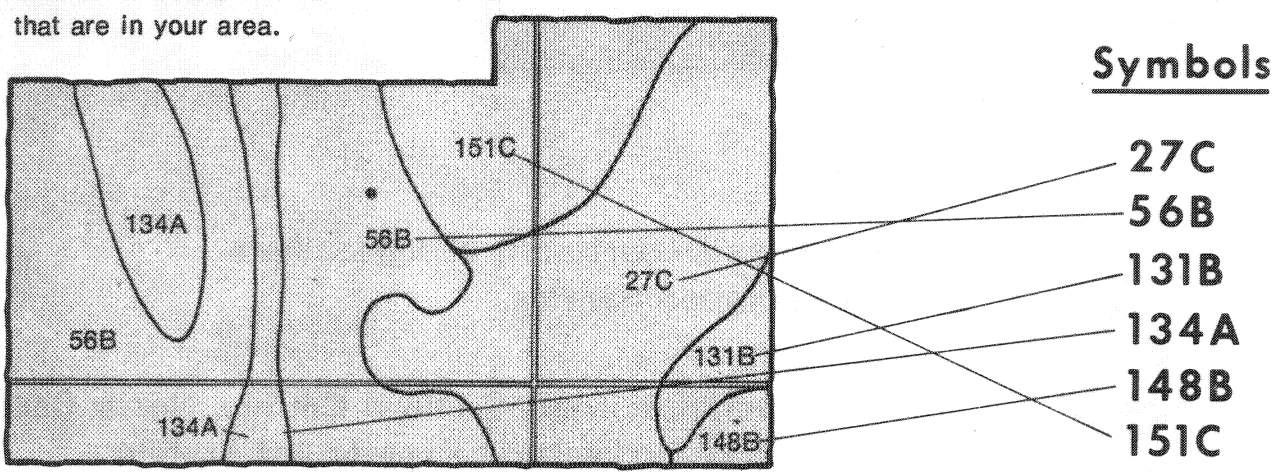
3. Locate your area of interest on the map sheet.



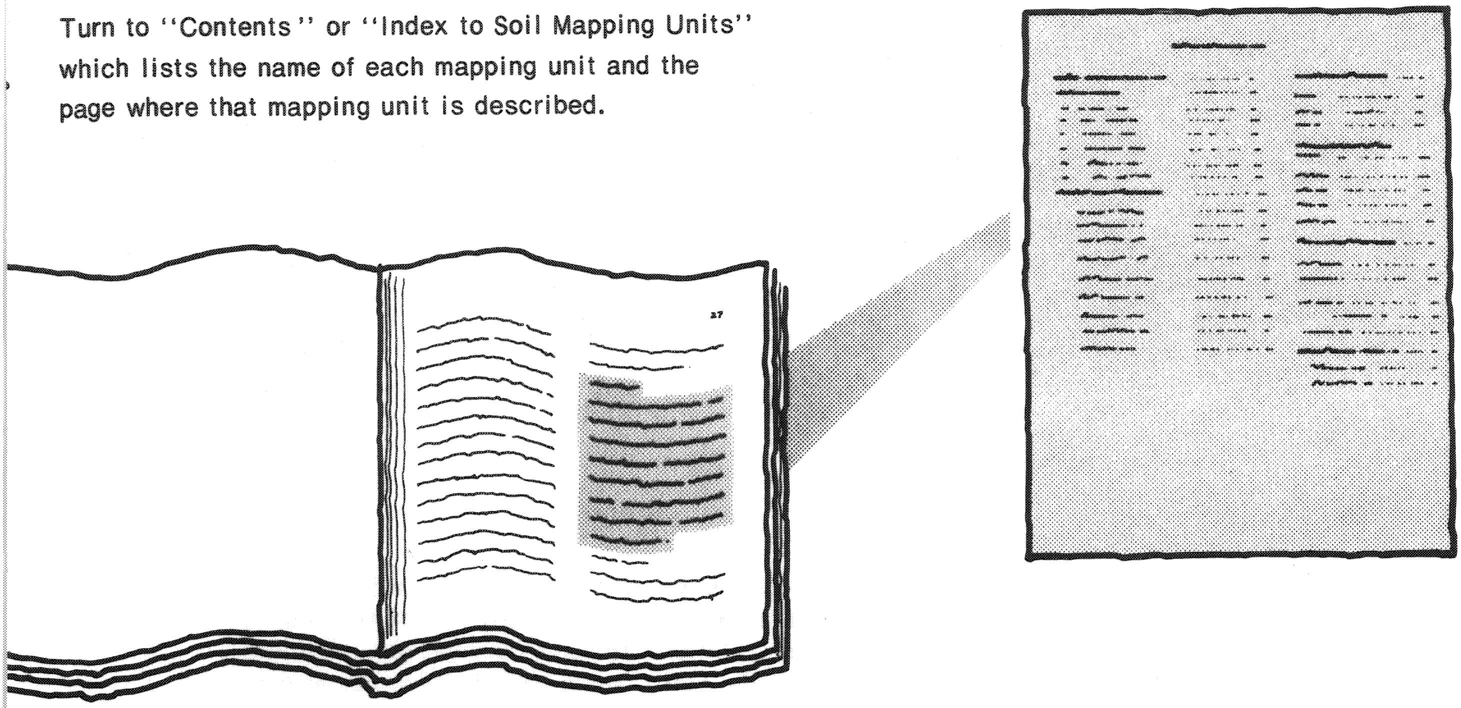


4. List the mapping unit symbols that are in your area.

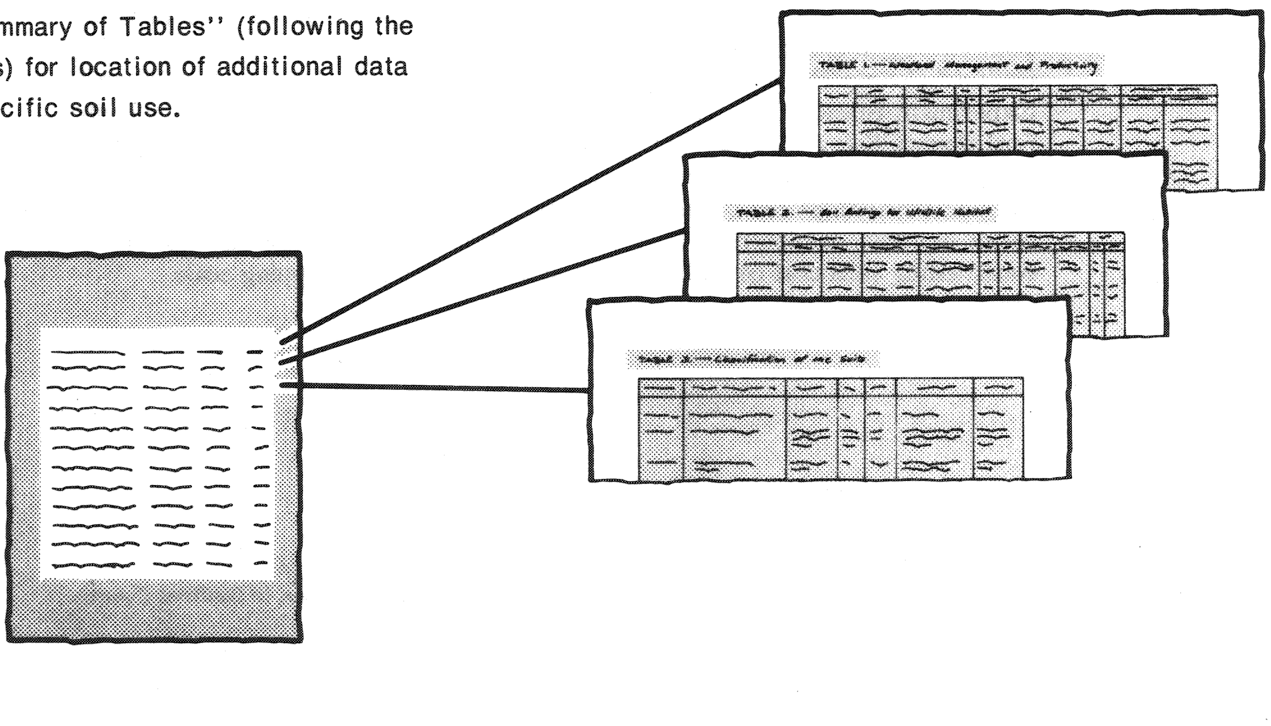


IS SOIL SURVEY

Turn to "Contents" or "Index to Soil Mapping Units" which lists the name of each mapping unit and the page where that mapping unit is described.



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

Major fieldwork for this soil survey was completed in the period 1969-1975. Soil names and descriptions were approved in 1975. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1975. This survey was made cooperatively by the Soil Conservation Service, the Guilford County Board of Commissioners, and the North Carolina Agricultural Experiment Station. It is part of the technical assistance furnished to the Guilford County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of constrasting soils that could have been shown at a larger mapping scale.

Cover: Improved stand of pine on Madison sandy loam, 2 to 6 percent slopes, in Guilford County.

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Issued December 1977

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Foreword

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

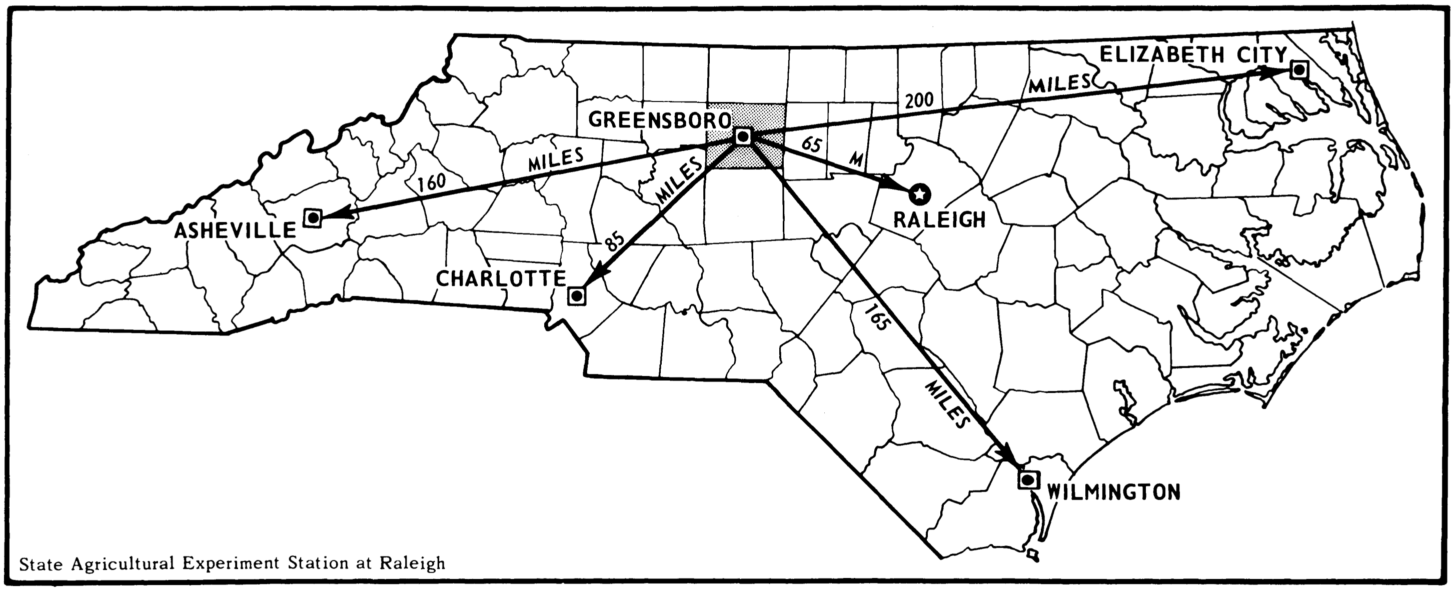
This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers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

Many people assume that soils are all more or less alike. They are unaware that great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey areas is described, and much information is given about each soil for specific uses. If you need additional information or assistance in using this publication, please call the local office of the Soil Conservation Service or the Cooperative Extension Service.

We believe that this soil survey can help bring us a better environment and a better life. Its widespread use can greatly assist us in the conservation, development, and productive use of our soil, water, and other resources.

Jesse L. Hicks
State Conservationist
Soil Conservation Service



Location of Guilford County in North Carolina.

SOIL SURVEY OF GUILFORD COUNTY, NORTH CAROLINA

By Ronald B. Stephens

Soils surveyed by E. H. Karnowski, R. B. Stephens, Marcus R. Bostian, R. L. Howard, Roger J. Leab, and Michael L. Sherrill, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with Board of Commissioners, Guilford County, North Carolina, and North Carolina Agricultural Experiment Station

Introduction

GUILFORD COUNTY is an agricultural, industrial, and urbanized county in north-central North Carolina (See map on facing page). It is bounded on the east by Alamance County, on the north by Rockingham County, on the west by Forsyth County, and on the south by Randolph County. The area of Guilford County is 415,940 acres. In 1970 the population was 288,590. The City of Greensboro is the county seat and is at the geographic center of the county.

Guilford County is in the Piedmont physiographic province. The county is generally rolling with moderately steep slopes along the drainageways.

Guilford County is rapidly growing into an industrial and urban county. Well diversified industry, government at all levels, educational institutions, wholesale and retail outlets, and transportation all contribute substantially to the economy of the county.

The northern part of the county is still primarily agricultural. Tobacco provides about 80 percent of the gross farm income from the major crops. Corn, hay, wheat, soybeans, oats, sweet potatoes, Irish potatoes, lespedeza seed, and cotton account for most of the remaining farm income. Beef and dairy livestock and poultry are also raised.

General Nature of the County

This section gives general facts about Guilford County. It briefly discusses climate, history, cultural facilities, industry and transportation, water supply, and land use.

Climate

Guilford County is hot and generally humid in summer because of its moist maritime air. Winter is moderately cold but short because the mountains to the west protect the county against many cold waves. Precipitation is quite evenly distributed throughout the year and is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Greensboro for the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter the average temperature is 40 degrees F, and the average daily low is 29 degrees. The lowest temperature on record, -1 degree, occurred at Greensboro on January 16, 1972. In summer the average temperature is 76 degrees, and the average daily high is 86 degrees. The highest temperature, 102 degrees, was recorded on June 27, 1954.

Growing degree days, shown in table 1, are equivalent to "heat units." Beginning in spring, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 22 inches, or 52 percent, usually fails during the period April through September, which includes the growing season for most crops. Two years in 10, the April-September rainfall is less than 19 inches. The heaviest 1-day rainfall during the period of record was 6.24 inches at Greensboro on October 15, 1954. Thunderstorms number about 47 each year, 29 of which occur in summer.

Average seasonal snowfall is 11 inches. The greatest snow depth at any one time during the period of record was 15 inches. On the average, 4 days have at least 1 inch of snow on the ground, but the number of days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night in all seasons, and the average at dawn is about 85 percent. The percentage of possible sunshine is 64 percent in summer and 54 percent in winter. Prevailing winds are southwesterly. Average windspeed is highest, 9 miles per hour, in March.

In winter every few years heavy snow covers the ground for a few days to a week. Every few years in late summer or autumn, a tropical storm moving inland from the Atlantic Ocean causes extremely heavy rain for 1 to 3 days.

History

From Bicentennial List of Important Events and Movements in Guilford County.

Settlement of what is now Guilford County was begun by German Lutherans in the eastern part of the county in 1744. Quakers from Pennsylvania settled the western and southern parts of the county in 1750. Scotch-Irish Presbyterians purchased land between the Lutherans and Quakers and began settling in this area in 1753.

Guilford County as it now stands was created from lands in the remote parts of Rowan and Orange Counties by an act of Governor Tryon on April 1, 1771. It was named for Lord Francis North, first Earl of Guilford.

The county's most famous historical event occurred during the Revolutionary War in 1781 when General Nathanael Greene's forces fought British forces in the Battle of Guilford Courthouse. General Greene lost the battle, but the severe losses suffered by the British in this action influenced General Cornwallis' surrender at Yorktown a few months later.

The first steam powered cotton mill in North Carolina started operation in 1833, and the first train rolled into the county seat at Greensboro in 1856. A rail connection was completed to Danville, Virginia, in 1864.

The founders of the county considered education to be of prime importance. The Quakers opened New Garden Friends Boarding School in 1837. This became Guilford College in 1888. Greensboro College, High Point College, and Bennett College were built by Methodists who moved into the area. Charters were granted for two state supported secondary schools in 1891. These schools are now the University of North Carolina at Greensboro and Agricultural and Technical State University.

From the agricultural county established by the early settlers, Guilford County has grown into a giant in industry, commerce, transportation, and education.

Cultural Facilities

Culture was a part of the heritage of the early settlers of Guilford County. From the very beginning the pioneers exerted tremendous efforts in building churches and schools and the cultural facilities that go with these institutions.

The two universities and four colleges in Guilford County are Agricultural and Technical State University, University of North Carolina at Greensboro, High Point College, Greensboro College, Guilford College, and Bennett College. All have art, drama, and music departments. Oak Ridge Military Institute and Guilford Technical Institute are also in Guilford County.

At the University of North Carolina, the Weatherspoon Art Gallery has a permanent collection of modern art. The Theatre of University of North Carolina at Greensboro and the Pixie Playhouse present several programs a year. Also, there are laboratory, experimental, and television productions open to the public. Other programs and exhibits are displayed periodically at most of the colleges and universities.

The United Arts Council was organized in 1959 to develop a well balanced cultural program in Guilford County. The Arts Center has courses in many arts and crafts.

Other organizations interested in the arts are Greensboro Artist League, Chamber of Commerce, Greensboro Chamber Music Society, Greensboro Oratorio Society, Greensboro Symphony, Eastern Music Festival, Greensboro Civic Ballet, the Lyric Theatre, the Little Theatre, and Greensboro Writers.

The story of the founding and development of Guilford County is told at the Greensboro Historical Museum in more than one hundred exhibits. Also of historical interest are the restored Quaker Room at Guilford College, Guilford Courthouse National Military Park, and the historical museum at High Point.

Guilford County is part of the six-county North Central Piedmont Resource Conservation and Development Project, which includes 11 committees. The committees, designed to encourage community participation, include representatives from all phases of the local citizenry.

Guilford County has five country clubs, four public swimming pools, and 15 neighborhood associations that operate pools for their members.

Municipal recreation facilities include 2,123 developed acres of parks. Hagan Stone park, which was developed by the Greensboro City Recreation Department, is 10 miles south of Greensboro and covers more than 400 acres. City Lake Park in High Point covers 1,500 acres. Sixteen community centers are also operated by the City of Greensboro and the City of High Point.

The spectator can watch professional hockey, college basketball, wrestling, and many other activities at the Greensboro Auditorium-Coliseum. One of the major attractions in Greensboro is the Greater Greensboro Open Golf Tournament.

There are two public libraries, a natural science museum, two wildlife clubs, more than 200 civic clubs, 34 Extension Homemakers Clubs, 33 4-H Clubs, 97 elementary and secondary schools, and 355 churches in Guilford County.

Industry and Transportation

Guilford County is the leading manufacturing county in North Carolina, both in number of manufacturing employees and number of manufacturing plants. The county has approximately 700 manufacturing plants. The plants employ 58,900 workers.

Guilford County has been one of the leaders in North Carolina in manufacturing gains during the last 5 years. Total manufacturing employment in the county increased by 12,665 workers between May 1965 and May 1970.

Greensboro has 35,985 workers in manufacturing enterprises. The 5-year increase was more than 11,000. With 13,900 workers, textile plants are the largest single source of employment. Other major types of industry, in order of total employment, are machinery, apparel, tobacco, food, newspaper printing and publishing, and metal working. Machinery manufacturing has had the greatest growth in employment, both in total number and in percentage of increase. In this field, employment in 1970 was 6,960, an increase of 259 percent since 1965.

High Point has 22,900 manufacturing workers. The 5-year increase was 1,600. Furniture manufacturing is the largest industry, with 8,100 employees, closely followed by textiles, with 7,000 employees. Other major types of industry are apparel, printing and publishing, and transportation equipment. Many of the nation's leading furniture and hosiery manufacturers have their headquarters in High Point.

Guilford County is also a major transportation center, with nearly 5,000 persons employed in various transportation enterprises. Rail service is provided by several lines. The airport serving both Greensboro and High Point has scheduled passenger and freight service. More than 100 trucking and warehousing firms have installations in the county and employ more than 3,000 workers.

Water Supply

Guilford County has an abundant supply of water from both surface streams and ground water (*3*).

There are three types of wells in Guilford County: dug, bored, and drilled.

Dug wells range from a few feet to nearly 100 feet in depth. The inside diameter usually is 24 to 30 inches. Dug wells have the advantage of larger storage capacity than other types, but digging below the water table and through bedrock is difficult. Contamination is another problem associated with the shallower dug wells.

Bored wells are very similar to dug wells, but the earth is removed by a large machine operated auger. Bored wells usually range from 30 to 40 feet in depth and from 18 to 24 inches in diameter. Because wells can easily be bored for a considerable depth below the water table, this type of well is not so apt to go dry during periods of drought. Bored wells, however, cannot be used where the water table is below the zone of completely decayed and disintegrated rock.

Drilled wells are safer and more reliable than dug and bored wells. Because they are tightly cased and water is obtained from crevices in the bedrock, the danger of contamination is much less. Because the well generally extends far below the fluctuating water table, drilled wells rarely go dry.

A drilled well, 3 inches or more in diameter, gives the greatest yield in the greenstone schist. Greenstone schist has an average yield of 28 gallons per minute and 0.17 gallon per minute per foot of well. Wells in sheared granite rank second, with an average yield of 14 gallons per foot of well. Next in order of greatest average yield are gneiss serioite schist, porphyritic granite, and diorite.

Topographic location is important when locating a well. The highest yields are from wells in valleys, the average being 28 gallons per minute from a drilled well 3 inches or more in diameter. The next greatest average yield is from wells in draws; they yield 27 gallons per minute. Next in order are flats, slopes, and hills.

Yield per minute generally increases with depth, but yield per foot of well depth generally decreases as depth increases.

Cities and industries in Guilford County cannot rely on wells for their water supply. Greensboro obtains its water from Lake Higgins, which has a capacity of 800,000,000 gallons; Lake Brandt, which has a capacity of 2,200,000,000 gallons; and Lake Townsend, which has a capacity of 6,500,000,000 gallons.

The City of High Point obtains its water from City Lake, which has a capacity of 1,250,000,000 gallons, and New City Lake, which has a capacity of 3,000,000,000 gallons. Jamestown obtains its water supply from Oakdale Mill Pond, capacity unknown. Other municipalities in Guilford County obtain their water supply from wells.

The approximately 2,500 artificial lakes are used chiefly for irrigation, livestock water supply, recreation, fire protection, and flood prevention.

Land Use

According to the 1971 North Carolina Conservation Needs Inventory, the land use in Guilford County is approximately as follows: cropland, 101,666 acres; pasture, 30,235 acres; urban and built-up areas, 70,744 acres; forest, 192,300 acres; and other land, 20,995 acres.

Guilford Battleground National Park is maintained by the U.S. Park Service. The Greensboro-High Point-Winston Salem Regional Airport is maintained by the Greensboro-High Point Airport Authority. The City of High Point maintains two lakes for water supply and recreation and several other recreational parks. The City of Greensboro maintains a park and zoo and three lakes, which are used for water supply and recreation.

How This Survey Was Made

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

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

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Soil series commonly are named for towns or other geographic features near the place where they were first observed and mapped. Cecil and Enon, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in characteristics.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Vance sandy loam, 2 to 6 percent slopes, is one of several phases within the Vance series.

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

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

Some mapping units are made up of soils of different series, or of different phases within one series, and some have little or no soil. These kinds of mapping units are discussed in the section "Soil Maps for Detailed Planning."

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

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 as to be readily useful to different groups of users, among them farmers, managers of woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation. Presenting the detailed information in an organized, understandable manner is the purpose of this publication.

This survey joins the surveys of Alamance County and Forsyth County. Most soil lines join; however, minor discrepancies do exist as a result of differences in soil legends, inclusions, or changes in concepts of soil series.

Soil Map for General Planning

The general soil map at the back of this publication shows, in color, the soil associations described in this survey. Each soil association is a unique natural landscape unit that has a distinctive pattern of soils and relief and drainage features. It normally consists of one or more soils of major extent and some soils of minor extent, and it is named for the major soils. The kinds of soil in one association may occur in other soil associations, but in a different pattern.

The map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas of the county for general kinds of land use. From the map, areas that are generally suitable for certain kinds of farming or other land uses can be identified. Likewise, areas with soil properties distinctly unfavorable for certain land uses can be located.

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

Major land uses considered are for cultivated farm crops, woodland, and urban uses. Cultivated farm crops include those grown extensively by farmers in the survey area. Woodland refers to land that is producing trees native to the area, or introduced species. Urban uses includes residential, commercial, and industrial developments.

1. Cecil-Madison Association

Gently sloping and sloping, well drained soils that have a sandy clay loam, clay loam, and clay subsoil; on uplands

This association is on broad, smooth ridges and side slopes. It is dissected by long, narrow drainageways.

This association makes up 29 percent of the county. It is about 60 percent Cecil soils and 30 percent Madison soils. The remaining 10 percent is Appling, Enon, and Mecklenburg soils, and Urban land on uplands and Chewacla, Congaree, and Wehadkee soils along small streams and drainageways.

Cecil soils are well drained. The surface layer is brown sandy loam about 6 inches thick. The subsoil is 46 inches thick; the upper part is yellowish red sandy clay loam, the middle part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Madison soils are well drained. The surface layer is reddish brown sandy loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

About one-half of this association is cultivated or is in pasture. The rest is in forest or in urban and industrial uses. Slope and a moderate shrink-swell potential are the main limitations in the use and management of these soils for farm and nonfarm uses.

This association has moderate potential for crops, moderate potential for most urban uses, and moderately high potential for woodland.

2. Madison-Cecil Association

Strongly sloping to steep, well drained soils that have a sandy clay loam, clay loam, and clay subsoil; on uplands

This association is on narrow ridges and side slopes. It is dissected by long, narrow drainageways.

This association makes up 3 percent of the county. It is about 65 percent Madison soils and 30 percent Cecil soils. The remaining 5 percent is Enon and Wilkes soils on the uplands and Congaree, Chewacla, and Wehadkee soils on flood plains of small streams.

The strongly sloping to steep Madison soils are well drained. The surface layer is reddish brown sandy loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

The strongly sloping Cecil soils are well drained. The surface layer is brown sandy loam about 6 inches thick. The subsoil is 46 inches thick; the upper part is yellowish red sandy clay loam, the middle part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Most of the acreage of this association is forested or is in urban uses. The rest is cultivated or in pasture. Slope is the main limitation in the use and management of these soils.

This association has low potential for crops, low potential for most urban uses, and moderately high potential for woodland.

3. Enon-Mecklenburg Association

Gently sloping and sloping, well drained soils that have a sandy clay loam, clay, and clay loam subsoil; on uplands

This association is on broad, smooth interstream divides and side slopes. It is dissected by long, narrow drainageways.

This association makes up 49 percent of the county. It is 45 percent Enon soils and 20 percent Mecklenburg soils. The remaining 35 percent is Appling, Cecil, Coronaca, Helena, Iredell, Madison, and Wilkes soils on uplands and Chewacla, Congaree, and Wehadkee soils along streams and drainageways.

Enon soils are well drained. The surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Mecklenburg soils are well drained. The surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil is 31 inches thick; the upper part is mottled yellowish red and red clay, and the lower part is yellowish red clay loam. The underlying material, to a depth of 70 inches, is mottled red and brownish yellow silty clay loam.

About one-half of this association is cultivated or is in pasture. The rest is in forest or in urban uses. Slope, a moderate to high shrink-swell potential, and slow permeability are the main limitations in the use and management of these soils.

This association has moderate potential for crops, low potential for most urban uses, and moderate potential for woodland.

4. Wilkes-Enon Association

Sloping to steep, well drained soils that have a sandy loam, clay loam, sandy clay loam, or clay subsoil; on uplands

This association is on narrow ridges and long slopes. It is dissected by long, narrow drainageways.

This association makes up 4 percent of the county. It is 60 percent Wilkes soils and 35 percent Enon soils. The remaining 5 percent is Madison and Mecklenburg soils on the uplands and Congaree, Chewacla, and Wehadkee soils on flood plains.

The sloping to steep Wilkes soils are well drained. The surface layer is dark brown sandy loam about 7 inches thick. The subsoil is 11 inches thick; the upper part is mottled brownish yellow sandy loam, and the lower part is yellowish brown clay loam. The underlying material, to a depth of 52 inches, is yellowish brown clay loam in the upper part and yellowish brown loamy coarse sand in the lower part.

The sloping and strongly sloping Enon soils are well drained. The surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Most of the acreage of this association is forested. The rest is pastured or cultivated. Slope, depth to bedrock, and slow permeability are the main limitations in the use and management of these soils.

This association has low potential for crops, low potential for most urban uses, and moderate potential for woodland.

5. Coronaca-Mecklenburg Association

Gently sloping and sloping, well drained soils that have a clay or clay loam subsoil; on uplands

This association is on broad, smooth interstream divides and smooth side slopes.

This association makes up 2 percent of the county. It is 55 percent Coronaca soils and 35 percent Mecklenburg soils. The remaining 10 percent is Cecil and Enon soils.

Coronaca soils are well drained. The surface layer is dark reddish brown clay loam about 8 inches thick. The subsoil is 72 inches thick; the upper part is dark red clay, the middle part is mottled dark red clay, and the lower part is red clay loam. The underlying material, to a depth of 95 inches, is red silty clay loam.

Mecklenburg soils are well drained. The surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil is 31 inches thick; the upper part is mottled yellowish red and red clay, and the lower part is yellowish red clay loam. The underlying material, to a depth of 70 inches, is mottled red and brownish yellow silty clay loam.

Most of the acreage of this association is cultivated or is in pasture. The rest is in forest or nonfarm uses. Slope, surface runoff, erosion, and moderate or slow permeability are the main limitations in the use and management of the soils in this association.

This association has moderate to high potential for crops, low to moderate potential for most urban uses, and moderate to moderately high potential for woodland.

6. Appling-Vance-Helena Association

Gently sloping and sloping, well drained and moderately well drained soils that have a sandy clay loam, sandy clay, clay, and clay loam subsoil; on uplands

This association is on broad ridges and long, narrow side slopes.

This association makes up 10 percent of the county. It is 55 percent Appling soils, 25 percent Vance soils, and 10 percent Helena soils. The remaining 10 percent is Cecil, Enon, and Mecklenburg soils on uplands and Chewacla, Congaree, and Wehadkee soils on flood plains.

The gently sloping and sloping Appling soils are well drained. The surface layer is brown sandy loam about 8 inches thick. The subsoil is 45 inches thick; the upper part is brownish yellow sandy clay loam, the middle part is mottled strong brown sandy clay and clay, and the lower part is mottled yellowish red and yellowish brown clay loam. The underlying material, to a depth of 72 inches, is mottled yellowish red and yellowish brown sandy loam.

The gently sloping and sloping Vance soils are well drained. The surface layer is brown sandy loam about 6 inches thick. The subsoil is 34 inches thick; the upper part is mottled strong brown clay, and the lower part is mottled brownish yellow clay loam. The underlying material, to a depth of 72 inches, is mottled brownish yellow, white, and red clay loam.

The sloping Helena soils are moderately well drained. The surface layer is dark brown sandy loam about 7 inches thick. The subsoil is 31 inches thick; the upper part is mottled brownish yellow and reddish yellow clay, and the lower part is mottled brownish yellow, strong brown, and light gray clay loam. The underlying material, to a depth of 80 inches, is mottled strong brown and white clay loam.

Most of the acreage of this association is cultivated or is in pasture. The rest is mainly in forest. Slope, surface runoff, erosion, slow permeability, and a high shrink-swell potential are the main limitations in the use and management of the major soils in this association.

The soils in this association have low to high potential for crops and urban uses and moderately high potential for woodland.

7. Chewacla-Wehadkee-Congaree Association

Nearly level, well drained to poorly drained soils that have a sandy loam, loam, silt loam, clay loam, and silty clay loam subsoil; on flood plains

This association is on flood plains along creeks and streams.

This association makes up 3 percent of the county. It is 60 percent Chewacla soils, 30 percent Wehadkee soils, and 10 percent Congaree soils.

Chewacla soils are somewhat poorly drained. The surface layer is about 12 inches thick; it is brown sandy loam in the upper part and pale brown silt loam in the lower part. The subsoil is 58 inches thick; the upper part is mottled brown sandy loam, the middle part is mottled light brownish gray loam and silt loam, and the lower part is mottled light brownish gray and strong brown clay loam. The underlying material, to a depth of 90 inches, is mottled dark bluish gray clay loam.

Wehadkee soils are poorly drained. The surface layer is brown silt loam 8 inches thick. The subsoil is 40 inches thick; the upper part is mottled grayish brown silt loam, the middle part is mottled light brownish gray silt loam, and the lower part is mottled gray silty clay loam and mottled gray loam. The underlying material, to a depth of 80 inches, is mottled gray loam.

Congaree soils are well drained. The surface layer is dark brown and brown loam about 8 inches thick. The underlying material, to a depth of 70 inches, is mottled strong brown sandy clay loam in the upper part, mottled strong brown loam in the middle part, and mottled light brownish gray loam in the lower part.

Most of the acreage of this association is cultivated or is in pasture. The rest is forested. Flooding, wetness, and moderate permeability are the main limitations in the use and management of the soils in this association.

The soils in this association have low to high potential for crops, low potential for most urban uses, and very high potential for woodland.

Soil Maps for Detailed Planning

The kinds of soil (mapping units) shown on the detailed soil maps at the back of this publication are described in this section. These descriptions together with the soil maps can be useful in determining the potential of soil and in managing it for food and fiber production, in planning land use and developing soil resources, and in enhancing, protecting, and preserving the environment. More detailed information for each soil is given in the section "Planning the Use and Management of Soils."

Preceding the name of each mapping unit is the symbol that identifies the unit on the detailed soil map. Each mapping unit description includes general facts about the soil and a brief description of the soil profile. The potential of the soil for various major land uses is estimated. The principal hazards and limitations are indicated, and the management concerns and practices for the major uses are discussed.

A mapping unit represents an area on the landscape and consists of a dominant soil or soils for which the unit is named. Most mapping units have one dominant soil, but some have two or more dominant soils. A mapping unit commonly includes small, scattered areas of other soils. The properties of some included soils can differ substantially from those of the dominant soil or soils and thus greatly influence the use of the dominant soil. How the included soils may affect the use and management of the mapping unit is discussed.

In most areas surveyed there is land that has little or no identifiable soil and supports no vegetation. This land, called miscellaneous areas, is delineated on the map and given descriptive names. Pits is an example. Areas too small to be delineated are identified by special symbols on the soil maps.

The acreage and proportionate extent of each mapping unit are given in table 4, and additional information on each unit is given in interpretive tables in other sections (see "Summary of Tables"). Many of the terms used in describing soils are defined in the Glossary.

Soil Descriptions and Potentials

ApB—Appling sandy loam, 2 to 6 percent slopes. This well drained soil is on broad upland ridges that are crossed by intermittent drainageways. The mapped areas are generally 4 to 50 acres or more in size.

Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is 45 inches thick; the upper part is brownish yellow sandy clay loam, the middle part is mottled strong brown sandy clay and clay, and the lower part is mottled red and yellowish brown clay loam. The underlying material, to a depth of 72 inches, is mottled yellowish red and yellowish brown sandy loam.

Included with this soil in mapping are small areas of soils that have slopes of more than 6 percent, a few small areas of soils that have a sandy clay loam surface layer, and a few small areas of eroded soils. Also included are small areas of Cecil, Enon, Helena, and Vance soils.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are used for crops and pasture. The rest are forested or urbanized. Slope, runoff, erosion, and moderate permeability are the main limitations.

This soil has high potential for tobacco, corn, soybeans, and small grain. It has high potential for horticultural crops such as tomatoes, strawberries, sweet corn, green beans, and peas. Slope, runoff, and erosion are the main limitations for these uses. Minimum tillage and crop residue management aid in controlling runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, contour farming, stripcropping, establishing field borders, and using crop rotations that include close-growing crops also help to conserve soil and water. This soil has high potential for hay and pasture plants. Proper pasture management helps to ensure adequate protective cover.

This soil has a high potential for most urban uses. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is high.

This soil has a moderately high potential for broadleaf and needleleaf trees. The dominant trees are yellow-poplar, sweetgum, hickory, ash, maple, white oak, black oak, post oak, northern red oak, southern red oak, loblolly pine, and shortleaf pine. The main understory species are dogwood, sourwood, holly, black cherry, and sassafras. There are no major limitations for woodland use and management. Capability unit IIe-1; woodland group 3o.

ApC—Appling sandy loam, 6 to 10 percent slopes. This well drained soil is on long, narrow upland side slopes that are crossed by intermittent drainageways. The mapped areas are 4 to 20 acres in size.

Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is 45 inches thick; the upper part is brownish yellow sandy clay loam, the middle part is mottled strong brown sandy clay and clay, and the lower part is mottled red and yellowish brown clay loam. The underlying material, to a depth of 72 inches, is mottled yellowish red and yellowish brown sandy loam.

Included with this soil in mapping are small areas of soils that have a sandy clay loam surface layer and a few small areas of eroded soils. Also included are small areas of Cecil, Enon, Madison, and Vance soils.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is moderate. Reaction of the subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

About one-half of the acreage of this soil is used for cultivated crops and for pasture. The rest is forested. Slope, runoff, erosion, and moderate permeability are the main limitations in the use and management of this soil.

This soil has moderate potential for tobacco, corn, oats, and soybeans. The potential for horticultural crops, such as tomatoes, sweet corn, green beans, and peas, is moderate. Slope, runoff, and erosion are the main limitations for these uses. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, stripcropping, contour farming, establishing field borders, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential is moderately high for hay and pasture plants such as ladino clover, red clover, and sericea lespedeza. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban uses is moderate because of slope and moderate permeability. The limitation of slope can be reduced or modified by special planning, design, and maintenance. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. Erosion is a hazard when ground cover is removed. The potential for recreation is only moderate because of slope.

This soil has moderately high potential for broadleaf and needleleaf trees. The main tree species are white oak, black oak, post oak, northern red oak, southern red oak, sweetgum, hickory, maple, loblolly pine, and shortleaf pine. The main understory species are dogwood, sourwood, holly, black cherry, and sassafras. There are no major limitations for woodland use and management. Capacicity unit IIIe-1; woodland group 3o.

CcB—Cecil sandy loam, 2 to 6 percent slopes. This well drained soil is on broad to very broad, smooth ridges on uplands. The mapped areas are 3 to 50 acres or more in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 46 inches thick; it is yellowish red sandy clay loam in the upper part, red clay in the middle part, and mottled red clay loam in the lower part. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Included with this soil in mapping are a few small areas of soils that have a clayey surface layer and small areas of soils that have a gravelly surface layer. Also included are a few small areas of Appling, Coronaca, Madison, and Mecklenburg soils.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are used for crops. Some areas are in pasture. The rest are used for woodland and for urban and industrial areas. Slope, runoff, erosion, and permeability are the main limitations in the use and management of this soil.

This soil has high potential for corn, soybeans, and small grain. The potential for horticultural crops, such as tomatoes, sweet corn, green beans, and peas, is moderately high. Slope and erosion are the main limitations for these uses. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, establishing field borders, contour farming, stripcropping, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential for hay and pasture plants is high. Proper pasture management helps to ensure adequate protection.

This soil has moderate potential for most urban uses such as dwellings and roads. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the absorption field or increasing the size of the absorption area. The potential for most recreation uses is high.

This soil has moderately high potential for broadleaf and needleleaf trees. The main trees are hickory, maple, white oak, black oak, post oak, northern red oak, southern red oak, and sweetgum. The main understory species are dogwood, sourwood, cedar, holly, black cherry, pin oak, and sassafras. There are no major limitations for woodland use and management. Capability unit IIe-1; woodland group 3o.

CcC—Cecil sandy loam, 6 to 10 percent slopes. This well drained soil is on long, narrow side slopes on the uplands. The mapped areas are 3 to 25 acres in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 46 inches thick; it is yellowish red sandy clay loam in the upper part, red clay in the middle part, and mottled red clay loam in the lower part. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Included with this soil in mapping are a few small areas of soils that have a clay loam surface layer and a few small areas of soils that have a gravelly surface layer. Also included are a few small areas of Appling, Coronaca, Madison, Mecklenburg, and Vance soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are used for woodland. Some areas are in hay and pasture. The rest are used for cultivated crops or for urban and industrial areas. Slope, runoff, permeability, and erosion are the main limitations in the use and management of this soil.

This soil has moderate potential for corn, soybeans, and tobacco. The potential for horticultural crops, such as sweet corn, green beans, and peas, is moderate. Slope and erosion are the main limitations for these uses. Minimum tillage and crop residue management aid in controlling runoff and erosion. Conservation practices such as installing and maintaining sod in drainageways, constructing terraces and diversions, stripcropping, establishing field borders, contour farming, and using crop rotations that include close growing crops also aid in conserving soil and water. The potential is moderately high for the production of hay and pasture plants such as ladino clover, red clover, and sericea lespedeza. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has only moderate potential for most urban uses because of slope and moderate permeability. The limitation of slope can be reduced or modified by special planning, design, or maintenance. Erosion is a hazard when ground cover is removed. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is moderate.

This soil has moderately high potential for broadleaf and needleleaf trees. The main trees are hickory, sweetgum, maple, white oak, black oak, post oak, northern red oak, and southern red oak. The main understory species are dogwood, cedar, sourwood, holly, black cherry, and sassafras. There are no major limitations for woodland use and management. Capability unit IIIe-1; woodland group 3o.

CcD—Cecil sandy loam, 10 to 15 percent slopes. This well drained soil is on narrow side slopes on uplands. The mapped areas are 3 to 20 acres or more in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 46 inches thick; it is yellowish red sandy clay loam in the upper part, red clay in the middle part, and mottled red clay loam in the lower part. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Included with this soil in mapping are a few small areas of soils that have a clay loam surface layer and a few small areas of soils that have slopes of more than 15 percent. Also included are a few areas of Appling and Madison soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are in woodland. A few areas are in pasture. Slope, runoff, erosion, and permeability are the main limitations in the use and management of this soil.

This soil has low potential for row crops. It has moderate potential for hay and pasture plants. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has low potential for most urban and recreation uses because of slope. Erosion is a hazard when ground cover is removed.

This soil has moderately high potential for broadleaf and needleleaf trees. The dominant trees are northern red oak, white oak, post oak, maple, sweetgum, shortleaf, loblolly pine, and Virginia pine. The main understory species are dogwood, cedar, holly, sassafras, and black cherry. There are no major limitations for woodland use and management. Capability unit IVe-1; woodland group 3o.

CeB2—Cecil sandy clay loam, 2 to 6 percent slopes, eroded. This well drained soil is on broad ridges on uplands. The mapped areas are 4 to 50 acres or more in size.

Typically, the surface layer is brown sandy clay loam about 6 inches thick. The subsoil is 46 inches thick; it is yellowish red sandy clay loam in the upper part, red clay in the middle part, and mottled red clay loam in the lower part. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Included with this soil in mapping are a few small areas of soils that have a sandy loam surface layer. Also included are a few small areas of Appling, Coronaca, Madison, and Mecklenburg soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

About one-half of the acreage of this soil is used for woodland. The rest is used for cultivated crops, for pasture, or for urban and industrial uses. Slope, erosion, runoff, and permeability are the main limitations in the use and management of this soil.

This soil has moderately low potential for row crops, such as corn and soybeans. It has moderate potential for hay and pasture plants such as fescue, sericea lespedeza, red clover, and white clover. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has only moderate potential for most urban uses because of the moderate permeability, which limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is moderate.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are shortleaf pine, maple, loblolly pine, Virginia pine, sweetgum, red oak, and white oak. The main understory species are dogwood, cedar, holly, pin oak, sassafras, and black cherry. A clayey subsoil is the main limitation in the use and management of this soil for woodland. Capability unit IIIe-2; woodland group 4c.

CeC2—Cecil sandy clay loam, 6 to 10 percent slopes, eroded. This well drained soil is on narrow side slopes. The mapped areas are 4 to 25 acres in size.

Typically, the surface layer is brown sandy clay loam about 6 inches thick. The subsoil is 46 inches thick; it is yellowish red sandy clay loam in the upper part, red clay in the middle part, and mottled red clay loam in the lower part. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Included with this soil in mapping are a few small areas of soils that have a sandy loam surface layer and a few small areas of soils that have slopes of more than 10 percent. Also included are a few small areas of Appling, Coronaca, Madison, and Mecklenburg soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are in woodland. The rest are used for cultivated crops, for pasture, or for urban uses. Slope, runoff, erosion, and permeability are the main limitations in the use and management of this soil.

This soil has low potential for row crops. It has moderate potential for hay and pasture plants such as fescue, sericea lespedeza, red clover, and white clover. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has only moderate potential for most urban uses because of moderate permeability and slope. The limitation of slope can be reduced or modified by special planning, design, or maintenance. Erosion is a hazard when ground cover is removed. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is moderate.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are shortleaf pine, loblolly pine, Virginia pine, sweetgum, red oak, and white oak. The main understory species are dogwood, cedar, holly, pin oak, sassafras, and black cherry. A clayey subsoil is the main limitation in the use and management of this soil for woodland. Capability unit IVe-2; woodland group 4c.

CfB—Cecil-Urban land complex, 2 to 10 percent slopes. This complex consists of areas of Cecil soils and Urban land so small or so intricately mixed that it was not practical to map them separately. The complex consists of about 30 to 60 percent Cecil soils and 30 to 60 percent Urban land.

Cecil soils are well drained and are on broad ridges and side slopes on uplands.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 46 inches thick; it is yellowish red sandy clay loam in the upper part, red clay in the middle part, and mottled red clay loam in the lower part. The underlying material, to a depth of 85 inches, is mottled red and yellow loam.

Urban land consists of areas where the original soil has been cut, filled, graded, paved, or otherwise changed to the extent that most soil properties have been so altered that a soil series is not recognized. These areas are used for shopping centers, factories, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement. Slope is generally modified to fit the needs of the soil. The extent of site modification varies greatly. Many areas have had little disturbance, while many others have been cut or filled.

Included in mapping are a few areas of Appling and Mecklenburg soils.

Determination of use and management of these areas generally requires onsite investigation. Not placed in interpretive groups.

Ch—Chewacla sandy loam. This nearly level, somewhat poorly drained soil is in long, flat areas parallel to the major streams on the flood plains. The mapped areas are 5 acres to more than 50 acres in size.

Typically, the surface layer is about 12 inches thick; it is brown sandy loam in the upper part and pale brown silt loam in the lower part. The subsoil is 58 inches thick; the upper part is mottled brown sandy loam, the middle part is mottled light brownish gray loam and silt loam, and the lower part is mottled light brownish gray and strong brown clay loam. The underlying material, to a depth of 90 inches, is mottled dark bluish gray clay loam.

Included with this soil in mapping are a few small areas of soils that have a silt loam or loamy sand surface layer. Also included are a few small areas of Congaree and Wehadkee soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid to slightly acid. Depth to bedrock is more than 60 inches. Depth to the seasonal high water table is about 1/2 foot to 1 1/2 feet late in winter and early in spring. This soil is commonly flooded for brief periods.

Most areas of this soil are used for woodland. A few areas are in pasture. The rest are used for crops. Wetness, flooding, and moderate permeability are the main limitations in the use and managment of this soil.

This soil has moderate potential for the production of water-tolerant row crops such as corn and soybeans; however, flooding damages these crops in places. Drainage and flood prevention are needed for most uses. Minimum tillage, cover crops, and grasses and legumes in the conservation cropping system help to maintain soil tilth and production. Tillage may be delayed in spring by wetness. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, establishing field borders, stripcropping, and using crop rotations that include close-growing crops also aid in conserving soil and water. Lack of suitable outlets is a limitation to the installation of drainage systems. The potential for hay and pasture plants is moderate. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban and recreation uses is low. The limitations of flooding and wetness are difficult and costly to overcome.

This soil has very high potential for broadleaf and needleleaf trees. The dominant trees are yellow-poplar, white oak, post oak, sweetgum, beech, ash, birch, willow oaks, and loblolly pine. The main understory species are cottonwood, dogwood, sourwood, and alders. Wetness is the main limitation for woodland use and management. Capability unit IIIw-1; woodland group 1w.

Co—Congaree loam. This nearly level, well drained soil is on long, narrow flood plains. The mapped areas are 4 to 40 acres in size.

Typically, the surface layer is dark brown and brown loam about 8 inches thick. The underlying material, to a depth of 70 inches, is mottled strong brown sandy clay loam in the upper part, mottled strong brown loam in the middle part, and mottled light brownish gray loam in the lower part.

Included with this soil in mapping are a few small areas of soils that have a loamy sand or sandy loam surface layer. Also included are a few small areas of Chewacla soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is high, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid to slightly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of about 2 1/2 to 4 feet late in winter and early in spring. These soils are frequently flooded for brief periods.

About one-half of the acreage of this soil is used for crops and pasture. The rest is in woodland. Flooding, wetness, and moderate permeability are the main limitations in the use and management of this soil.

This soil has high potential for corn, small grain, oats, soybeans, and wheat. Minimum tillage and crop residue management aid in controlling runoff and erosion. Conservation practices, such as constructing diversions, establishing field borders, stripcropping, and using crop rotations that include close-growing crops, also aid in conserving soil and water. Tillage operations may be delayed during wet seasons. This soil has high potential for hay and pasture plants. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has low potential for most urban and recreation uses because of wetness and flooding. The limitations of wetness and flooding are difficult and costly to overcome.

This soil has very high potential for broadleaf and needleleaf trees. The dominant trees are yellow-poplar, sweetgum, walnut, persimmon, willow oak, white oak, black oak, post oak, northern red oak, southern red oak, beech, birch, and loblolly pine. The main understory species are dogwood, cedar, and sourwood. There are no major limitations for woodland use and management. Capability unit IIw-1; woodland group 1o.

CrB—Coronaca clay loam, 2 to 6 percent slopes. This well drained soil is on broad, smooth interstream divides. The mapped areas are 4 to 40 acres or more in size.

Typically, the surface layer is dark reddish brown clay loam about 8 inches thick. The subsoil is 72 inches thick; the upper part is dark red clay, the middle part is mottled dark red clay, and the lower part is red clay loam. The underlying material, to a depth of 95 inches, is red silty clay loam.

Included with this soil in mapping are a few small areas of Cecil and Mecklenburg soils. Also included are small areas of soils that have a loam surface layer and a few small areas of eroded soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are used for crops. The rest are used for pasture, woodland, and urban and industrial areas. Slope, runoff, erosion, and moderate permeability are the main limitations in the use and management of this soil.

This soil has high potential for corn, soybeans, and small grain. Slope, runoff, and erosion are the main limitations. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, establishing field borders, stripcropping, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential is high for hay and pasture plants such as sericea lespedeza, red clover, white clover, fescue, and orchardgrass. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban uses, such as dwellings and roads, is high. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. This soil has high potential for most forms of recreation.

This soil has moderately high potential for broadleaf and needleleaf trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, yellow-poplar, sweetgum, hickory, maple, ash, beech, and loblolly pine. The main understory species are dogwood, sourwood, holly, and sassafras. There are no major limitations for woodland use and management. Capability unit IIe-2; woodland group 3o.

CrC—Coronaca clay loam, 6 to 10 percent slopes. This well drained soil is on smooth side slopes. The mapped areas are 4 to 20 acres in size.

Typically, the surface layer is dark reddish brown clay loam about 6 inches thick. The subsoil is 73 inches thick; the upper part is dark red clay loam, the middle part is dark red clay, and the lower part is dark red clay loam. The underlying material, to a depth of 85 inches, is dark red and red loam.

Included with this soil in mapping are a few areas of soils that have slopes of more than 10 percent, small areas of soils that have a loam surface layer, and a few small areas of eroded soils. Also included are some small areas of Cecil and Mecklenburg soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is medium acid or slightly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are in woodland. A small acreage is in urban and industrial areas. The rest is in pasture and cultivated crops. Slope, runoff, and moderate permeability are the main limitations in the use and management of this soil.

This soil has moderate potential for corn, soybeans, and small grain. Slope and erosion are the main limitations. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, establishing field borders, stripcropping, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential is moderately high for hay and pasture plants such as sericea lespedeza, red clover, white clover, fescue, and orchardgrass. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban and recreation uses is moderate because of slope and permeability. The limitation of slope can be reduced or modified by special planning, design, or maintenance. Erosion is a hazard when ground cover is removed. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is only moderate because of slope.

This soil has moderately high potential for broadleaf and needleleaf trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, yellow-poplar, sweetgum, hickory, maple, ash, beech, and loblolly pine. The main understory species are dogwood, sourwood, holly, and sassafras. There are no major limitations for woodland use and management. Capability unit IIIe-2; woodland group 4c.

CuB—Coronaca-Urban land complex, 2 to 10 percent slopes. This complex consists of areas of Coronaca soils and Urban land so small or so intricately mixed that it was not practical to map them separately. The complex consists of about 40 to 60 percent Coronaca soils and 30 to 50 percent Urban land.

Coronaca soils are well drained and are on smooth side slopes and broad, smooth interstream divides. Typically, the surface layer is dark reddish brown clay loam about 8 inches thick. The subsoil is 72 inches thick; the upper part is dark red clay, the middle part is mottled dark red clay, and the lower part is red clay loam. The underlying material, to a depth of 95 inches, is red silty clay loam.

The Urban land part of this complex consists of areas where the original soil has been cut, filled, graded, paved, or otherwise changed to the extent that most soil properties have been so altered that a soil series is not recognized. These areas are used for shopping centers, factories, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement. Slope is generally modified to fit the needs of the site. The extent of site modification varies greatly. Many areas have had little disturbance, while many others have been cut down or filled over.

Included in mapping are a few areas of Enon and Mecklenburg soils.

Determination of use and management of these areas generally requires onsite investigation. Not placed in interpretative groups.

EnB—Enon fine sandy loam, 2 to 6 percent slopes. This well drained soil is on broad, smooth interstream divides on the uplands. The mapped areas are 3 to 100 acres or more in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick. The upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Included with this soil in mapping are a few small areas of soils that have a clayey surface layer. Also included are some small areas of Appling, Iredell, Mecklenburg, Sedgefield, and Vance soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than

60 inches. The seasonal high water table is at depth of 1 to 2 feet.

Most areas of this soil are used for crops and pasture. The rest are used for woodland and urban and industrial areas. Slope, runoff, the high shrink-swell potential, and slow permeability are the main limitations in the use and management of this soil.

This soil has moderate potential for corn, soybeans, tobacco, and small grain. It has moderate potential for horticultural crops, such as tomatoes, sweet corn, green beans, and peas. Slope, erosion, and a perched water table are the main limitations for these uses. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, establishing field borders, stripcropping, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential is high for hay and pasture plants such as sericea lespedeza, red clover, white clover, fescue, and orchardgrass. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for urban uses, such as houses and streets, is low because of slow permeability and high shrink-swell potential. The permeability severely limits performance of septic tank absorption fields, but this limitation sometimes can be overcome by modifying the field or increasing the size of the absorption area. Erosion is a hazard when ground cover is removed. Potential for recreation areas is moderate.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, sweetgum, hickory, cedar, blackjack oak, willow oak, loblolly pine, shortleaf pine, and Virginia pine. The main understory species are dogwood and sourwood. There are no major limitations for woodland use and management. Capability unit IIIe-1; woodland group 4c.

EnC—Enon fine sandy loam, 6 to 10 percent slopes. This well drained soil is on long, narrow side slopes on uplands. The mapped areas are 3 to 20 acres or more in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Included with this soil in mapping are a few small areas of soils that have a clayey surface layer. Also included are a few small areas of Appling, Mecklenburg, Vance, and Wilkes soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of 1 to 2 feet.

About one-half of the acreage this soil is used for crops and pasture. The rest is used for woodland. Slope, runoff, erosion, the high shrink-swell potential, and slow permeability are the main limitations in the use and management of this soil.

This soil has moderate potential for tobacco, corn, soybeans, and small grain. It has moderate potential for horticultural crops, such as tomatoes, sweet corn, green beans, and peas. Slope, runoff, and erosion are the main limitations. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, establishing field borders, stripcropping, contour farming, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential for hay and pasture plants such as ladino clover, red clover, and sericea lespedeza is moderately high. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for urban uses, such as houses and streets, is low because of slow permeability and the high shrink-swell potential. There is a moderate limitation for recreation areas because of permeability, slope, and traffic-supporting capacity.

This soil has a moderate potential for broadleaf and needleleaf trees. The dominant trees grown are loblolly pine, shortleaf pine, Virginia pine, and red cedar. The main understory species are dogwood and sourwood. There are no major limitations for woodland use and management. Capability unit IVe-1; woodland group 4c.

EnD—Enon fine sandy loam, 10 to 15 percent slopes. This well drained soil is on long, narrow side slopes on the uplands. The mapped areas are 3 to 15 acres or more in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Included with this soil in mapping are a few small areas of soils that have a clayey surface layer. Also included are small areas of Mecklenburg and Wilkes soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of 1 to 2 feet.

Most areas of this soil are used for woodland. The rest are used for pasture. Slope, runoff, erosion, slow permeability, and the high shrink-swell potential are the main limitations in the use and management of this soil.

This soil has low potential for most crops because of slope, runoff, and erosion. It has moderate potential for hay and pasture plants. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban and recreation uses is low because of slope.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are shortleaf pine, Virginia pine, cedar, white oak, northern red oak, southern red oak, post oak, black oak, sweetgum, hickory, and beech. The main understory species are dogwood, sourwood, holly, and black cherry. There are no major limitations for woodland use and management. Capability unit IVe-2; woodland group 4c.

EoB2—Enon clay loam, 2 to 6 percent slopes, eroded. This well drained soil is on narrow ridges on uplands. The mapped areas are 3 to 20 acres in size.

Typically, the surface layer is dark grayish brown clay loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Included with this soil in mapping are a few small areas of soils that have a fine sandy loam surface layer. Also included are a few small areas of Appling, Iredell, Mecklenburg, and Vance soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of 1 to 2 feet.

Most areas of this soil are used for woodland. The rest are used for cultivated crops, for pasture, or for urban and industrial areas. Slope, runoff, erosion, slow permeability, and high shrink-swell potential are the main limitations in the use and management of this soil.

This soil has low potential for crops because of slope and erosion. It has low potential for hay and pasture plants.

The potential for most urban and recreation uses is low because of slow permeability and the high shrink-swell potential.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are Virginia pine, cedar, shortleaf pine, red oak, and white oak. The main understory species are dogwood and sourwood. A clayey subsoil is the main limitation for woodland use and management. Capability unit IVe-3; woodland group 4c.

EoC2—Enon clay loam, 6 to 10 percent slopes, eroded. This well drained soil is on long, narrow side slopes on uplands. The mapped areas are 3 to 20 acres in size.

Typically, the surface layer is dark grayish brown clay loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Included with this soil in mapping are a few small areas of soils that have a fine sandy loam surface layer. Also included are a few small areas of Appling, Mecklenburg, Vance, and Wilkes soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of 1 to 2 feet.

Most areas of this soil are used for woodland. The rest are used for cultivated crops, pasture, or urban areas. Slope, runoff, erosion, slow permeability, and the high shrink-swell potential are the main limitations in the use and management of this soil.

This soil has low potential for crops because of slope and erosion. It has low potential for hay and pasture plants.

The potential for most urban and recreation uses is low because of slow permeability and the high shrink-swell potential.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are Virginia pine, shortleaf pine, cedar, red oak, and white oak. The main understory species are dogwood and sourwood. A clayey subsoil is the main limitation for woodland use and management. Capability unit VIe-1; woodland group 4c.

EoD2—Enon clay loam, 10 to 15 percent slopes, eroded. This well drained soil is on narrow side slopes on uplands. The mapped areas are 3 to 12 acres or more in size.

Typically, the surface layer is dark grayish brown clay loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Included with this soil in mapping are a few small areas of soils that have a fine sandy loam surface layer. Also included are a few small areas of Appling, Mecklenburg, and Wilkes soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of 1 to 2 feet.

Most areas of this soil are used for woodland. The rest are mainly used for pasture. Slope, surface runoff, erosion, slow permeability, and the high shrink-swell potential are the main limitations in the use and management of this soil.

This soil is unsuited to crops. It has low potential for hay and pasture plants.

This soil is unsuited to most urban and recreation uses.

There is a moderate potential for broadleaf and needleleaf trees. The dominant trees are Virginia pine, shortleaf pine, cedar, red oak, and white oak. The dominant understory species are dogwood and sourwood. Capability unit VIe-2; woodland group 4c.

Es—Enon complex, gullied. This complex is on points, shoulders, and sides of ridges. The mapped areas are 3 acres to more than 10 acres in size. Enon soils make up about half or slightly more than half of this complex. They are on elevated narrow ridges between gullies that have dissected these areas.

In most places the original surface layer of these Enon soils has been eroded and the present surface layer is made up of clay from the subsoil. In a few small places these Enon soils are not so eroded; in these places the surface layer is loam or fine sandy loam and the surface layer and subsoil are thinner than is described as representative of the Enon series.

Moderately deep to deep gullies make up 40 to 50 percent of the mapped areas. These gullies have exposed underlying parent material in many places; however, remnants of subsoil from the Enon soils remain on the sides of these gullies. Gravel, cobbles, or stones are in places.

This complex is well suited to trees or wildlife; however, trees or plants grow slowly unless the erosion is checked and the land is adequately fertilized and limed. Without proper treatment, this land is subject to accelerated erosion. Capability unit VIIe-2; woodland group not assigned.

EuB—Enon-Urban land complex, 2 to 10 percent slopes. This complex consists of areas of Enon soils and Urban land so small or so intricately mixed that is was not practical to map them separately. The complex consists of about 30 to 60 percent Enon soils and 30 to 60 percent Urban land.

Enon soils are well drained and are on side slopes and broad interstream divides. Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 5 inches thick. The subsoil is 25 inches thick; the upper part is light olive brown sandy clay loam, and the lower part is yellowish brown clay. The underlying material, to a depth of 75 inches, is mottled brownish yellow, black, and dark greenish gray loam.

Urban land part consists of areas where the original soil has been cut, filled, graded, paved, or otherwise changed to the extent that most soil properties have been so altered that a soil series is not recognized. These areas are used for shopping centers, factories, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement. Slope is generally modified to fit the needs of the site. The extent of site modification varies greatly. Many areas have had little disturbance, while many areas have been cut down or filled over.

Included in mapping are a few areas of Mecklenburg soils.

Determination of use and management of these areas generally requires onsite investigation. Not placed in interpretive groups.

HeC—Helena sandy loam, 6 to 10 percent slopes. This moderately well drained soil is on long, narrow side slopes on uplands. The mapped areas are generally 3 to 20 acres in size.

Typically, the surface layer is dark brown sandy loam about 7 inches thick. The subsoil is 31 inches thick; the upper part is mottled brownish yellow and reddish yellow clay, and the lower part is mottled brownish yellow, strong brown, and light gray clay loam. The underlying material, to a depth of 80 inches, is mottled strong brown and white clay loam.

Included with this soil in mapping are a few small areas of soils that have a loamy sand surface layer, a few small areas of soils that have a clay loam surface layer, a few areas of soils that have slopes of less than 6 percent or more than 10 percent, and a few small areas of soils that have gravel or cobbles on the surface. Also included are small areas of Appling, Enon, Iredell, Sedgefield, Vance, and Wilkes soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is very strongly acid or strongly acid. Depth to rippable bedrock is more than 48 inches. The seasonal high water table is commonly at a depth of more than 5 feet, but because of a slowly permeable subsoil, a perched water table is at a depth of 1 foot to 2 1/2 feet in places during wet seasons.

Most areas of this soil are used for woodland. The rest are used for cultivated crops and for pasture. Slope, runoff, erosion, wetness, and the high shrink-swell potential are the main limitations in the use and management of this soil.

This soil has moderate potential for corn, sorghum, and small grain. Slope and wetness are the main limitations. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, stripcropping, establishing field borders, contour farming, and using crop rotations that include close-growing crops also help to conserve soil and water. The potential for hay and pasture plants such as ladino clover, red clover, and sericea lespedeza is moderately high. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for urban uses, such as houses and streets, is low because of slope, slow permeability, and the high shrink-swell potential. The limitation of slope can be reduced or modified by special planning, design, or maintenance. The slow permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. There is only moderate potential for recreation areas because of slow permeability.

This soil has moderately high potential for broadleaf and needleleaf trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, sweetgum, hickory, maple, blackjack oak, willow oak, cedar, chestnut oak, Virginia pine, loblolly pine, and shortleaf pine. The main understory species are dogwood, holly, sourwood, black cherry, and sassafras. Wetness is the main limitation for woodland use and management. Capability unit IIIe-3; woodland group 3w.

HhB—Helena-Sedgefield sandy loams, 0 to 6 percent slopes. This complex consists of moderately well drained to somewhat poorly drained soils so intermingled that it was not practical to map them separately. These soils are on flats, in concave areas, and around the heads of intermittent drainageways on broad ridges. These soils receive surface and subsurface runoff from the surrounding higher areas. Most areas are 10 to 50 acres in size. Helena soils make up about 45 percent of the mapped acreage and Sedgefield soils about 35 percent.

Typically, Helena soils have a dark brown sandy loam surface layer about 7 inches thick. The subsoil is 31 inches thick; the upper part is mottled brownish yellow and reddish yellow clay, and the lower part is mottled brownish yellow, strong brown, and light gray clay loam. The underlying material, to a depth of 80 inches, is mottled strong brown and white clay loam.

The organic-matter content of the surface layer of the Helena soils is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is high. Reaction of the subsoil is very strongly acid or strongly acid. Depth to rippable bedrock is more than 48 inches. The seasonal high water table is commonly at a depth of more than 5 feet, but because of a slowly permeable subsoil, a perched water table is at a depth of 1 foot to 2 1/2 feet in places during wet seasons.

Typically, the Sedgefield soils have a grayish brown sandy loam surface layer about 8 inches thick. The subsurface layer is pale yellow loamy sand 4 inches thick. The subsoil is 25 inches thick; the upper part is light yellowish brown sandy loam the middle part is mottled yellowish brown clay, and the lower part is mottled strong brown, light gray, and light yellowish brown sandy loam and sandy clay loam. The underlying material extends to a depth of 60 inches; the upper part is yellowish brown, light yellowish brown, very pale brown coarse sandy loam, the middle part is light olive brown and grayish brown loam, and the lower part is greenish gray saprolite.

The organic-matter content of the surface layer of the Sedgefield soils is low. Permeability is slow, available water capacity is medium to high, and the shrink-swell potential is high. Reaction of the subsoil is strongly acid or medium acid. Depth to bedrock is more than 48 inches. The seasonal high water table is commonly at a depth of more than 5 feet, but because of a slowly permeable subsoil, a perched water table is at a depth of 1 foot to 1 1/2 feet in places during wet seasons.

Included with these soils in mapping are a few small areas of soils that have a loamy sand surface layer. Also included are a few areas of Enon, Iredell, and Vance soils.

About one-half of the acreage of these soils is used for cultivated crops and for pasture. The remainder is forested. Slope, runoff, erosion, wetness, the high shrink-swell potential, and slow permeability are the main limitations in the use and management of these soils.

These soils have moderate potential for small grain, corn, and tobacco. Slope, erosion, and wetness are the main limitations. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, stripcropping, establishing field borders, contour farming, and using crop rotations that include close-growing crops also help to conserve soil and water. The potential for growing hay and pasture plants such as ladino clover, red clover, and sericea lespedeza is moderately high. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for urban uses, such as houses and streets, is low because of slope, slow permeability, and high shrink-swell potential. The limitation of slope can be reduced or modified by special planning, design, or maintenance. The permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. Potential is only moderate for recreation areas because of slow permeability.

This soil has a moderately high potential for broadleaf and needleleaf trees. The dominant trees are white oak, northern red oak, southern red oak, sweetgum, blackgum, Virginia pine, and loblolly pine. The main understory species are dogwood, holly, sourwood, black cherry, and sassafras. Capability unit IIe-3; woodland group 3w.

IrB—Iredell fine sandy loam, 0 to 4 percent slopes. This moderately well drained soil is on flats, in concave areas, and around the heads of intermittent drainageways. The mapped areas are 4 to 30 acres or more in size.

Typically, the surface layer is grayish brown fine sandy loam about 7 inches thick. The subsoil is 25 inches thick; the upper part is mottled yellowish brown sandy clay loam, the middle part is light olive brown clay, and the lower part is mottled olive brown, olive, and olive gray clay loam. The underlying material, to a depth of 60 inches, is mottled yellow, olive brown, olive gray, black, olive, and yellow clay loam.

Included with this soil in mapping are a few areas of soils that have a sandy loam or loam surface layer. Also included are some small areas of Enon, Helena, and Vance soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is very high. Reaction of the subsoil is medium acid to neutral. Depth to rippable bedrock is 20 to 40 inches. The seasonal high water table is commonly at a depth of more than 6 feet, but because of a slowly permeable subsoil, a perched water table is at a depth of about 18 inches in places during wet seasons.

About one-half of the acreage of this soil is used for pasture and crops. The rest is in woodland. Slow permeability, wetness, and the very high shrink-swell potential are the main limitations in the use and management of this soil.

This soil has a low potential for row crops. The potential for pasture plants is moderate. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban and recreation uses is low because of slow permeability and the high shrink-swell potential.

The potential for broadleaf and needleleaf trees is moderate. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, sweetgum, hickory, blackjack oak, willow oak, cedar, maple, and loblolly pine. The main understory species are dogwood, holly, and sassafras. A clayey subsoil is the main limitation for woodland use and management. Capability unit IIe-3; woodland group 4c.

MaB—Madison sandy loam, 2 to 6 percent slopes. This well drained soil is on narrow ridges on uplands. The mapped areas are 3 to 50 acres in size.

Typically, the surface layer is reddish brown sandy loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are a few small areas of soils that have quartz gravel and rock fragments on the surface and small areas of soils that have a clay loam surface layer. Also included are small areas of Appling and Cecil soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are used for cultivated crops or pasture. The rest are used for forest or other uses. Slope, runoff, erosion, and permeability are the main limitations in the use and management of this soil.

This soil has high potential for corn, soybeans, and small grain. Slope and erosion are the main limitations for these uses. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, establishing field borders, stripcropping, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential for hay and pasture plants is also high. Proper pasture management helps to ensure adequate protection.

This soil has moderate potential for most urban uses, such as dwellings and roads. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the absorption field or increasing the size of the absorption area. The potential for most recreation uses is high.

This soil has moderately high potential for broadleaf and needleleaf trees. The main trees are ash, hickory, white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow-poplar, sweetgum, and sycamore. The main understory species are dogwood, sourwood, redbud, holly, black cherry, and sassafras. There are no major limitations for woodland use and management. Capability unit IIe-1; woodland group 3o.

MaC—Madison sandy loam, 6 to 10 percent slopes. This well drained soil is on fairly narrow upper side slopes on uplands. The mapped areas are 3 to 40 acres in size.

Typically, the surface layer is reddish brown sandy loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are a few areas of soils that have a clay loam surface layer, a few small areas of soils that have slopes of more than 10 percent, and a few small areas of soils that have quartz gravel and small rock fragments in the surface layer. Also included are a few small areas of Cecil soils and a few small areas of soils that have only a few flakes of mica in the subsoil.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

About one-half of the acreage of this soil is used for cultivated crops or for pasture, and the rest is used for forests or other uses. Slope, runoff, erosion, and permeability are the main limitations in the use and management of this soil.

This soil has moderate potential for corn and soybeans. Slope and erosion are the main limitations. Minimum tillage and crop residue management aid in controlling runoff and erosion. Conservation practices such as installing and maintaining sod in drainageways, constructing terraces and diversions, stripcropping, establishing field borders, contour farming, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential for the production of hay and pasture plants such as ladino clover, red clover, fescue, and sericea lespedeza is moderately high. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has only moderate potential for most urban uses because of slope and moderate permeability. The limitation of slope can be reduced or modified by special planning, design, or maintenance. Erosion is a hazard when ground cover is removed. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is moderate.

This soil has moderately high potential for broadleaf and needleleaf trees. The main trees are ash, yellow-poplar, hickory, sweetgum, maple, sycamore, white oak, black oak, post oak, northern red oak, southern red oak, and crimson oak. The main understory species are dogwood, sourwood, redbud, holly, black cherry, and sassafras. There are no major limitations for woodland use and management. Capability unit IIIe-1; woodland group 3o.

MaD—Madison sandy loam, 10 to 15 percent slopes. This well drained soil is on lower side slopes. Mapped areas are 3 to 30 acres in size.

Typically, the surface layer is reddish brown sandy loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are small areas of soils that have a clay loam surface layer and a few small areas of soils that have quartz gravel and rock fragments in the surface layer. Also included are a few small areas of Cecil soils and a few areas of soils that have a thinner combined surface layer and suboil than this Madison soil.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are forested. The rest are used for cultivated crops or for pasture. Slope, runoff, erosion, permeability, and mica content are the main limitations in the use and management of this soil.

This soil has low potential for crops because of slope and erosion. The potential for hay and pasture plants is moderate. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential is low for most urban and recreation uses because of slope and mica content. Erosion is a hazard when ground cover is removed.

This soil has moderately high potential for broadleaf and needleleaf trees. The main trees are northern red oak, white oak, post oak, southern red oak, maple, sweetgum, shortleaf pine, and Virginia pine. The main understory species are dogwood, cedar, holly, sassafras, and black cherry. There are no major limitations for woodland use and management. Capability unit IVe-1; woodland group 3o.

MaE—Madison sandy loam, 15 to 35 percent slopes. This well drained soil is on long, narrow side slopes adjacent to streams. The mapped areas are 3 to 60 acres in size.

Typically, the surface layer is reddish brown sandy loam about 5 inches thick. The subsoil is 29 inches thick. The upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are small areas of soils that have a clay loam surface layer. Also included are small areas of soils that have a thinner surface layer and subsoil than this Madison soil and that have a loamy subsoil.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are forested. The rest are mainly in pasture. Slope, runoff, erosion, permeability, and mica content are the main limitations in the use and management of this soil.

This soil has low potential for crops because of slope and erosion. It has low potential for hay and pasture plants. Proper pasture management helps to ensure adequate protection.

The potential for most urban and recreation uses is low because of slope.

This soil has moderately high potential for broadleaf and needleleaf trees. The main trees are northern red oak, southern red oak, white oak, post oak, maple, sweetgum, shortleaf pine, and Virginia pine. The dominant understory species are dogwood, cedar, holly, sassafras, and black cherry. Slope is the main limitation in the use and management of this soil for woodland. Capability unit VIe-1; woodland group 3r.

McB2—Madison clay loam, 2 to 6 percent slopes, eroded. This well drained soil is on fairly narrow ridges on the uplands. The mapped areas are 3 to 45 acres in size.

Typically, the surface layer is reddish brown clay loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are small areas of soils that have a sandy loam surface layer and a few small areas of soils that have slopes of more than 6 percent. Also included are a few small areas of Cecil soils, a few small areas of soils that have rock fragments on the surface, and a few small areas of soils that have only a few flakes of mica in the subsoil.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most of the acreage of this soil is in pasture or cultivated crops. The rest is in forest. Slope, runoff, erosion, permeability, and mica content are the main limitations in the use and management of this soil.

This soil has moderately low potential for row crops such as corn and soybeans. Minimum tillage and crop residue management aid in controlling runoff and erosion. Conservation practices such as installing and maintaining sod in drainageways, constructing terraces and diversions, stripcropping, establishing field borders, contour farming, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential for the production of hay and pasture plants such as fescue, sericea lespedeza, red clover, and white clover is moderate. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has moderate potential for most urban uses because of permeability. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the absorption field or increasing the size of the absorption area. The potential for most recreation uses is high.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are shortleaf pine, loblolly pine, Virginia pine, sweetgum, red oak, white oak, and maple. The main understory species are dogwood, cedar, holly, pin oak, sassafras, and black cherry. Capability unit IIIe-2; woodland group 4c.

McC2—Madison clay loam, 6 to 10 percent slopes, eroded. This well drained soil is on long, fairly narrow upper side slopes on uplands. The mapped areas are 3 to 40 acres in size.

Typically, the surface layer is reddish brown clay loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are small areas of soils that have a sandy loam surface layer and a few areas of soils that have only a few flakes of mica in the subsoil. Also included are a few areas of soils that have rock fragments on the surface and small areas of Cecil soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most of the acreage of this soil is forested. The rest is mainly in cultivated crops and pasture. Slope, runoff, erosion, permeability, and mica content are the main limitations in the use and management of this soil.

This soil has low potential for crops because of slope and erosion. The potential for hay and pasture plants such as fescue, sericea lespedeza, red clover, and white clover is moderate. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

This soil has only moderate potential for urban uses because of permeability and slope. The limitation of slope can be reduced or modified by special planning, design, or maintenance. Erosion is a hazard when ground cover is removed. The moderate permeability limits performance of septic tank absorption fields, but this limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is moderate.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are shortleaf pine, loblolly pine, Virginia pine, sweetgum, red oak, and white oak. The main understory species are dogwood, cedar, holly, pin oak, sassafras, and black cherry. A clayey subsoil is the main limitation in the use and management of this soil for woodland. Capability unit IVe-2; woodland group 4c.

McD2—Madison clay loam, 10 to 15 percent slopes, eroded. This well drained soil is on narrow lower side slopes. The mapped areas are 3 to 35 acres in size.

Typically, the surface layer is reddish brown clay loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are a few small areas of soils that have a sandy loam surface layer and a few areas of soils that have rock fragments on the surface. Also included are a few areas of Cecil soils and a few areas of other Madison soils.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most of the acreage of this soil is forested. The rest is mainly in pasture. Slope, runoff, erosion, permeability, and mica content are the main limitations in the use and management of this soil.

This soil is unsuited for cultivation. It has moderate potential for hay and pasture plants. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential is low for most urban and recreation uses because of slope, permeability, and mica content. Erosion is a hazard when ground cover is removed.

The soil has moderate potential for needleleaf and broadleaf trees. The dominant trees are shortleaf pine, loblolly pine, Virginia pine, sweetgum, red oak, and white oak. The main understory species are dogwood, cedar, holly, pin oak, sassafras, and black cherry. A clayey subsoil is the main limitation in the use and management of this soil for woodland. Capability unit VIe-2; woodland group 4c.

McE2—Madison clay loam, 15 to 25 percent slopes, eroded. This well drained soil is on long, narrow upland side slopes adjacent to streams. The mapped areas are 3 to 60 acres in size.

Typically, the surface layer is reddish brown clay loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Included with this soil in mapping are a few small areas of soils that have a sandy loam surface layer. Also included are areas of soils that have rock fragments in the surface layer and a few areas of soils that have a thinner surface layer and subsoil than this Madison soil and that have a loamy subsoil.

The organic-matter content of the surface layer is low. Permeability is moderate, available water capacity is low, and the shrink-swell potential is low. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most of the acreage of this soil is forested. Slope, runoff, erosion, permeability, and mica content are the main limitations in the use and management of this soil.

This soil is unsuited for cultivated crops because of slope and erosion. The potential is low for hay and pasture plants.

This soil is unsuited to urban and recreation uses because of slope, permeability, and mica content.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are shortleaf pine, loblolly pine, Virginia pine, sweetgum, red oak, and white oak. The main understory species are dogwood, cedar, holly, pin oak, sassafras, and black cherry. A clayey subsoil is the main limitation in the use and management of this soil for woodland. Capability unit VIIe-2; woodland group 4c.

Md—Madison complex, gullied. This complex is on points, shoulders, and sides of ridges. The mapped areas are 3 acres to more than 10 acres in size.

About 50 to 60 percent of the area is Madison soils. In most places the original surface layer of these Madison soils has been eroded and the present surface layer is made up of red micaceous clay from the subsoil. In a few small places these Madison soils are not so eroded; in these places the surface layer is clay loam or sandy clay loam and the surface layer and subsoil are thinner than is described as representative of the Madison series.

Gullied areas make up 40 to 50 percent of the area. Most of the gullies have cut into the highly micaceous parent material; however, a few retain some remnants of the subsoil of the Madison soil. The gullies range from 3 to 15 feet below the original surface.

This complex is well suited to trees or wildlife; however, trees or plants grow very slowly unless the erosion is checked and the soil is adequately fertilized and limed. Without proper treatment, this complex is subject to accelerated erosion. Capability unit VIIe-2; woodland group unclassified.

MeB—Madison-Urban land complex, 2 to 10 percent slopes. This complex consists of areas of Madison soils and Urban land so small or so intricately mixed that it was not practical to map them separately. The complex consists of about 40 to 60 percent Madison soils and 30 to 50 percent Urban land.

Madison soils are well drained and are on ridges and side slopes on uplands. Typically, the surface layer is reddish brown sandy loam about 5 inches thick. The subsoil is 29 inches thick; the upper part is red clay, and the lower part is mottled red clay loam. The underlying material, to a depth of 80 inches, is mottled reddish yellow sandy clay loam in the upper part and mottled reddish yellow sandy loam in the lower part.

Urban land consists of areas where the original soil has been cut, filled, graded, paved, or otherwise changed to the extent that most soil properties have been altered or changed so that a soil series is not recognized. These areas are used for shopping centers, factories, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement. Slope is generally modified to fit the needs of the site. The extent of site modification varies greatly. Many areas have had little disturbance, while many areas have been cut or filled.

Included in mapping are a few areas of Appling and Cecil soils.

Determination of use and management of these areas generally requires onsite investigation. Not placed in interpretive groups.

MhB2—Mecklenburg sandy clay loam, 2 to 6 percent slopes, eroded. This well drained soil is on broad, smooth interstream divides on the uplands. The mapped areas are 3 to 15 acres in size.

Typically, the surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil is 31 inches thick; it is mottled yellowish red and red clay in the upper part and yellowish red clay loam in the lower part. The underlying material, to a depth of 70 inches, is mottled red and brownish yellow silty clay loam.

Included with this soil in mapping are a few small areas of soils that have a loam or clay loam surface layer, a few small areas of soils that have a thicker solum than that of this Mecklenburg soil, and a few small areas of soils that have gravel-size fragments and black concretions in the surface layer.

The organic-matter content of the surface layer is medium. Permeability is slow, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is medium acid or slightly acid. Depth to bedrock is 48 to 60 inches. The seasonal high water table is at a depth of more than 6 feet.

About one-half of the acreage of this soil is used for cultivated crops or pasture. The rest is used for forests or urban and industrial areas. Slope, runoff, erosion, and slow permeability are the main limitations in the use and management of this soil.

This soil has moderate potential for corn, small grain, sorghum, and soybeans. Minimum tillage and crop residue management aid in controlling runoff and erosion. Conservation practices such as installing and maintaining sod in drainageways, constructing terraces and diversions, stripcropping, establishing field borders, contour farming, and using crop rotations that include close-growing crops also aid in conserving soil and water. The potential for the production of hay and pasture plants such as fescue, sericea lespedeza, red clover, and white clover is moderate. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential is low for most urban uses because of slow permeability, which limits performance of septic tank absorption fields. This limitation generally can be overcome by modifying the field or increasing the size of the absorption area. The potential for recreation is moderate.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are loblolly pine, shortleaf pine, northern red oak, southern red oak, sweetgum, and cedar. There are no major limitations for woodland use and management. Capability unit IIe-3; woodland group 4o.

MhC2—Mecklenburg sandy clay loam, 6 to 10 percent slopes, eroded. This well drained soil is on long, narrow side slopes on uplands. The mapped areas are 3 to 20 acres in size.

Typically, the surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil is 31 inches thick; the upper part is mottled yellowish red and red clay, and the lower part is yellowish red clay loam. The underlying material, to a depth of 70 inches, is mottled red and brownish yellow silty clay loam.

Included with this soil in mapping are a few small areas of soils that have a clay loam or loam surface layer and a few small areas of soils that have gravel-size fragments and black concretions in the surface layer. Also included are a few small areas of Cecil and Enon soils.

The organic-matter content of the surface layer is medium. Permeability is slow, available water capacity is medium, and the shrink-swell potential is moderate. Reaction of the subsoil is medium acid or slightly acid. Depth to bedrock is 48 to 60 inches. The seasonal high water table is at a depth of more than 6 feet.

About one-half of the acreage of this soil is used for cultivated crops or pasture. The rest is mainly forested. Slope, runoff, erosion, and slow permeability are the main limitations in the use and management of this soil.

This soil has high potential for crops. It has moderate potential for hay and pasture plants such as sericea, fescue, red clover, and white clover. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban uses is low. The potential for recreation is moderate.

This soil has moderate potential for broadleaf and needleleaf trees. The dominant trees are loblolly pine, shortleaf pine, northern red oak, southern red oak, sweetgum, and cedar. The main understory species are holly, dogwood, pin oak, sassafras, and black cherry. There are no major limitations in the use and management of this soil for woodland. Capability unit IIIe-3; woodland group 4o.

MuB—Mecklenburg-Urban land complex, 2 to 10 percent slopes. This complex consists of areas of Mecklenburg soils and Urban land so small or so intricately mixed that it was not practical to map them separately. The complex consists of about 30 to 60 percent Mecklenburg soils and 30 to 60 percent Urban land.

Well drained Mecklenburg soils are on side slopes on uplands. Typically, the surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil is 31 inches thick; it is mottled yellowish red and red clay in the upper part and is yellowish red clay loam in the lower part. The underlying material, to a depth of 70 inches, is mottled red and brownish yellow silty clay loam.

Urban land consists of areas where the original soil has been cut, filled, graded, paved, or otherwise changed to the extent that most soil properties have been so altered that a soil series is not recognized. These areas are used for shopping centers, factories, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement. Slope is generally modified to fit the needs of the site. The extent of site modification varies greatly. Many areas have had little disturbance, while many areas have been cut or filled.

Included in mapping are a few small areas of Enon soils.

Determination of use and management of these areas generally requires onsite investigation. Not placed in interpretive groups.

Pt—Pits. Pits are miscellaneous land types consisting of areas where the original soil material has been removed or altered beyond recognition. This unit is made up of borrow pits, quarries, and sanitary landfills. Areas range from 1 acre to 50 acres or more in size.

Borrow pits are areas where the soil has been excavated to a depth of more than 20 feet. The more recently excavated areas are bare and are subject to accelerated erosion. The older areas are eroded, but many of them have stabilized under pine and other vegetation. Some of the areas are smooth, and others have a highly irregular surface.

Quarries are areas where the regolith has been removed and the underlying rock has been quarried for use mainly as construction aggregate. These areas are open excavations as deep as 100 feet or more. Water fills the deeper cavities all year in most of the abandoned quarries. These cavaties are almost entirely devoid of vegetation. Some pine and cedar trees are around the top of the quarries, where the soil is exposed.

In sanitary landfill areas the original soil has been removed and solid waste material placed in alternating layers with the original soils and other soil materials. A few areas have been used as dumps for industrial and other wastes. Soil material was mixed in some of these dumps in low areas, and the land was then leveled. Some of the older sanitary landfills that are closed have stands of Virginia pine and shortleaf pine.

These areas are so diverse that onsite investigation of each unit should be made before proceeding with any land use practice.

Ur—Urban land. This land type consists of areas where more than 75 percent of the surface is covered with streets, buildings of all types, parking lots, railroad yards, and airports. The soils between these facilities are used for parks, lawns, playgrounds, cemeteries, and drainageways. The natural soils have been greatly altered by cutting, filling, grading, and shaping during the processes of urbanization. The original landscape, or topography, and the drainage pattern has been changed.

Most of the acreage of this land type is in the business districts of Greensboro and High Point or around the perimeter of the cities. Isolated areas are as small as 5 acres. Slopes are 2 to 10 percent.

The major concern is the excessive runoff from roofs, roads, and parking lots, which increases the flooding hazard in lower lying areas. There is a very severe hazard of waterway and reservoir siltation from areas that are graded and not immediately stabilized.

Determination of use and treatment requires onsite investigation.

VaB—Vance sandy loam, 2 to 6 percent slopes. This well drained soil is on narrow ridges on uplands. The mapped areas are 3 to 15 acres or more in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 34 inches thick; the upper part is mottled strong brown clay, and the lower part is mottled brownish yellow clay loam. The underlying material, to a depth of 72 inches, is mottled brownish yellow, white, and red clay loam.

Included with this soil in mapping are a few small areas of soils that have a clay loam surface layer. Also included are small areas of Appling, Enon, and Helena soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is moderate. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are used for cultivated crops or pasture. The rest are forested. Slope, runoff, erosion, and slow permeability are the main limitations in the use and management of this soil.

This soil has moderately high potential for tobacco, corn, milo, and small grain. It has high potential for horticultural crops, such as tomatoes, sweet corn, green beans, and peas. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, stripcropping, establishing field borders, contour farming, and using crop rotations that include close-growing crops also help conserve soil and water. The potential for hay and pasture plants such as ladino clover, red clover, fescue, and sericea lespedeza. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for urban uses, such as houses and streets, is low because of slow permeability and low strength. Potential is moderate for recreation areas because of slow permeability.

This soil has moderately high potential for broadleaf and needleleaf trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, blackjack oak, cedar, maple, hickory, loblolly pine, shortleaf pine, and Virginia pine. The main understory species are dogwood, holly, and sassafras. There are no major limitations in the use and management of this soil for woodland. Capability unit IIIe-3; woodland group 3o.

VaC—Vance sandy loam, 6 to 10 percent slopes. This well drained soil is on long, narrow side slopes. The mapped areas are 3 to 15 acres in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 34 inches thick; the upper part is mottled strong brown clay, and the lower part is mottled brownish yellow clay loam. The underlying material, to a depth of 72 inches, is mottled brownish yellow, white, and red clay loam.

Included with this soil in mapping are a few small areas of soils that have a clay loam surface layer and a few small areas of soils that have gravel or small cobbles in the surface layer. Also included are a few small areas of Appling, Cecil, Enon, and Helena soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shink-swell potential is moderate. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are forested. The rest are used for cultivated crops, for pasture, or for urban and industrial areas. Slope, runoff, erosion, and slow permeability are the main limitations in the use and management of this soil.

This soil has moderate potential for tobacco, corn, soybeans, and small grain. Minimum tillage and crop residue management help to control runoff and erosion. Conservation practices such as maintaining sod in drainageways, constructing terraces and diversions, strip-cropping, establishing field borders, contour farming, and using crop rotations that include close-growing crops also help to conserve soil and water. The potential for hay and pasture plants such as ladino clover, red clover, fescue, and sericea lespedeza is moderately high. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban uses is low because of slow permeability and low strength. The potential is moderate for recreation areas because of slow permeability.

This soil has moderately high potential for broadleaf and needleleaf trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, blackjack oak, cedar, maple, hickory, loblolly pine, shortleaf pine, and Virginia pine. The main understory species are dogwood, holly, and sassafras. There are no major limitations in the use and management of this soil for woodland. Capability unit IVe-3; woodland group 3o.

VaD—Vance sandy loam, 10 to 15 percent slopes. This well drained soil is on narrow side slopes on uplands. The mapped areas are 3 to 10 acres or more in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 34 inches thick; the upper part is mottled strong brown clay, and the lower part is mottled brownish yellow clay loam. The underlying material, to a depth of 72 inches, is mottled brownish yellow, white, and red clay loam.

Included with this soil in mapping are a few small areas of soils that have a clay loam surface layer. Also included are a few small areas of Appling, Cecil, and Enon soils.

The organic-matter content of the surface layer is low. Permeability is slow, available water capacity is low, and the shrink-swell potential is moderate. Reaction of the subsoil is strongly acid or very strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of the soil are forested. The rest are in pasture. Slope, runoff, erosion, and slow permeability are the main limitations in the use and management of this soil.

This soil has low potential for crops because of slope and erosion. It has low potential for hay and pasture plants. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban and recreation uses is low because of slow permeability.

This soil has a moderately high potential for broadleaf and needleleaf trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, blackjack oak, cedar, maple, hickory, loblolly pine, shortleaf pine, and Virginia pine. The main understory species are dogwood, holly, and sassafras. There are no major limitations in the use and management of this soil for woodland. Capability unit IVe-3; woodland group 3o.

VuB—Vance-Urban land complex, 2 to 10 percent slopes. This complex consists of areas of Vance soils and Urban land so small or so intricately mixed that it was not practical to map them separately. The complex consists of about 40 to 60 percent Vance soils and about 30 to 50 percent Urban land.

Vance soils are well drained and are on side slopes on the uplands. Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is 34 inches thick; the upper part is mottled strong brown clay, and the lower part is mottled brownish yellow clay loam. The underlying material, to a depth of 72 inches, is mottled brownish yellow, white, and red clay loam.

Urban land consists of areas where the original soil has been cut, filled, graded, paved, or otherwise changed to the extent that most soil properties have been so altered that a soil series is not recognized. These areas are used for shopping centers, factories, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement. Slope is generally modified to fit the needs of the site. The extent of site modification varies greatly. Many areas have had little disturbance, and many areas have been cut or filled.

Included in mapping are a few areas of Appling and Cecil soils.

Determination of use and management of these areas generally requires onsite investigation. Not placed in interpretive groups.

Wh—Wehadkee silt loam. This nearly level, poorly drained soil is on broad flood plains along creeks and streams. The mapped areas are 4 to 50 acres or more in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is 40 inches thick; the upper part is mottled grayish brown silt loam, the middle part is mottled light brownish gray silt loam, and the lower part is mottled gray silty clay loam and mottled gray loam. The underlying material, to a depth of 80 inches, is mottled gray loam.

Included with this soil in mapping are a few small areas of soils that have a loam or fine sandy loam surface layer. Also included are a few small areas of Chewacla soils.

The organic-matter content of the surface layer is medium. Permeability is moderate, available water capacity is medium, and the shrink-swell potential is low. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is more than 60 inches. The seasonal high water table is at or near the surface. This soil is frequently flooded for brief periods.

Most areas of this soil are forested. The rest are dominantly in pasture. Wetness and flooding are the main limitations in the use and management of this soil.

This soil has low potential for crops and pasture because of wetness and flooding.

The potential is low for most urban and recreation uses because of wetness and flooding.

This soil has very high potential for growing broadleaf and needleaf trees. The dominant trees are sweetgum, yellow-poplar, willow oak, water oak, ash, and loblolly pine. The main understory species are cottonwood, sourwood, and alders. Capability unit IVw-1; woodland group 1w.

WkC—Wilkes sandy loam, 6 to 10 percent slopes. This well drained soil is on small hummocky ridges and side slopes. The mapped areas are 2 to 10 acres in size.

Typically, the surface layer is dark brown sandy loam about 7 inches thick. The subsoil is 11 inches thick; the upper part is mottled brownish yellow sandy loam, and the lower part is yellowish brown clay loam. The underlying material, to a depth of 52 inches, is yellowish brown clay loam in the upper part and yellowish brown loamy coarse sand in the lower part.

Included with this soil in mapping are a few areas of soils that have slopes of more than 10 percent, a few small areas of soils that have a loam surface layer, and a few small areas of soils that have gravel or cobbles on the surface. Also included are small areas of Enon, Helena, Madison, and Mecklenburg soils.

The organic matter content of the surface layer is low. Permeability is moderately slow, available water capacity is very low, and the shrink-swell potential is moderate. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is 40 to 80 inches. The seasonal high water table is at a depth of more than 6 feet.

Most areas of this soil are forested. A small acreage is in pasture. Slope, runoff, erosion, and moderately slow permeability are the main limitations in the use and management of this soil.

This soil has low potential for row crops. The potential for hay and pasture plants such as ladino clover, red clover, and sericea lespedeza is moderate. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban uses is low because of slope and depth to rock. The potential is moderate for most recreation uses.

This soil has moderate potential for needleleaf trees. The dominant trees are loblolly pine, shortleaf pine, and Virginia pine. The main understory species are dogwood, holly, sourwood, black cherry, and sassafras. There are no major limitations for woodland use and management. Capability unit IVe-3; woodland group 4o.

WkD—Wilkes sandy loam, 10 to 15 percent slopes. This well drained soil is on long side slopes that commonly border drainageways. The mapped areas are 3 to 10 acres or more in size.

Typically, the surface layer is dark brown sandy loam about 7 inches thick. The subsoil is 11 inches thick; the upper part is brownish yellow sandy loam, and the lower part is yellowish brown clay loam. The underlying material, to a depth of 52 inches, is yellowish brown clay loam in the upper part and yellowish brown loamy coarse sand in the lower part.

Included with this soil in mapping are a few areas of soils that have a loam surface layer and a few small areas of soils that have gravel and cobbles on the surface. Also included are small areas of Enon, Madison, and Vance soils and rock outcrops.

The organic-matter content of the surface layer is low. Permeability is moderately slow, available water capacity is very low, and the shrink-swell potential is moderate. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is 40 to 80 inches. The seasonal high water table is at a depth of more than 6 feet.

Almost all areas of this soil are forested. Slope, erosion, runoff, and depth to rock are the main limitations in the use and management of this soil.

This soil is unsuited to row crops. The potential for hay and pasture plants is low. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban and recreation uses is low because of slope and depth to rock.

This soil has moderate potential for needleleaf trees. The dominant trees are loblolly pine, shortleaf pine, and Virginia pine. The main understory species are dogwood, holly, sourwood, black cherry, and sassafras. There are no major limitations for woodland use and management. Capability unit VIe-1; woodland group 4o.

WkE—Wilkes sandy loam, 15 to 45 percent slopes. This well drained soil is on side slopes adjacent to the major drainageways. The mapped areas are 2 to 20 acres in size.

Typically, the surface layer is dark brown sandy loam about 7 inches thick. The subsoil is 11 inches thick; the upper part is brownish yellow sandy loam, and the lower part is yellowish brown clay loam. The underlying material, to a depth of 52 inches, is yellowish brown clay loam in the upper part and yellowish brown loamy coarse sand in the lower part.

Included with this soil in mapping are a few areas of soils that have a loam surface layer. Also included are small areas of Enon soils and small areas of rock outcrop.

The organic-matter content of the surface layer is low. Permeability is moderately slow, available water capacity is very low, and the shrink-swell potential is moderate. Reaction of the subsoil is medium acid to neutral. Depth to bedrock is 40 to 80 inches. The seasonal high water table is at a depth of more than 6 feet.

All areas of this soil are forested. Slope, runoff, erosion, and depth to rock are the main limitations in the use and management of this soil.

This soil is unsuited to row crops. The potential for hay and pasture plants is low. Proper pasture management helps to ensure adequate protective cover, which reduces runoff and controls erosion.

The potential for most urban and recreation uses is low because of slope and depth to rock.

This soil has moderate potential for needleleaf and broadleaf trees. The dominant trees are loblolly pine, shortleaf pine, and Virginia pine. The main understory species are dogwood, holly, sourwood, black cherry, and sassafras. Slope is the main limitation in the use and management of this soil for woodland. Capability unit VIIe-1; woodland group 4r.

Planning the Use and Management of the Soils

The soil survey is a detailed analysis and evaluation of the most basic resource of the survey area—the soil. It may be used to fit the use of the land, including urbanization, to the limitations and potentials of the natural resources and the environment and to help avoid soil-related failures in uses of the land.

During a soil survey soil scientists, conservationists, engineers, and others keep extensive notes, not only about the nature of the soils but also about unique aspects of behavior of these soils in the field and at construction sites. These notes include observations of erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic systems, and other factors relating the kinds of soil and their productivity, potentials, and limitations under various uses and management. In this way field experience incorporated with measured data on soil properties and performance is used as a basis for predicting soil behavior.

Information in this section will be useful in applying basic facts about the soils to plans and decisions for use and management of soils for crops and pasture, range, woodland, and many nonfarm uses, including building sites, highways and other transportation systems, sanitary facilities, parks and other recreational developments, and wildlife habitat. From the data presented, the potential of each soil for specified land uses may be determined, soil limitations to these land uses may be identified, and costly failures in homes and other structures, because of unfavorable soil properties, may be avoided. A site can be selected where the soil properties are favorable, or practices can be planned that will overcome the soil limitations.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area, and on the environment. Both of these factors are closely related to the nature of the soil. Plans can be made to maintain or create a land use pattern in harmony with the natural soil.

Contractors can find information useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, trees and shrubs, and most other uses of land are influenced by the nature of the soil.

Crops and Pasture

By EMMETT R. WALLER, JR., conservation agronomist, and H. W. ROBERTSON, district conservationist, Soil Conservation Service.

The major management concerns when using the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best adapted to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the predicted yields of the main crops and pasture are presented for each soil.

This section provides information about the overall agricultural potential and needed practices in the survey area for those in the agribusiness sector—equipment dealers, drainage contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil Maps for Detailed Planning." When making plans for management systems for individual fields or farms, check the detailed information given in the description of each soil.

More than 131,000 acres in the survey area was used for crops and pasture in 1967, according to the Conservation Needs Inventory. Of this total about 30,000 acres was used for permanent pasture; 36,000 acres for row crops; about 22,000 acres for close-grown crops; and about 11,000 acres for rotation hay and pasture. The rest was idle cropland.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. It was estimated that in 1967 there was about 71,000 acres of urban and built up land in the county. The use of this soil survey to help make land use decisions that will influence the future role of farming in the county is discussed in the section "Soil Map for General Planning."

Soil erosion is a problem in Guilford County where slope is more than 2 percent. Enon and Helena soils, for example, have slopes of 2 to 6 percent and an additional problem of wetness.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil and on soils that have a layer in or below the subsoil that limits the depth of the root zone. Second, soil erosion results in sediment entering streams. Control of erosion minimizes the pollution of streams by sediment and improves quality of water for municipal use, for recreation, and for fish and wildlife.

In many sloping fields, preparing a good seedbed and tilling are difficult on clayey spots because the original surface soil has been eroded away.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, the legume and grass forage crops in the cropping system reduce erosion on sloping land and provide nitrogen and improve tilth for the following crop.

On soils that have short slopes, cropping systems that provide substantial vegetative cover are required to control erosion unless minimum tillage is practiced. Minimizing tillage and leaving crop residue on the surface help to increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the survey area but are more difficult to use successfully on the eroded soils and on the soils that have a clayey surface layer. No-tillage is effective in reducing erosion on sloping land and can be adapted to most soils in the survey area. It is more difficult to practice successfully, however, on the soils with a clayey surface layer.

Terraces and diversions reduce the length of slope and can reduce runoff and erosion. They are most practical on deep, well-drained soils that have regular slopes.

Contouring and contour stripcropping are widespread erosion control practices in the survey area. They are best adapted to soils that have smooth, uniform slopes.

Information on the design of erosion control practices for each kind of soil is available from local offices of the Soil Conservation Service.

Soil drainage is the major management need on about one-third of the acreage used for crops and pasture in the survey area. Some soils are naturally so wet that the production of crops common to the area is generally not possible.

The design of both surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained and very poorly drained soils used for intensive row cropping. Drains have to be more closely spaced in slowly permeable soils than in the more permeable soils. Finding adequate outlets for tile drainage systems is difficult in some areas.

Soil fertility is naturally low to medium in most soils on the uplands in the survey area.

On all soils additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

Some of the soils used for crops in the survey area have a silt loam or sandy loam surface layer that is yellow or red in color and low in content of organic matter. Generally the structure of such soils is weak, and intense rainfall causes the formation of a crust on the surface. The crust is hard and nearly impervious to water when dry. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can help to improve soil structure and to reduce crust formation.

Helena soils are clayey and tilth is a problem because the soils often stay wet until late in spring. If they are wet when plowed, they tend to be very cloddy when dry and a good seedbed is difficult to prepare. Fall plowing generally results in good tilth in spring.

Field crops suited to the soils and climate of the survey area include many that are not now commonly grown. Corn, soybeans, and tobacco are the major row crops. Grain sorghum, sunflowers, potatoes, and similar crops can be grown if economic conditions are favorable.

Wheat and oats are the common close-growing crops. Rye, barley, buckwheat, and flax could be grown.

Special crops grown commercially in the survey area are vegetables, small fruits, tree fruits, and nursery plants. A small acreage throughout the county is used for melons, strawberries, celery, sweet corn, tomatoes, peppers, and other vegetables and small fruits.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to vegetables and small fruits. Crops can generally be planted and harvested earlier on all of these soils than on the other soils in the survey area.

Latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields Per Acre

The per acre average yields 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 table 5 because of seasonal variations in rainfall and other climatic factors. Absence of a yield estimate indicates that the crop is not suited to or not commonly grown on the soil or that irrigation of a given crop is not commonly practiced on the soil.

The predicted yields are based mainly on the experience and records of farmers, conservationists, and Extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The latest soil and crop management practices used by many farmers in the county are assumed in predicting the yields. Hay and pasture yields are predicted for varieties of grasses and legumes suited to the soil. A few farmers may be using more advanced practices and are obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends upon the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

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

Crops other than those shown in table 5 are grown in the survey area, but because their acreage is small, predicted yields for these crops are not included. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the productivity and management concerns of the soils for these crops.

Capability Classification

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to horticultural crops or other crops that require special management. This classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forage, for forest trees, or for engineerng purposes.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

Class VIII soils and landforms have limitations that nearly preclude their use for commercial plants.

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

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

The capability unit is identified in the description of each soil mapping unit in the section "Soil Maps for Detailed Planning." Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-2 or IIIe-1.

Woodland Management and Productivity

By EDWIN L. YOUNG, woodland conservationist, Soil Conservation Service.

Table 6 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for those soils suitable for wood crops are listed alphabetically by soil name, and the ordination symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the 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; *c*, clay in the upper part of the soil; and *r*, steep slopes. The letter *o* indicates no significant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the order in which the letters are listed above—w, c, and r.

In table 6 the soils are also rated for a number of factors to be considered in management. The ratings of slight, moderate, and severe are used to indicate the degree of major soil limitations.

Ratings of the hazard of erosion indicate the risk of loss of soil in well-managed woodland. The risk is *slight* if the expected soil loss is small; *moderate* if some 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 equipment; *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 that the soil affects expected mortality of planted tree seedlings when plant competition is not a limiting factor. The ratings are for seedlings from good planting stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortaility of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Considered in the ratings of windthrow hazard are characteristics of the soil that affect the development of tree roots and the ability of soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate*, that some trees are 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.

Ratings of plant competition indicate the degree to which undesirable plants are expected to invade or grow if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The potential productivity of merchantable trees on a soil is expressed as a site index. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands.

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

Engineering

By SIDNEY F. GRAY, geologist, Soil Conservation Service.

This section provides information about the use of soils for building sites, sanitary facilities, construction materials, and water management. Among those who can benefit from this section are engineers, landowners, community decision makers and planners, town and city managers, land developers, builders, contractors, and farmers.

The ratings in tables in this section are based on test data and estimated data in the "Soil Properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by the soil survey and used in determining the ratings in this section are grain-size distribution, liquid limit, plasticity index, soil reaction, depth to and hardness of bedrock within 5 or 6 feet of the surface, soil wetness characteristics, depth to a seasonal water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

Based on the information assembled about soil properties, ranges of values may be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values may be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to—(1) select potential residential, commercial, industrial, and recreational areas; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternate routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternate sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations and testing.

The information is presented mainly in tables. Table 7 shows, for each kind of soil, ratings of the degree and kind of limitations for building site development; table 8, for sanitary facilities; and table 10, for water management. Table 9 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have different meanings in soil science and in engineering; the Glossary defines many of these terms.

Building Site Development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 7. A *slight* limitation indicates that soil properties are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are used for pipelines, sewerlines, telephone and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by the soil wetness of a high seasonal water table, the texture and consistence of soils, the tendency of soils to cave in or slough, and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is defined, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and small commercial buildings referred to in table 7 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence from settling or shear failure of the foundation do not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and the large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious limitation.

Local roads and streets referred to in table 7 have an all-weather surface that can carry light to medium traffic all year. They consist of subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The AASHTO and Unified classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones, all of which affect stability and ease of excavation, were also considered.

Sanitary Facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that deal with the ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 8 shows the degree and kind of limitations of each soil for these uses and for use of the soil as daily cover for landfills.

If the degree of soil limitation is indicated by the rating *slight*, soils are favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance are required.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect the absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones and a shallow depth to bedrock interfere with installation. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas. Also, soil erosion and soil slippage are hazards where absorption fields are installed in sloping soils.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth less than 4 feet below the tile lines. In these soils the absoption field does not adequately filter the effluent, and as a result ground water supplies in the area may be contaminated. Soils having a hazard of inadequate filtration are indicated by footnotes in table 8.

Percolation tests are performed to determine the absorptive capacity of the soil and its suitability for septic tank absorption fields. These tests should be performed during the season when the water table is highest and the soil is at minimum absorptive capacity.

In many of the soils that have moderate or severe limitations for septic tank absorption fields, it may be possible to install special systems that lower the seasonal water table or to increase the size of the absorption field so that satisfactory performance is achieved.

Sewage lagoons are shallow ponds constructed to hold sewage while bacteria decompose the solid and liquid wastes. Lagoons have a nearly level flow area surrounded by cut slopes or embankments of compacted, nearly impervious soil material. They generally are designed so that depth of the sewage is 2 to 5 feet. Impervious soil at least 4 feet thick for the lagoon floor and sides is required to minimize seepage and contamination of local ground water. Soils that are very high in organic matter and those that have stones and boulders are undesirable. Unless the soil has very slow permeability, contamination of local ground water is a hazard in areas where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce its capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the location of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soils affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste, either in excavated trenches or on the surface of the soil. The waste is spread, compacted in layers, and covered with thin layers of soil. Landfill areas are subject to heavy vehicular traffic. Ease of excavation, risk of polluting ground water, and trafficability affect the suitability of a soil for this purpose. The best soils have a loamy or silty texture, have moderate or slow permeability, are deep to bedrock and a seasonal water table, are free of large stones and boulders, and are not subject to flooding. In areas where the seasonal water table is high, water seeps into the trenches and causes problems in excavating and filling the trenches. Also, seepage into the refuse increases the risk of pollution of ground water. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability that might allow noxious liquids to contaminate local ground water.

Unless otherwise stated, the ratings in table 8 apply only to soil properties and features within a depth of about 6 feet. If the trench is deeper, ratings of slight or moderate may not be valid. Site investigation is needed before a site is selected.

In the area type of sanitary landfill, refuse is placed on the surface of the soil in successive layers. The limitations caused by soil texture, depth to bedrock, and stone content do not apply to this type of landfill. Soil wetness, however, may be a limitation because of difficulty in operating equipment.

Daily cover for sanitary landfills should be soil that is easy to excavate and spread over the compacted fill during both wet and dry weather. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

In addition to these features, the soils selected for final cover of landfills should be suitable for growing plants. In comparison with other horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas, such as slope, erodibility, and potential for plant growth.

Construction Materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 9 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet, and described as the survey is made.

Roadfill is soil material used in embankments for roads. The ratings reflect the ease of excavating and working the material and the expected performance of the material after it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about soil properties that determine such performance is given in the descriptions of soil series.

The ratings apply to the soil profile between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within the profile. The estimated engineering properties in table 13 provide more specific information about the nature of each horizon that can help determine its suitability for road fill.

Soils rated *good* have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as high shrink-swell potential, high potential frost action, steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*, regardless of the quality of the suitable material.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 9 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 13.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to sustain the growth of plants. Also considered is the damage that would result to the area from which the topsoil is taken.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones, are low in content of gravel and other coarse fragments, and have gentle slopes. They are low in soluble salts, which can limit plant growth. They are naturally fertile or respond well to fertilization. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils, very firm clayey soils, soils that have suitable layers less than 8 inches thick, soils that have a large amount of gravel, stones, or soluble salt, steep soils, and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter a surface horizon is much preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter. Consequently, careful preservation and use of material from these horizons is desirable.

Water Management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 10 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitation are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the rated use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for this use have low seepage potential, which is determined by the permeability and depth over fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and is of favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

An *aquifer-fed excavated pond* is a body of water created by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 10 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability, texture, structure, depth to claypan or other layers that influence rate of water movement, depth to the water table, slope, stability of ditchbanks, susceptibility to flooding, and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments, or a combination of channels and ridges, constructed across a slope to intercept runoff and allow the water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity of slope and steepness, depth to bedrock or other unfavorable material, permeability, ease of establishing vegetation, and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff at nonerosive velocities to outlets. Features that affect the use of soils for waterways are slope, permeability, erodibility, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for camp areas, picnic areas, playgrounds, and paths and trails. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreational use by the duration of flooding and the season when it occurs. Onsite assessment of height, duration, and frequency of flooding is essential in planning recreational facilities.

In table 11 the limitations of soils are rated as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by additional information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 8, and interpretations for dwellings without basements and for local roads and streets, given in table 7.

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

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and not wet nor subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over rock should be sufficient to allow necessary grading.

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

Wildlife Habitat

By J. PHILLIP EDWARDS, biologist, Soil Conservation Service.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the development of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, inadequate, or inaccessible, wildlife will either be scarce or will not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by properly managing the existing plant cover, and by fostering the natural establishment of desirable plants.

In table 12 the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in—

1. Planning the use of parks, wildlife refuges, nature study areas, and other developments for wildlife.
2. Selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat.
3. Determining the intensity of management needed for each element of the habitat.
4. Determining areas that are suitable for acquisition to manage for wildlife.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderate intensity of management and fairly frequent attention are required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and requires intensive effort. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

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

Grain and seed crops are seed-producing annuals used by wildlife. Examples are corn, sorghum, wheat, oats, barley, millet, buckwheat, cowpeas, soybeans, and sunflowers. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Examples are fescue, bluegrass, lovegrass, switchgrass, bromegrass, timothy, orchardgrass, clover, alfalfa, trefoil, and crownvetch. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations.

Wild herbaceous plants are native or naturally established herbaceous grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, indiangrass, goldenrod, beggarweed, pokeweed, partridgepea, wheatgrass, fescue, and grama. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, persimmon, sassafras, sumac, hickory, black walnut, blackberry, grape, blueberry, bayberry, and briers. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated good are Russian-olive, autumn-olive, and crabapple. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness.

Coniferous plants are cone-bearing trees, shrubs, or ground cover that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Examples are pine and cedar. Major soil properties that affect the growth of coniferous plants are depth of the root zone, available water capacity, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Examples of wetland plants are smartweed, wild millet, rushes, sedges, reeds, wildrice, saltgrass, cordgrass, and cattail. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness.

Shallow water areas are bodies of surface water that have an average depth of less than 5 feet and are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control devices in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of croplands, pastures, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, killdeer, cottontail rabbit, red fox, and woodchuck.

Woodland habitat consists of hardwoods or conifers or a mixture of both, with associated grasses, legumes, and wild herbaceous plants. Examples of wildlife attracted to this habitat are wild turkey, woodcock, thrushes, vireos, woodpeckers, squirrels, grey fox, raccoon, and deer.

Wetland habitat consists of water-tolerant plants in open, marshy, or swampy shallow water areas. Examples of wildlife attracted to this habitat are ducks, geese, herons, shore birds, rails, kingfishers, muskrat, mink, and beaver.

Soil Properties

Extensive data about soil properties collected during the soil survey are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of samples selected from representative soil profiles in the field.

When he makes soil borings during field mapping, the soil scientist can identify several important soil properties. He notes the seasonal soil moisture condition, or the presence of free water and its depth in the profile. For each horizon, he notes the thickness of the soil and its color; the texture, or the amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or natural pattern of cracks and pores in the undisturbed soil; and the consistence of soil in-place under the existing soil moisture conditions. He records the root depth of existing plants, determines soil pH, or reaction, and identifies any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to characterize key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many of the soil series are available from nearby areas.

Based on summaries of available field and laboratory data, and listed in tables in this section, are estimated ranges in engineering properties and classifications and in physical and chemical properties for each major horizon of each soil in the survey area. Also, pertinent soil and water features, engineering test data, and data obtained from laboratory analyses, both physical and chemical, are presented.

Engineering Properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area. These estimates are presented as ranges in values most likely to exist in areas where the soil is mapped.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Information is presented for each of these contrasting horizons. Depth to the upper and lower boundaries of each horizon in a typical profile of each soil is indicated. More information about the range in depth and in properties of each horizon is given for each soil series in "Soil Series Descriptions and Morphology."

Texture is described in table 13 in standard terms used by the United States Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms used by USDA are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified soil classification system (*2*) and the American Association of State Highway and Transportation Officials soil classification system (AASHTO) (*1*). In table 13 soils in the survey area are classified according to both systems.

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, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example CL-ML.

The AASHTO system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified as one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified as A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or more for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 16. The estimated classification, without group index numbers, is given in table 13. Also in table 13 the percentage, by weight, of cobbles, or the rock fragments more than 3 inches in diameter, are estimated for each major horizon. These estimates are determined largely by observing volume percentage in the field and then converting it, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four standard sieves is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many soil borings made during the survey.

Liquid limit and plasticity index indicate the effect of water on the strength and consistency of soil. These indexes are used in both the Unified and the AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior.

Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

Physical and Chemical Properties

Table 14 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the representative profile of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships between the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for water movement in a vertical direction when the soil is saturated. Not considered in the estimates are lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in the planning and design of drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops and ornamental or other plants to be grown, in evaluating soil amendments for fertility and stabilization, and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others swelling was estimated on the basis of the kind of clay and on measurements of similar soils. Size of imposed loadings and the magnitude of changes in soil moisture content are also important factors that influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A *high* shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion, as used in table 14, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rating of soils for corrosivity to concrete is based mainly on the sulfate content, soil texture, and acidity. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Installations of steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the amount of erosion that will result from specific kinds of land treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or wind, that may occur without reducing crop production or environmental quality.

Soil and Water Features

Features that relate to runoff or infiltration of water, to flooding, and of each soil are indicated in table 15. This information is helpful in planning land uses and engineering projects that are likely to be affected by the amount of runoff from watersheds, by flooding and a seasonal high water table, and by the presence of bedrock in the upper 5 or 6 feet of the soil.

Hydrologic groups are used to estimate runoff after rainfall. Soil properties that influence the minimum rate of infiltration into the bare soil after prolonged wetting are depth to a water table, water intake rate and permeability after prolonged wetting, and depth to layers of slowly or very slowly permeable soil.

Flooding is rated in general terms that describe the frequency, duration, and period of the year when flooding is most likely. The ratings are based on evidences in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; absence of distinctive soil horizons that form in soils of the area that are not subject to flooding; local information about floodwater heights and the extent of flooding; and local knowledge that relates the unique landscape position of each soil to historic floods. Most soils in low positions on the landscape where flooding is likely to occur are classified as fluvents at the suborder level or as fluventic subgroups. See the section "Classification of the Soils."

The generalized description of flood hazards is of value in land use planning and provides a valid basis for land use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

A high water table is the highest level of a saturated zone more than 6 inches thick in soils for continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed during the course of the soil survey. Indicated are the depth to the seasonal high water table; the kind of water table, whether perched, artesian, or the upper part of the ground water table; and the months of the year that the high water commonly is present. Only those saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not to construct basements and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at depths of 5 to 6 feet or less. For many soils, limited range in depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and other observations during the soil mapping. The kind of bedrock and its relative hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200 horsepower tractor, but hard bedrock generally requires blasting.

Soil Test Data

Table 16 contains engineering test data for some of the major soil series in Guilford County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Moisture-density (or compaction) data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum moisture content* is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed *maximum dry density.* As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Tests to determine liquid limit and plastic limit measure the effect of water on the consistence of soil material, as has been explained for table 13.

Classification of the Soils

This section describes the soil series of the survey area, defines the current system of classifying soils, and classifies the soils of the area according to that system.

Soil Series and Morphology

On the following pages each soil series in the survey area is described in detail. The series descriptions are presented in alphabetic order by series name.

For each series, some facts about the soil and its parent material are presented first. Then a pedon, a small three dimensional area of soil typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*4*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series mapped in this survey area. In the last paragraph the series is compared with similar soil series and with nearby soil series. Phases, or mapping units, of each soil series are described in the section "Soil Maps for Detailed Planning."

Appling Series

The Appling series consists of well drained, moderately permeable soils that formed in residuum weathered from acid igneous and metamorphic rocks. These soils are on broad ridges and long, narrow side slopes. Slopes are 2 to 10 percent.

Typical pedon of Appling sandy loam, 2 to 6 percent slopes, 1.5 miles northeast of Monticello on North Carolina Highway 150, 1.3 miles north of North Carolina Highway 150 on State Road 2702, 250 feet west of State Road 2702 in a cultivated field:

Ap—0 to 8 inches; brown (10YR 5/3) sandy loam; weak medium granular structure; very friable; many fine roots; very slightly acid; abrupt smooth boundary.

B1—8 to 11 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable; common medium subangular blocky structure; friable; common medium roots; few medium pores; slightly acid; gradual smooth boundary.

B21t—11 to 19 inches; strong brown (7.5YR 5/6) sandy clay; few fine distinct yellowish red mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine and medium roots; few medium root channels; few medium pores; common thin discontinuous clay films on faces of peds; strongly acid; clear wavy boundary.

B22t—19 to 45 inches; strong brown (7.5YR 5/6) clay; common medium prominent red (2.5YR 4/8) and few fine prominent brownish yellow mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few medium roots and few medium root channels; few medium pores; thin discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B3—45 to 53 inches; mottled yellowish red (5YR 5/8) and yellowish brown (10YR 5/8) clay loam; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few root channels; few thin patchy clay films on vertical faces of peds; very strongly acid; gradual wavy boundary.

C—53 to 72 inches; mottled yellowish red and yellowish brown sandy loam; massive; friable; 90 percent saprolite; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock is more than 60 inches.

The A horizon is yellowish brown, brown, brownish yellow, and dark brown. The Ap horizon is chiefly sandy loam, but in a few places it is fine sandy loam.

The B1 horizon, if present, is strong brown or brownish yellow. The Bt horizon is yellowish red, reddish yellow, and strong brown clay, clay loam, and sandy clay. The B3 horizon is sandy clay loam, sandy clay, and clay loam. The B horizon is strongly acid or very strongly acid.

The C horizon is commonly red, yellow, strong brown, yellowish red, and yellowish brown saprolite that crushes to sandy clay loam or sandy loam.

Cecil Series

The Cecil series consists of well drained, moderately permeable soils that formed in residuum weathered from acid igneous and metamorphic rocks. These soils are on broad to very broad, smooth ridges and on long, narrow side slopes. Slopes are 2 to 15 percent.

Typical pedon of Cecil sandy loam, 2 to 6 percent slopes, 0.2 mile south of Colfax on the Bunker Hill Road, 110 feet west of Bunker Hill Road:

Ap—0 to 6 inches; brown (7.5YR 5/4) sandy loam; weak fine granular structure; very friable; few fine roots; few fine fragments of quartz; medium acid; clear smooth boundary.

B1—6 to 8 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots and root channels; few thin faint patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

B21t—8 to 34 inches; red (2.5YR 4/8) clay; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few fine root channels; few to common medium pores; few thin faint discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—34 to 45 inches; red (2.5YR 4/8) clay; weak medium subangular blocky structure; firm sticky and plastic; few medium root channels; few to common medium pores; few thin faint discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

B3—45 to 52 inches; red (2.5YR 4/8) clay loam; few medium prominent reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few thin faint patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—52 to 60 inches; red (2.5YR 4/8) loam; common medium prominent reddish yellow (7.5YR 6/6) mottles; massive; friable; common fine flakes of mica; 85 percent schist saprolite; very strongly acid; gradual wavy boundary.

C2—60 to 85 inches; variegated red and yellow loam; massive; very friable; common fine flakes of mica; 90 percent schist saprolite; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock is more than 60 inches.

The Ap horizon is red, yellowish red, reddish brown, or brown sandy loam or sandy clay loam.

The B1 horizon, if present, is yellowish red or red sandy clay loam or clay loam. The B2t horizon is clay or clay loam. The B3 horizon is sandy clay loam or clay loam. The B horizon is strongly acid or very strongly acid.

The C horizon is commonly variegated red and yellow loam or clay loam.

Chewacla Series

The Chewacla series consists of somewhat poorly drained, moderately permeable soils that formed in recent alluvium. These soils are in long, flat areas parallel to the major streams on the flood plains. Slopes are 0 to 2 percent.

Typical pedon of Chewacla sandy loam 3.5 miles northeast of Colfax on State Road 2016, 0.7 mile north of State Road 2016 on State Road 2063, 200 feet east of Reedy Fork Creek, and 200 feet north of woods:

Ap—0 to 9 inches; brown (7.5YR 5/4) sandy loam; weak medium granular structure; very friable; many fine roots; common fine flakes of mica; few fine quartz gravel; slightly acid; clear smooth boundary.

A12—9 to 12 inches; pale brown (10YR 6/3) silt loam; few fine distinct dark brown and many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine and few medium roots; few medium root channels; common fine flakes of mica; medium acid; clear smooth boundary.

B1—12 to 18 inches; brown (7.5YR 5/4) sandy loam; few fine distinct light brownish gray mottles; weak medium subangular blocky structure; very friable; few fine and medium roots; common fine flakes of mica; slightly acid; clear wavy boundary.

B21g—18 to 50 inches; light brownish gray (10YR 6/2) loam; many fine distinct strong brown mottles; weak medium subangular blocky structure; friable, slightly sticky; few medium roots and root channels; common fine flakes of mica; slightly acid; gradual wavy boundary.

B22g—50 to 58 inches; light brownish gray (10YR 6/2) silt loam; many fine distinct strong brown mottles; weak medium subangular blocky structure; friable, slightly sticky; few black mineral particles; few fine flakes of mica; medium acid; gradual wavy boundary.

B3g—58 to 70 inches; mottled light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; firm, sticky and plastic; many black mineral particles; few fine flakes of mica; slightly acid; gradual wavy boundary.

Cg—70 to 90 inches; dark bluish gray (5B 4/1) clay loam; many medium distinct strong brown (7.5YR 5/6) mottles; massive; firm, sticky and plastic; many black mineral particles; common fine flakes of mica; slightly acid.

The solum ranges from 36 to more than 70 inches in thickness. Depth to bedrock is more than 60 inches. Most horizons contain few to common flakes of mica.

The A horizon is pale brown, brown, and dark brown sandy loam or silt loam.

The B1 horizon is yellowish brown and brown sandy loam or loam. The B2 horizon is light brownish gray and gray silt loam, sandy clay loam, clay loam, or loam. The B3 horizon is light brownish gray, strong brown, or grayish brown clay loam or silty clay loam. The B horizon is slightly acid to strongly acid.

The C horizon is clay loam, silt loam, or loamy sand.

Congaree Series

The Congaree series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on long, narrow flood plains. Slopes are 0 to 2 percent.

Typical pedon of Congaree loam 1 mile north of Greensboro on U.S. Highway 220 at Horsepen Creek, 170 feet east of U.S. Highway 220 and 120 feet south of gas pipeline in forest:

A11—0 to 3 inches; dark brown (10YR 4/3) loam; weak medium granular structure; very friable; many fine roots; few fine flakes of mica; medium acid; clear smooth boundary.

A12—3 to 8 inches; brown (7.5YR 5/4) loam; massive; very friable; many fine roots and few medium roots; few fine flakes of mica and black mineral fragments; slightly acid; clear wavy boundary.

C1—8 to 23 inches; strong brown (7.5YR 5/6) sandy clay loam; many fine distinct pale brown mottles; massive; friable, slightly sticky and slightly plastic; few fine and medium roots; few medium root channels; few fine flakes of mica; many fine black mineral fragments; slightly acid; gradual wavy boundary.

C2—23 to 41 inches; strong brown (7.5YR 5/6) loam; many medium distinct pale brown (10YR 6/3) mottles; massive; friable, slightly sticky and slightly plastic; few medium roots and root channels; few fine flakes of mica; many fine black mineral fragments; slightly acid; gradual wavy boundary.

C3—41 to 49 inches; strong brown (7.5YR 5/6) loam; common medium distinct light brownish gray (10YR 6/2) and dark grayish brown (10YR 4/2) mottles; massive; friable, slightly sticky and slightly plastic; common fine flakes of mica; common medium black mineral fragments; slightly acid; gradual wavy boundary.

C4g—49 to 70 inches; light brownish gray (10YR 6/2) loam; few pockets of sandy clay; common medium prominent brownish yellow (10YR 6/6) mottles; massive; friable, sticky and slightly plastic; common fine flakes of mica; few fine black mineral fragments; slightly acid.

Depth to bedrock is more than 60 inches. Few to common fine flakes of mica occur throughout.

The A horizon is brown and dark brown loam, silt loam, or fine sandy loam.

The C horizon is dark brown, yellowish brown, dark yellowish brown, brown, light brownish gray, or strong brown loam, sandy loam, sandy clay loam, or loamy sand. The C horizon is slightly acid to strongly acid.

Coronaca Series

The Coronaca series consists of well drained, moderately permeable soils that formed in material weathered from hornblende gneiss, gabbro, and diorite. These soils are on broad, smooth interstream divides. Slopes are 2 to 10 percent.

Typical pedon of Coronaca clay loam, 2 to 6 percent slopes, 4.5 miles south of Whitsett on North Carolina Highway 61 to junction of North Carolina Highway 61 and State Route 3108, 1 mile northeast on State Route 3108 to State Route 3110; 0.5 mile south on State Route 3110, and 200 yards west of road in cultivated field:

Ap—0 to 8 inches; dark reddish brown (2.5YR 3/4) clay loam; moderate medium granular structure; friable; common fine roots; few medium pores; neutral; abrupt smooth boundary.

B21t—8 to 30 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common fine pores; common thin distinct discontinuous clay films on faces of peds; few dark mineral stains; slightly acid; gradual wavy boundary.

B22t—30 to 52 inches; dark red (2.5YR 3/6) clay; few fine prominent reddish yellow mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few medium roots; few fine pores; common thin distinct discontinuous clay films on faces of peds; few dark mineral stains; slightly acid; gradual wavy boundary.

B23t—52 to 71 inches; dark red (2.5YR 3/6) clay; common fine prominent reddish yellow mottles; weak medium subangular blocky structure; firm, sticky and plastic; few medium roots; few thin faint patchy clay films on faces of peds; few dark mineral stains; slightly acid; gradual wavy boundary.

B3—71 to 80 inches; red (2.5YR 4/6) clay loam; common medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few thin distinct discontinuous clay films on faces of peds; medium acid; gradual wavy boundary.

C—80 to 95 inches; red (2.5YR 5/8) silty clay loam; many medium prominent reddish yellow (7.5YR 6/8) mottles; massive; friable; 85 percent saprolite; medium acid.

The solum ranges from 60 to 100 inches or more in thickness. Depth to bedrock is more than 60 inches.

The Ap horizon is dark red or dark reddish brown clay loam or sandy clay loam.

The B2t horizon is dark red or red. The B3 horizon is red or dark red clay loam, clay, or silty clay loam. The B horizon is medium acid to neutral.

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

Enon Series

The Enon series consists of well drained, slowly permeable soils that formed in residuum weathered from dark colored rocks such as diorite, gabbro, hornblende schist, or mixed acidic and basic rocks. These soils are on broad, smooth interstream divides and long, narrow side slopes. Slopes are 2 to 15 percent.

Typical pedon of Enon fine sandy loam, 2 to 6 percent slopes, 1 mile southwest of Greensboro on U.S. Highway 29-70 to State Road 1662, 25 feet north of State Road 1662, and 450 feet east of State Road 1387:

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

A2—3 to 8 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots and root channels; few medium black concretions; medium acid; clear wavy boundary.

B1—8 to 11 inches; light olive brown (2.5Y 5/4) sandy clay loam; weak medium subangular blocky structure; friable, sticky and plastic; few fine roots and root channels; few thin faint patchy clay films on faces of peds; slightly acid; gradual wavy boundary.

B21t—11 to 21 inches; yellowish brown (10YR 5/8) clay; moderate medium prismatic structure that parts to moderate medium angular blocky structure; firm, sticky and plastic; few fine and medium roots between peds; few fine pores and root channels; common thick distinct discontinuous clay films on faces of peds; common fine and medium black concretions; slightly acid; gradual wavy boundary.

B22t—21 to 33 inches; yellowish brown (10YR 5/8) clay; moderate medium angular blocky structure; firm, very sticky and plastic; few fine roots and pores; common thick distinct discontinuous clay films on faces of peds; many medium black concretions; few medium gravel; neutral; gradual wavy boundary.

C—33 to 75 inches; mottled brownish yellow (10YR 6/8), black (10YR 2/1), and dark greenish gray (5GY 4/1) loam; massive; friable; 90 percent saprolite; neutral.

The solum ranges from 20 to 44 inches in thickness. Depth to bedrock is more than 60 inches.

The Ap or A1 horizon is dark brown, grayish brown, dark grayish brown, yellowish brown, brown, and light olive brown fine sandy loam, loam, and clay loam.

The B1 horizon, is light olive brown or yellowish brown. The B2t horizon is light olive brown, light yellowish brown, yellowish brown, or strong brown clay or clay loam. The B3 horizon, if present, is brownish yellow, strong brown, reddish yellow, yellowish brown, or light olive brown sandy clay loam, silty clay loam, or clay loam. The B horizon is medium acid to neutral.

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

Helena Series

The Helena series consists of moderately well drained, slowly permeable soils that formed in a mixture of material weathered from acidic and basic crystalline rocks such as aplitic granite or granite gneiss that is cut by dikes of gabbro and diorite. These soils are on long, narrow side slopes. Slopes are 0 to 10 percent.

Typical pedon of Helena sandy loam, 0 to 6 percent slopes, in an area of Helena-Sedgefield sandy loams, 0 to 6 percent slopes, 2 miles south of Kimesville on State Road 3349, 80 feet west of State Road 3349, 40 feet southwest of power pole:

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

B21t—7 to 16 inches; brownish yellow (10YR 6/6) clay; few medium distinct yellowish red (5YR 5/8) mottles; moderate medium angular blocky structure; very firm, sticky and plastic; few fine and medium roots and few medium root channels; common thin distinct discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22t—16 to 32 inches; reddish yellow (7.5YR 6/6) clay; common fine distinct light gray mottles, few medium distinct very pale brown (10YR 8/4) mottles, and few fine distinct reddish yellow mottles; moderate medium angular blocky structure; very firm, sticky and plastic; few medium roots and root channels; common thin distinct discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3—32 to 38 inches; mottled brownish yellow (10YR 6/8), strong brown (7.5YR 5/8), and light gray (10YR 7/2) clay loam; weak medium angular blocky structure; firm, sticky and plastic; few medium root channels; few thin faint patchy clay films on faces of peds; few fine uncoated sand grains; very strongly acid; gradual wavy boundary.

C—38 to 80 inches; mottled strong brown (7.5YR 5/8) and white (10YR 8/1) clay loam; massive; firm; 90 percent saprolite; very strongly acid.

The solum ranges from is 20 to 60 inches in thickness. Depth to bedrock is greater than 48 inches.

The A horizon is pale brown, dark brown, light brownish gray, or grayish brown sandy loam or loamy sand.

The B1 horizon, if present, is yellowish brown sandy clay loam. The B2t horizon is strong brown, reddish yellow, yellowish brown, or brownish yellow sandy clay loam or clay loam. The B horizon is strongly acid to very strongly acid.

The C horizon is commonly variegated yellowish red, strong brown, yellow, white, or gray sandy clay loam or clay loam.

Iredell Series

The Iredell series consists of moderately well drained, slowly permeable soils that formed in residuum weathered from diorite, gabbro schist, and other rocks high in content of ferromagnesian minerals. These soils are on flats, in concave areas, and around the heads of intermittent drainageways. Slopes are 0 to 4 percent.

Typical pedon of Iredell fine sandy loam, 0 to 4 percent slopes, about 1 mile east of Pleasant Garden on State Road 3418 to junction with State Road 3412, about 3/4 mile southeast on State Road 3412 to farm road, and 500 yards south of highway in pasture:

Ap—0 to 7 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium subangular blocky structure parting to moderate medium granular structure; very friable; many fine and medium roots; few small fragments of quartz; few small concretions; neutral; clear wavy boundary.

B1—7 to 9 inches; yellowish brown (10YR 5/8) sandy clay loam; small pockets of light brownish gray (10YR 6/2) fine sandy loam mixed throughout; weak medium subangular blocky structure; friable; common medium roots; few medium concretions; few small fragments of quartz; medium acid; clear smooth boundary.

B2t—9 to 27 inches; light olive brown (2.5YR 5/4) clay; moderate medium and coarse angular blocky structure; very firm, very sticky and very plastic; common thin distinct discontinuous clay films on faces of peds; common fine and medium roots; few very fine pale yellow fragments; slightly acid; gradual wavy boundary.

B3—27 to 32 inches; mottled olive brown (2.5YR 4/4), olive (5Y 4/3), and olive gray (5Y 4/2) clay loam; moderate medium angular blocky structure grading to massive; firm, sticky and plastic; few medium roots; common thin distinct discontinuous clay films on faces of peds; common very fine pale yellow fragments; neutral; gradual wavy boundary.

C1—32 to 41 inches; mottled yellow (2.5Y 7/6), olive brown (2.5Y 4/4), and olive gray (5Y 4/2) sandy clay loam; few pockets of gray clay loam; massive; friable; 85 percent saprolite; mildly alkaline; gradual wavy boundary.

C2—41 to 60 inches; mottled black, olive, olive gray, and yellow clay loam; massive; friable; 90 percent saprolite; mildly alkaline.

R—60 inches; hard dark colored diorite.

The solum ranges from 20 to 36 inches in thickness. Depth to bedrock is 40 to 72 inches.

The Ap horizon is dark brown, grayish brown, or dark grayish brown fine sandy loam or sandy loam.

The B1 horizon is yellowish brown or light olive brown. The B2t horizon is light olive brown, olive brown, or yellowish brown. The B3 horizon is pale olive, olive brown, light olive brown, or brownish yellow clay loam or sandy clay loam. The B horizon is medium acid to neutral.

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

Madison Series

The Madison series consists of well drained, moderately permeable soils that formed in residuum weathered from acid micaceous metamorphic rock. These soils are on fairly narrow ridges and long, fairly narrow side slopes. Slopes are 2 to 35 percent.

Typical pedon of Madison sandy loam, 6 to 10 percent slopes, 3 miles north of Regional Airport on North Carolina Highway 68, 3/4 mile west on State Road 2016, 0.5 mile north on State Road 2070, and 25 feet north of State Road 2016 in pine forest:

Ap—0 to 5 inches; reddish brown (5YR 4/4) sandy loam; weak medium granular structure; very friable; many fine roots; few fine flakes of mica; medium acid; abrupt smooth boundary.

B2t—5 to 29 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; firm, sticky and slightly plastic; few fine and medium roots and root channels; few thin faint patchy clay films on faces of peds; many fine flakes of mica; when dry the mica appears as reddish yellow (7.5YR 7/6) streaks; strongly acid; gradual irregular boundary.

B3—29 to 34 inches; red (2.5YR 4/8) clay loam; few fine distinct reddish yellow mottles; weak fine subangular blocky structure; friable; slightly sticky and slightly plastic; few fine and medium roots; few thin faint patchy clay films on faces of peds; many fine and medium flakes of mica; few fine fragments of weathered mica gneiss; strongly acid; gradual irregular boundary.

C1—34 to 58 inches; reddish yellow (5YR 6/8) sandy clay loam; few fine prominent dark gray mottles; massive; friable; many fine and medium flakes of mica; 85 percent mica gneiss saprolite; strongly acid; gradual irregular boundary.

C2—58 to 80 inches; reddish yellow (5YR 6/8) sandy loam; common fine prominent black mottles; massive; very friable; 90 percent mica gneiss saprolite; strongly acid.

The solum ranges from 20 to 40 inches in thickness. Depth to bedrock is more than 60 inches. Few to many flakes of mica occur in the upper part of the profile, and many occur in the lower parts. Mica schist and mica gneiss fragments are on the surface and throughout the profile in places.

The A horizon is reddish brown, dark brown, brown, yellowish red, or yellowish brown sandy loam, fine sandy loam, or clay loam.

The B1 horizon, if present, is yellowish red sandy clay loam. The B2t horizon is red or light red clay or clay loam. The B3 horizon is red or yellowish red clay loam or sandy clay loam. The B horizon is strongly acid to very strongly acid.

The C horizon is red, yellowish red, or reddish yellow sandy clay loam, sandy loam, or loam.

Mecklenburg Series

The Mecklenburg series consists of well drained, slowly permeable soils that formed in material weathered from dark colored basic rocks such as diorite, gabbro, and hornblende schist. These soils are on broad, smooth interstream divides and long, narrow side slopes. Slopes are 2 to 10 percent.

Typical pedon of Mecklenburg sandy clay loam, 2 to 6 percent slopes, eroded, 1 mile southwest of Greensboro in the Sedgefield area, 0.5 mile east of High Point Road (U.S. Highways 29A and 70A), 360 feet east of woodland:

Ap—0 to 7 inches; reddish brown (5YR 4/4) sandy clay loam; weak medium granular structure; very friable; many fine roots; material from the B21t horizon; common small black concretions; few small pebbles; medium acid; clear smooth boundary.

B21t—7 to 16 inches; yellowish red (5YR 4/6) clay; few fine distinct reddish yellow mottles; moderate medium angular blocky structure; firm, sticky and plastic; few fine and medium roots and root channels; common thick distinct discontinuous clay films on faces of peds; common small black concretions; slightly acid; gradual wavy boundary.

B22t—16 to 33 inches; red (2.5YR 4/6) clay; common medium distinct brownish yellow (10YR 6/8) mottles; moderate medium angular blocky structure; firm, sticky and plastic; few medium roots; common thick distinct discontinuous clay films on faces of peds; few fine black concretions; slightly acid; gradual wavy boundary.

B3—33 to 38 inches; yellowish red (5YR 4/6) clay loam; many medium distinct brownish yellow (10YR 6/8) mottles; weak medium angular blocky structure; friable, slightly sticky and slightly plastic; few fine root channels; few thin faint patchy clay films on faces of peds; few fine black concretions; medium acid; gradual wavy boundary.

C—38 to 70 inches; mottled red (2.5YR 4/6) and brownish yellow (10YR 6/8) silty clay loam; massive; friable, slightly sticky and slightly plastic; few black concretions; medium acid.

The solum ranges from 20 to 40 inches in thickness. Depth to bedrock is 48 to 60 inches.

The Ap horizon is reddish brown, yellowish red, or brown.

The B2t horizon is red or yellowish red. The B3 horizon is yellowish red or reddish yellow clay loam or sandy clay loam. The B horizon is medium acid or slightly acid.

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

Sedgefield Series

The Sedgefield series consists of moderately well drained and somewhat poorly drained, slowly permeable soils that formed in residuum weathered from mixed acidic and basic rocks. These soils are on the lower parts of the slopes and on broad, flat areas. Slopes are 0 to 6 percent.

Typical pedon of Sedgefield sandy loam, 0 to 6 percent slopes, 11 miles south of Greensboro to Sumner School, 1 mile south of Sumner School on State Road 1137, 25 feet west of highway, and 25 feet north of farm road in field:

Ap—0 to 8 inches; grayish brown (10YR 5/2) sandy loam; weak medium granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

A2—8 to 12 inches; pale yellow (2.5Y 7/4) loamy sand; weak medium granular structure; very friable; few fine roots; medium acid; clear wavy boundary.

B1—12 to 16 inches; light yellowish brown (2.5Y 6/4) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; common fine and medium pores; common pale yellow (2.5Y 7/4) tongues of material from the A2 horizon extend through this horizon and make up about 15 percent of the horizon; slightly acid; clear wavy boundary.

B2t—16 to 28 inches; yellowish brown (10YR 5/6) clay; common coarse prominent light gray (2.5Y 7/2) mottles and few medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure that parts to moderate medium angular blocky structure; few pale yellow (2.5Y 7/4) tongues of material from the A2 horizon extend 1 to 5 centimeters into this horizon; few to common fingers of material from the A2 horizon 1 to 2 millimeters wide extend to about 10 centimeters into this horizon, fingers and tongues of material from the A2 horizon make up about 1 to 4 percent of this horizon; very firm, sticky and plastic; common fine roots mostly between primary structural aggregates; common fine and medium pores; common thin distinct discontinuous clay films on faces of primary and secondary peds; medium acid; clear wavy boundary.

B3—28 to 33 inches; mottled strong brown (7.5YR 5/8), light gray (2.5Y 7/2), and light yellowish brown (2.5Y 6/4) sandy loam and sandy clay loam; weak medium angular blocky structure; friable, sticky; few fine roots; few thin faint patchy clay films on faces of peds; few medium quartz gravel; slightly acid; gradual wavy boundary.

C1—33 to 38 inches; yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), and very pale brown (10YR 7/3) coarse sandy loam; massive; friable; 85 percent saprolite; neutral.

C2—38 to 48 inches; light olive brown (2.5Y 5/4) and grayish brown (2.5Y 5/2) loam; massive; friable; 85 percent saprolite; neutral.

Cr—48 to 60 inches; moderately hard greenish gray saprolite that is streaked with black and yellow.

The solum ranges from 20 to 40 inches in thickness. Depth to bedrock is more than 48 inches.

The Ap horizon is grayish brown, dark grayish brown, or brown. The A2 horizon, if present, is pale yellow, light yellowish brown, or pale brown. The A horizon is sandy loam, fine sandy loam, or loamy sand. It is 0 to 15 percent coarse fragments. Reaction is strongly acid to slightly acid.

The B1 horizon, if present, is light yellowish brown or yellowish brown sandy loam or sandy clay loam. The B2t horizon is light yellowish brown, brownish yellow, yellowish brown, or light olive brown clay loam, sandy clay, or clay. The B3 horizon is sandy loam, sandy clay loam, or clay loam. The Bt horizon is strongly acid to slightly acid, and the B2 horizon is medium acid to neutral.

The C horizon is yellowish brown, light yellowish brown, very pale brown, light olive brown, or grayish brown coarse sandy loam or loam. Reaction is medium acid to neutral.

Vance Series

The Vance series consists of well drained, slowly permeable soils that formed in residuum weathered from acid crystalline rocks, primarily aplitic granite. These soils are on narrow ridges and long narrow side slopes. Slopes are 2 to 15 percent.

Typical pedon of Vance sandy loam, 2 to 6 percent slopes, 1 1/4 miles east of McLeansville on State Road 2755, 100 feet southeast of junction of State Road 2755 and State Road 2814, and 50 feet southeast of telephone pole:

Ap—0 to 6 inches; brown (10YR 5/3) sandy loam; weak medium granular structure; very friable; many fine roots; many fine pores; neutral; abrupt smooth boundary.

B21t—6 to 18 inches; strong brown (7.5YR 5/8) clay; few fine distinct red mottles; moderate medium angular blocky structure; very firm, sticky and plastic; few medium roots and root channels; few fine pores; many fine and medium white (10YR 8/1) weathered fragments of rock; common thick discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22t—18 to 35 inches; strong brown (7.5YR 5/8) clay; few fine distinct red and light yellowish brown mottles; moderate medium angular blocky structure; very firm, sticky and plastic; few fine roots and root channels; few fine pores; many fine and medium white (10YR 8/1) weathered fragments of rock; common thick discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3t—35 to 40 inches; brownish yellow (10YR 6/8) clay loam; few fine distinct red mottles; weak medium angular blocky structure; firm, sticky and plastic; few thin faint patchy clay films on faces of peds; many medium white (10YR 8/1) weathered fragments of rock; very strongly acid; gradual wavy boundary.

C1—40 to 50 inches; mottled brownish yellow (10YR 6/8), white (10YR 8/1), and red (2.5YR 4/8) clay loam; massive; firm, slightly sticky and slightly plastic; common medium white weathered fragments of rock; 85 percent saprolite; very strongly acid; gradual wavy boundary.

C2—50 to 72 inches; mottled brownish yellow (10YR 6/8), red (2.5YR 4/8), and white (10YR 8/1) clay loam; massive; friable; 90 percent saprolite; very strongly acid.

The solum ranges from 24 to 48 inches in thickness. Depth to bedrock is more than 60 inches.

The Ap horizon is brown or yellowish brown sandy loam or fine sandy loam.

The B2t horizon is yellowish red, strong brown, or yellowish brown clay or sandy clay. The B3 horizon is yellowish red, strong brown, or brownish yellow clay loam or sandy clay loam. The B horizon is strongly acid or very strongly acid.

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

Wehadkee Series

The Wehadkee series consists of poorly drained, moderately permeable soils that formed in alluvium derived from schist, gneiss, granite, phyllite, and other metamorphic and igneous rocks. These soils are on stream flood plains. Slopes are 0 to 1 percent.

Typical pedon of Wehadkee silt loam approximately 3.5 miles southwest of Kimesville on State Road 3343, 200 feet north of State Road 3343, and 155 feet west of Stinking Quarter Creek:

Ap—0 to 8 inches; brown (10YR 5/3) silt loam; few fine distinct yellowish red mottles; weak medium granular structure; very friable; many fine roots; few fine flakes of mica; medium acid; clear wavy boundary.

B21g—8 to 12 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish red mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and few medium roots; few fine flakes of mica; medium acid; clear wavy boundary.

B22g—12 to 16 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct dark brown mottles; weak medium subangular blocky structure; friable; few medium roots and root channels; few fine flakes of mica; medium acid; gradual wavy boundary.

B23g—16 to 20 inches; gray (10YR 6/10) silty clay loam; few fine distinct dark brown mottles; weak medium subangular blocky structure; friable, slightly sticky slightly plastic; few fine flakes of mica; medium acid; gradual wavy boundary.

B24g—20 to 48 inches; gray (10YR 5/1) loam; few fine distinct brownish yellow mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; slightly acid; gradual wavy boundary.

Cg—48 to 80 inches; gray (10YR 6/1) loam; few fine distinct yellowish brown mottles; massive; friable; common fine and medium white soft fragments; few fine flakes of mica; slightly acid.

The solum ranges from 30 to 60 inches in thickness. Depth to bedrock is more than 60 inches. Few to many fine flakes of mica occur throughout the profile.

The A horizon is gray, dark grayish brown, grayish brown, or brown silt loam or fine sandy loam.

The B2 horizon is gray, grayish brown, or light brownish gray loam, silt loam, sandy clay loam, or silty clay loam. The B horizon is medium acid to neutral.

The C horizon is sandy loam or sand, commonly mixed with gravel.

Wilkes Series

The Wilkes series consists of well drained, moderately slowly permeable soils that formed in residuum weathered from diorite, hornblende schist, and related rocks that are moderately high in content of ferromagnesian minerals or that formed in a mixture of acidic and basic rocks. These soils are on side slopes that generally border drainageways. Slopes are 6 to 45 percent.

Typical pedon of Wilkes sandy loam, 6 to 10 percent slopes, approximately 3 miles east of High Point on State Road 1141, between Register Creek and Deep River, and 30 feet east of State Road 1141 and 30 feet southeast of power pole:

Ap—0 to 7 inches; dark brown (10YR 4/3) sandy loam; weak medium granular structure; very friable; many fine roots; few fine pores; common small gravel; slightly acid; clear smooth boundary.

B1—7 to 11 inches; brownish yellow (10YR 6/6) sandy loam; few small pockets of sandy clay loam; few fine distinct strong brown mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few fine pores; common small gravel; medium acid; clear wavy boundary.

B2t—11 to 18 inches; yellowish brown (10YR 5/6) clay loam; moderate medium angular blocky structure; firm, sticky and plastic; few medium roots and root channels; few fine pores; common thin distinct discontinuous clay films on faces of peds; medium acid; clear wavy boundary.

C1—18 to 26 inches; yellowish brown (10YR 5/8) clay loam; massive; friable; many fine and medium white and black weathered fragments of rock; 85 percent saprolite; medium acid; clear wavy boundary.

C2—26 to 52 inches; yellowish brown (10YR 5/6) loamy coarse sand; massive; very friable; 90 percent saprolite; slightly acid.

The solum ranges from 10 to 20 inches in thickness. Depth to bedrock is 40 to 80 inches.

The A horizon is dark brown, yellowish brown, dark grayish brown, pale brown, and grayish brown sandy loam or loam.

The B1 horizon, if present, is strong brown or brownish yellow sandy loam, sandy clay loam, or loam. The B2t horizon is brownish yellow, light olive brown, or yellowish brown clay, clay loam, or sandy clay loam. The B3 horizon, if present, is olive brown or strong brown sandy clay loam or clay loam. Reaction is medium acid to neutral.

The C horizon is sandy loam or coarse loamy sand.

Classification

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to the latest literature available (*5, 6*).

The system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the bases for classification are the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 17 the soils of the survey area are classified according to the system. Classes of the system are briefly discussed in the following paragraphs.

ORDER. Ten soil orders are recognized. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and that are important to plant growth or that were selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid climate, 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 expression of pedogenic horizons; soil moisture and temperature regimes; and base status. The name of a great group ends with the name of a suborder. A prefix added to the name suggests something about the properties of the soil. An example is Hapludult (*Hapl*, meaning simple horizons, plus *udult*, the suborder).

SUBGROUP. Each great group is divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades that have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. The names of subgroups are derived by placing one or more adjectives before the name of the great group. The adjective *Typic* is used for the subgroup that is thought to typify the great group. An example is Typic Hapludult.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is clayey, kaolinitic, thermic Typic Hapludults.

SERIES. The series consists of a group of soils that are formed from a particular kind of parent material and have horizons that, except for texture of the surface soil, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Formation of the Soils

This section discusses the factors of soil formation, relates them to the formation of soils in the survey area, and explains the processes of soil formation.

Soil is the product of soil-forming processes acting on material altered or deposited by geologic forces. The factors that contribute to the differences among soils are climate, plant and animal life, parent material, relief, and time. Climate and plant and animal life, particularly vegetation, are the active forces in soil formation. Their effect on parent material is modified by topography and by the length of time the parent material has been in place. The relative importance of each factor differs from place to place. In some places one factor dominates the formation of a soil and determines most of its properties, but normally the interaction of all factors determines the kind of soil that develops in any given place.

Climate

Climate, as a factor of soil formation, affects the physical, chemical, and biological relationships in the soil, primarily through the influence of precipitation and temperature. Temperature and rainfall exert much influence on the rates of rock weathering and organic matter decomposition. The amount of leaching in a soil is also related to the amount of precipitation and its movement through the soil. The effects of climate also control the kinds of plants and animals that can thrive in a region. Temperature influences the kind and growth of organisms and the speed of chemical reactions and physical changes in the soil.

Guilford County has a warm, humid climate and is located on a plateau that ranges in elevation from 600 feet to nearly 1,000 feet. Mountains to the west of the county modify both temperature and precipitation; therefore, changes are gradual. The climate of Guilford County favors rapid chemical processes resulting in the decomposition of organic matter and weathering of rock. The temperature and rainfall especially favor intense leaching and oxidation.

The effects of climate are reflected in the soils of Guilford County. Mild temperature throughout the year and abundant rainfall result in depletion of organic matter and considerable leaching of soluble bases from most soils leaving them acid. Differences in climate within the county are small and probably have not caused major local differences in soils. The most important effect that climate has had on the formation of Guilford County soils is the alteration of parent material through changes in temperature and the amount of precipitation and influences on the plant and animal life.

Plant and Animal Life

Plants and animals are indispensable in soil development and exert their greatest influence in the formation and differentiation of horizons. The types and amount of organisms in and on the soil are determined in part by climate and in part by the nature of soil materials, relief, and age of the soil.

The plants and animals that live on a soil are its primary source of organic material. Plants largely determine the kinds and amounts of organic matter that go into a soil under normal conditions and the way in which the organic matter is added. Animals convert complex compounds into simpler forms and add their own bodies to the organic matter.

Besides adding organic matter, organisms modify certain chemical and physical properties in the soil. In Guilford County most of the organic material accumulates on the surface and is acted on by micro-organisms, fungi, earthworms, and other forms of life and by direct chemical reaction. The material is then mixed with the uppermost part of the mineral portion of the soil by the activities of earthworms and other small invertebrates. Rodents have had little effect on the formation of soils in the county. Bacteria, fungi, and other micro-organisms aid in the weathering of rocks and in the decomposition of organic matter.

Plants also play an important role in changes of base status and in the leaching process of a soil through the nutrient cycle. Under the native forest of this county, not enough bases are brought to the surface by plants to counteract the effects of leaching.

In general, the soils of Guilford County developed under a hardwood forest. These trees take up elements from the subsoil and add organic matter to the surface by depositing leaves, roots, twigs, and eventually the whole plant. Here the material is acted on by organisms and undergoes chemical reaction. Organic material decomposes rather rapidly in this county because of the moderate temperature, the abundant moisture supply, and the character of the organic material. Organic matter decays rapidly in the well drained soils, such as Cecil soils, with little accumulation in the surface layer. Decomposition is slower in the wetter soils, such as Wehadkee soils, and there is more accumulation.

Relief

Relief, or topography, affects soil formation by causing differences in free drainage, surface runoff, soil temperature, and the extent of geologic erosion. In Guilford County, the relief is largely determined by the kind of bedrock underlying the soils, by the geology of the area and the amount of landscape dissection by streams, and by slope retreat. Guilford County is located on a plateau that ranges in elevation from 600 feet to nearly 1,000 feet.

Percolation of water through the profile is affected by relief. Water movement through the profile is important in soil development because it aids chemical reactions and is necessary for leaching. Leaching is reflected in most soils of the county by the low amount of bases and the high acidity.

The soils of the county have slopes of 0 to 45 percent. Soils on the uplands that have slopes of less than 10 percent generally have a deeper and better defined profile than steeper soils. Well developed soils of this group include members of the Cecil, Appling, and Coronaca series. Relief is also important in soil formation because it may affect the depth of soils. From some soils that have slopes of 15 percent, geologic erosion removes soil material almost as fast as the soil develops. As a result, most strongly sloping to steep soils have a thinner solum. Wilkes and Madison soils occupy such areas and are not so deep or so well developed as soils that have less slope.

The drainage of a sequence of soils that developed in similar parent material can also be affected by relief. The drainage may be affected by a high water table, which is usually related to nearly level relief. As an example, Mecklenburg soils on divides and side slopes are well drained, Iredell soils on flats are moderately well drained, and Wehadkee soils on flood plains are poorly drained. These soils formed in similar parent material but have different characteristics because of their different topographic position and internal drainage.

Time

The length of time that soil materials have been exposed to the soil-forming processes accounts for some differences in soils. The length of time required for a soil profile to develop depends on the other factors of soil formation. Less time is required for a profile to develop in coarse-textured material than in similar but finer textured material, even though the environment is the same for both. Less time is required for profile development in a warm, humid area where there is a dense plant cover than in a cold, dry area where the plant cover is sparse.

The age of soils varies considerably, and the length of time that a soil has been developing is generally reflected in the profile. Old soils generally have better defined horizons than young soils. In Guilford County, the effect of time as a soil-forming factor is more apparent in the older soils, such as Cecil and Appling soils, which occupy the broader sections of the uplands. These soils have more distinct horizons than Congaree soils, for instance, which formed in alluvium and are still acquiring new material from the uplands. Such soils on flood plains have not been in place long enough to develop distinct horizons. Other soils in the county are considered young because of their topographic position. Wilkes soils are not so well developed as other soils because they are steep and geologic erosion keeps pace with soil development. This also accounts for their being shallower over bedrock.

Parent Materials

Parent material is the unconsolidated mass in which a soil develops. The character of this material affects the kind of profile that forms and the degree of development of the profile. In some places, the parent material is the dominant factor in soil development. In most places, however, the degree of profile development depends on a combination or interaction of parent material with some of the other factors. Parent material is largely responsible for the chemical and mineralogical composition of soils and is one of the most important factors in causing major differences among the soils of Guilford County. Major differences among parent materials, such as differences in texture, can be observed in the field. Less distinct differences, such as differences in mineralogical composition, can be determined only by careful laboratory analysis.

The two broad classes of parent materials in Guilford County are residual materials and alluvium. Residual material is related to the underlying rock, from which it has weathered. Transported materials are related directly to the soils or rocks from which they were removed.

Guilford County is underlain by granite, diorite, slate, schist, and gneiss (*3*). Granite makes up about 48 percent of the underlying rock. Gneiss is found in the northwestern corner of the county and makes up about 15 percent. Schist underlies about 31 percent of the county. Minor amounts of diorite and slate make up the remaining underlying bedrock.

In Guilford County the parent materials of the residual soils derived primarily from acid and basic igneous and metamorphic rocks. The light-colored, acid rocks include granite, gneiss, and schist. Cecil and Appling soils formed in material derived from acid igneous and metamorphic rocks, as reflected in the low pH of these soils. In addition, the characteristics of the parent material have influenced the texture of these soils and of other more friable, coarser textured soils of this group. The dark-colored, basic rocks include diorite and gabbro. These rocks are the parent material of Iredell, Mecklenburg, and other soils of the county that are more plastic and finer in texture. The basic influence of the parent materials is reflected in the reaction of these soils: they are less acid than others in the county. A number of soils of Guilford County formed in mixed acid and basic rocks; for example, Coronaca, Helena, Sedgefield, and Wilkes soils. Greenstone schist makes up a large part of the mixed rocks. At various locations the mixture consists of weathered granitic rocks and dikes of basic, dark-colored rocks that intrude into the granite. These dikes vary considerably in width, and their sudden outcropping results in abrupt changes in kinds of soil. Many of the soils in such areas are mapped in the Helena-Sedgefield complex.

Transported parent materials are primarily alluvium and local alluvium, both of which may be young or old. Young alluvium has been deposited recently and consists of material that has been changed very little by the soil-forming processes. Old alluvium consists of material that has been deposited long enough for the soil-forming processes to change it in varying degrees. Local alluvium consists of soil material that has been transported short distances by water and has been deposited along small drainageways, in depressions, and at the foot of slopes. The principal soils that formed in alluvium along streams on flood plains are in the Congaree, Chewacla, and Wehadkee series.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping 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	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (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.

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.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

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.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying

C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hummocky. Refers to a landscape of hillocks, separated by low sags, having sharply rounded tops and steep sides. Hummocky relief resembles rolling or undulating relief, but the tops of ridges are narrower and the sides are shorter and less even.

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.

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. Inadequate strength for supporting loads.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

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).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

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.

Permafrost. Layers of soil, or even bedrock, occuring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characterisitc that affects management. These differencees are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Formation by moving water of subsurface tunnels or pipelike cavities in 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 a semisolid to a plastic state.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Soil scientists regard as soil only the part of the regolith that is modified by organisms and other soil-building forces. Most engineers describe the whole regolith, even to a great depth, as "soil."

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground 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.

Saprolite (geology). Soft, earthy, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous and metamorphic rock. In soil survey, the term saprolite is applied to any unconsolidated residual material underlying the soil and grading to hard bedrock below.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

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.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unstaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

[Recorded in the period 1951-74 at Greensboro, N.C.]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	48.3	27.8	38.1	73	5	12	3.25	2.02	4.35	7	4.2
February---	51.1	29.3	40.2	72	8	11	3.63	2.52	4.65	8	2.2
March------	59.1	36.1	47.6	83	17	96	3.76	2.47	4.92	8	2.3
April------	70.5	45.8	58.2	89	28	257	3.31	2.34	4.19	7	0
May--------	78.1	54.9	66.5	93	35	512	3.27	1.62	4.61	7	0
June-------	84.5	62.9	73.7	98	48	711	4.21	2.21	5.83	7	0
July-------	87.4	66.8	77.2	98	54	843	4.00	2.25	5.43	8	0
August-----	85.9	66.1	76.0	96	52	806	4.36	2.41	5.94	8	0
September--	80.5	58.9	69.7	94	41	591	3.11	1.08	4.72	5	0
October----	70.6	46.9	58.8	88	27	280	3.06	.96	4.73	5	0
November---	59.8	36.8	48.3	80	18	43	2.53	1.24	3.57	6	.3
December---	50.4	30.1	40.3	73	7	28	3.50	1.79	4.88	6	1.3
Year-----	68.9	46.9	57.9	99	4	4,190	41.99	37.80	46.03	82	10.3

[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 (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-74 at Greensboro, N.C.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 3	April 11	April 22
2 years in 10 later than--	March 28	April 5	April 18
5 years in 10 later than--	March 15	March 26	April 11
First freezing temperature in fall:			
1 year in 10 earlier than--	November 7	October 23	October 15
2 years in 10 earlier than--	November 11	October 28	October 19
5 years in 10 earlier than--	November 19	November 6	October 26

TABLE 3.--GROWING SEASON LENGTH

[Recorded in the period 1951-74 at Greensboro, N.C.]

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	226	204	184
8 years in 10	234	211	189
5 years in 10	248	224	198
2 years in 10	263	237	207
1 year in 10	270	244	211

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
ApB	Appling sandy loam, 2 to 6 percent slopes	21,232	5.1
ApC	Appling sandy loam, 6 to 10 percent slopes	9,125	2.2
CcB	Cecil sandy loam, 2 to 6 percent slopes	31,469	7.6
CcC	Cecil sandy loam, 6 to 10 percent slopes	9,149	2.2
CcD	Cecil sandy loam, 10 to 15 percent slopes	5,335	1.3
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, eroded	24,274	5.8
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	10,302	2.5
CfB	Cecil-Urban land complex, 2 to 10 percent slopes	11,075	2.7
Ch	Chewacla sandy loam	14,632	3.5
Co	Congaree loam	3,557	0.9
CrB	Coronaca clay loam, 2 to 6 percent slopes	9,590	2.3
CrC	Coronaca clay loam, 6 to 10 percent slopes	2,748	0.7
CuB	Coronaca-Urban land complex, 2 to 10 percent slopes	700	0.2
EnB	Enon fine sandy loam, 2 to 6 percent slopes	44,139	10.6
EnC	Enon fine sandy loam, 6 to 10 percent slopes	29,389	7.1
EnD	Enon fine sandy loam, 10 to 15 percent slopes	14,030	3.4
EoB2	Enon clay loam, 2 to 6 percent slopes, eroded	1,526	0.4
EoC2	Enon clay loam, 6 to 10 percent slopes, eroded	2,244	0.5
EoD2	Enon clay loam, 10 to 15 percent slopes, eroded	1,008	0.2
Es	Enon complex, gullied	232	0.1
EuB	Enon-Urban land complex, 2 to 10 percent slopes	15,296	3.7
HeC	Helena sandy loam, 6 to 10 percent slopes	1,719	0.4
HhB	Helena-Sedgefield sandy loams, 0 to 6 percent slopes	4.347	1.0
IrB	Iredell fine sandy loam, 0 to 4 percent slopes	3,117	0.7
MaB	Madison sandy loam, 2 to 6 percent slopes	3,515	0.8
MaC	Madison sandy loam, 6 to 10 percent slopes	7,611	1.8
MaD	Madison sandy loam, 10 to 15 percent slopes	6,230	1.5
MaE	Madison sandy loam, 15 to 35 percent slopes	11,716	2.8
McB2	Madison clay loam, 2 to 6 percent slopes, eroded	3,803	0.9
McC2	Madison clay loam, 6 to 10 percent slopes, eroded	9,448	2.3
McD2	Madison clay loam, 10 to 15 percent slopes, eroded	5,113	1.2
McE2	Madison clay loam, 15 to 25 percent slopes, eroded	4,115	1.0
Md	Madison complex, gullied	444	0.1
MeB	Madison-Urban land complex, 2 to 10 percent slopes	210	0.1
MhB2	Mecklenburg sandy clay loam, 2 to 6 percent slopes, eroded	22,389	5.4
MhC2	Mecklenburg sandy clay loam, 6 to 10 percent slopes, eroded	12,462	3.0
MuB	Mecklenburg-Urban land complex, 2 to 10 percent slopes	11,265	2.7
Pt	Pits	601	0.1
Ur	Urban land	4,730	1.1
VaB	Vance sandy loam, 2 to 6 percent slopes	7,356	1.8
VaC	Vance sandy loam, 6 to 10 percent slopes	2,763	0.7
VaD	Vance sandy loam, 10 to 15 percent slopes	3,060	0.7
VuB	Vance-Urban land complex, 2 to 10 percent slopes	1,637	0.4
Wh	Wehadkee silt loam	5,870	1.4
WkC	Wilkes sandy loam, 6 to 10 percent slopes	3,769	0.9
WkD	Wilkes sandy loam, 10 to 15 percent slopes	3,030	0.7
WkE	Wilkes sandy loam, 15 to 45 percent slopes	9,355	2.2
	Water	5,213	1.3
	Total	415,940	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[All yields were estimated for a high level of management in 1975. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Corn	Soybeans	Cotton lint	Tobacco	Oats	Wheat	Grass-legume pasture
	Bu	Bu	Lb	Lb	Bu	Bu	[1]AUM
Appling:							
ApB	95	35	650	2,400	---	45	8.3
ApC	80	30	600	2,200	---	40	8.0
Cecil:							
CcB	95	---	750	2,100	90	---	8.5
CcC	90	---	700	2,000	85	---	8.0
CcD	80	---	600	1,900	75	---	7.4
CeB2	70	---	500	---	70	---	8.0
CeC2	60	---	---	---	60	---	7.4
[2]CfB	---	---	---	---	---	---	---
Chewacla:							
Ch	100	35	---	---	70	---	9.5
Congaree:							
Co	125	45	---	---	80	---	9.0
Coronaca:							
CrB	95	40	600	---	90	---	8.5
CrC, [2]CuB	70	25	400	---	70	---	7.8
Enon:							
EnB, [2]EuB	75	30	500	1,900	---	40	5.5
EnC, EnD	65	25	450	1,700	---	40	4.8
EoB2	65	25	450	1,700	---	40	4.8
EoC2, EoD2	---	---	---	---	---	---	4.5
[2]Es	---	---	---	---	---	---	3.9
Helena:							
HeC	65	---	475	1,800	55	---	3.8
[2]HhB	83	---	576	2,050	66	---	4.5
Iredell:							
IrB	65	---	900	---	65	---	4.2
Madison:							
MaB	90	---	700	2,100	85	---	7.8
MaC	80	---	600	1,900	75	---	7.5
MaD	70	---	500	1,800	60	---	7.0
MaE	---	---	---	---	---	---	---
McB2	70	---	500	1,300	70	---	7.5
McC2, [2]MeB	60	---	---	1,200	60	---	7.0
McD2	---	---	---	---	---	---	6.5
McE2, [2]Md	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Cotton lint	Tobacco	Oats	Wheat	Grass-legume pasture
	Bu	Bu	Lb	Lb	Bu	Bu	[1]AUM
Mecklenburg:							
MhB2	65	30	---	---	55	---	4.5
MhC2, [2]MuB	55	25	---	---	45	---	4.0
Pits:							
Pt.							
Urban land:							
Ur.							
Vance:							
VaB	80	35	500	2,000	---	60	5.5
VaC, [2]VuB	75	30	400	1,900	---	55	4.8
VaD	---	---	---	---	---	---	4.0
Wehadkee:							
Wh	60	25	---	---	---	---	7.5
Wilkes:							
WkC, WkD	---	---	---	---	---	---	6.0
WkE	---	---	---	---	---	---	4.5

[1]AUM is animal-unit-months, a term used to express the carrying capacity of pasture. It is the number of months that one animal unit (one cow, steer, or horse; five hogs; or seven sheep) can graze 1 acre without injury to the pasture.

[2]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Important trees	Site index	
Appling:									
ApB, ApC	3o	Slight	Slight	Slight	---------	---------	Loblolly pine	81	Loblolly pine, yellow-poplar, sweetgum.
							Shortleaf pine	65	
							Scarlet oak	68	
							Southern red oak	76	
							Virginia pine	74	
							White oak	71	
							Yellow-poplar	90	
Cecil:									
CcB, CcC, CcD	3o	Slight	Slight	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, sweet gum, yellow-poplar.
							Shortleaf pine	69	
							Virginia pine	73	
							Black oak	66	
							Northern red oak	82	
							Post oak	65	
							Scarlet oak	80	
CeB2, CeC2	4c	Moderate	Moderate	Moderate	Slight	Slight	Loblolly pine	72	Loblolly pine, Virginia pine.
							Shortleaf pine	66	
							Virginia pine	65	
Chewacla:									
Ch	1w	Slight	Moderate	Moderate	---------	---------	Loblolly pine	96	Loblolly pine, green ash, American sycamore, yellow-poplar, sweetgum.
							Yellow-poplar	104	
							American sycamore	90	
							Sweetgum	97	
							Water oak	86	
							Eastern cottonwood	100	
							Green ash	97	
							Southern red oak	90	
Congaree:									
Co	1o	Slight	Slight	Slight	---------	---------	Sweetgum	100	Loblolly pine, yellow-poplar, American sycamore, black walnut, cherrybark oak, eastern cottonwood, sweetgum.
							Yellow-poplar	107	
							Cherrybark oak	107	
							Loblolly pine	90	
							Eastern cottonwood	107	
							American sycamore	89	
							Black walnut	100	
							Scarlet oak	100	
							Willow oak	95	
Coronaca:									
CrB	3o	Slight	Slight	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine.
							Shortleaf pine	70	
							Northern red oak	85	
							Southern red oak	70	
							Sweetgum	80	
							White oak	70	
CrC	4c	Moderate	Moderate	Moderate	Slight	Slight	Loblolly pine	70	Loblolly pine, shortleaf pine.
							Shortleaf pine	62	
Enon:									
EnB, EnC, EnD, EoB2, EoC2, EoD2	4c	Moderate	Moderate	Moderate	---------	---------	Loblolly pine	71	Loblolly pine, Virginia pine.
							Shortleaf pine	60	
							Virginia pine	65	
[1]Es	4c	Severe	Severe	Moderate	---------	---------	Loblolly pine	71	Loblolly pine, Virginia pine.
							Shortleaf pine	60	
							Virginia pine	65	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Important trees	Site index	Trees to plant
Helena:									
[1]HhB:									
Helena part	3w	Slight	Moderate	Slight	--------	--------	Loblolly pine	80	Loblolly pine, sweetgum, Virginia pine, yellow-poplar.
							Shortleaf pine	63	
							White oak	64	
							Yellow-poplar	87	
Sedgefield part	3w	Slight	Moderate	Slight	--------	--------	Loblolly pine	80	Loblolly pine, yellow-poplar, sweetgum.
							Shortleaf pine	70	
							Virginia pine	70	
							Southern red oak	70	
							Sweetgum	80	
							Yellow-poplar	90	
							White oak	70	
HeC	3w	Slight	Moderate	Slight	--------	--------	Loblolly pine	80	Loblolly pine, Virginia pine, yellow-poplar, sweetgum.
							Shortleaf pine	63	
							White oak	64	
							Yellow-poplar	87	
Iredell:									
IrB	4c	Slight	Moderate	Moderate	--------	--------	Loblolly pine	67	Loblolly pine.
							Shortleaf pine	58	
							Post oak	44	
							White oak	47	
Madison:									
MaB, MaC, MaD	3o	Slight	Slight	Slight	--------	--------	Loblolly pine	73	Loblolly pine, sweetgum, longleaf pine, yellow-poplar.
							Longleaf pine	63	
							Shortleaf pine	66	
							Southern red oak	81	
							Yellow-poplar	96	
MaE	3r	Moderate	Moderate	Slight	--------	--------	Loblolly pine	73	Loblolly pine, sweetgum, longleaf pine, yellow-poplar.
							Longleaf pine	63	
							Shortleaf pine	66	
							Southern red oak	81	
							Yellow-poplar	96	
McB2, McC2, McD2, [1]McE2	4c	Moderate	Moderate	Moderate	--------	--------	Loblolly pine	72	Loblolly pine, Virginia pine.
							Shortleaf pine	66	
							Longleaf pine	60	
							Virginia pine	66	
Mecklenburg:									
MhB2, MhC2	4o	Slight	Slight	Slight	--------	--------	Loblolly pine	75	Loblolly pine, Virginia pine, yellow-poplar, sweetgum.
							Shortleaf pine	67	
							Southern red oak	75	
							Sweetgum	82	
							White oak	71	
							Yellow-poplar	89	
							Eastern redcedar	---	
Vance:									
VaB, VaC, VaD	3o	Slight	Slight	Slight	--------	--------	Loblolly pine	76	Loblolly pine, Virginia pine, sweetgum, yellow-poplar.
							Northern red oak	---	
							Shortleaf pine	---	
							White oak	---	
Wehadkee:									
Wh	1w	Slight	Severe	Severe	--------	--------	Loblolly pine	102	Loblolly pine, American sycamore, yellow-poplar, green ash, sweetgum.
							Sweetgum	93	
							Yellow-poplar	98	
							Willow oak	90	
							Green ash	96	
							Water oak	86	
							White ash	88	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Important trees	Site index	Trees to plant
Wilkes:									
WkC, WkD	4o	Slight	Slight	Slight	---	---	Loblolly pine	75	Loblolly pine, Virginia pine.
							Post oak	79	
							Shortleaf pine	63	
							Southern red oak	76	
							Sweetgum	82	
WkE	4r	Moderate	Moderate	Slight	---	---	Loblolly pine	75	Loblolly pine, Virginia pine.
							Post oak	79	
							Shortleaf pine	63	
							Southern red oak	76	
							Sweetgum	82	

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 7.--BUILDING SITE DEVELOPMENT

["Depth to rock" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Appling:					
ApB	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight.
ApC	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Cecil:					
CcB, CeB2, [1]CfB	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
CcC, CcD, CeC2	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.
Chewacla:					
Ch	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Congaree:					
Co	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Coronaca:					
CrB, [1]CuB	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight.
CrC	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Enon:					
EnB, EnC, EnD, EoB2, EoC2, EoD2, [1]Es, [1]EuB	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.
Helena:					
[1]HhB:					
Helena part	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.
Sedgefield part	Severe: too clayey, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell.
HeC	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell.
Iredell:					
IrB	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Madison:					
MaB, McB2, [1]MeB	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
MaC, MaD, McC2, McD2	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Madison:					
MaE, McE2, [1]Md	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mecklenburg:					
MhB2, [1]MuB	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.
MhC2	Severe: too clayey.	----------------	Severe: slope, low strength.	Severe: slope, low strength.	Severe: low strength.
Pits:					
Pt.					
Urban land:					
Ur.					
Vance:					
VaB, [1]VuB	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.
VaC, VaD	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.
Wehadkee:					
Wh	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Wilkes:					
WkC, WkD	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.
WkE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 8.--SANITARY FACILITIES

["Depth to rock" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils. Absence of an entry means 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
Appling:					
ApB	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
ApC	Moderate: slope, percs slowly.	Severe: slope, seepage.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
Cecil:					
CcB, CeB2, [1]CfB	Moderate: percs slowly.	Moderate: seepage.	Severe: too clayey.	Slight	Fair: too clayey.
CcC, CcD, CeC2	Moderate: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: too clayey.
Chewacla:					
Ch	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Good.
Congaree:					
Co	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
Coronaca:					
CrB, [1]CuB	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey.
CrC	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Enon:					
EnB, EoB2, [1]EuB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
EnC, EnD, EoC2, EoD2	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
[1]Es	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: too clayey.
Helena:					
[1]HhB:					
Helena part	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
Sedgefield part	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
HeC	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Iredell:					
IrB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, depth to rock.	Slight	Poor: too clayey.

See footnote at end of table.

TABLE 8.--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
Madison:					
MaB, McB2, [1]MeB	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Fair: too clayey.
MaC, MaD, McC2, McD2	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: too clayey.
MaE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
McE2, [1]Md	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
Mecklenburg:					
MhB2, [1]MuB	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: too clayey, depth to rock.	Slight	Poor: thin layer.
MhC2	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope.	Poor: thin layer.
Pits: Pt.					
Urban land: Ur.					
Vance:					
VaB, [1]VuB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
VaC, VaD	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Wehadkee:					
Wh	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
Wilkes:					
WkC, WkD	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer.
WkE	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: thin layer.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 9.--CONSTRUCTION MATERIALS

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "unsuited." Absence of an entry means soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Appling:				
ApB, ApC	Fair: low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
Cecil:				
CcB, CcC, CcD, CeB2, CeC2, [1]CfB	Fair: low strength.	Unsuited	Unsuited	Fair: too clayey.
Chewacla:				
Ch	Poor: wetness, low strength.	Unsuited	Unsuited	Good.
Congaree:				
Co	Fair: low strength.	Unsuited	Unsuited	Good.
Coronaca:				
CrB, CrC, [1]CuB	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Enon:				
EnB, EnC, EnD, EoB2, EoC2, EoD2, [1]Es, [1]EuB	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Helena:				
[1]HhB:				
Helena part	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Sedgefield part	Poor: shrink-swell.	Unsuited	Unsuited	Fair: thin layer.
HeC	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Iredell:				
IrB	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Poor: thin layer.
Madison:				
MaB, MaC, MaD, McB2, McC2, McD2, [1]MeB	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
MaE	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
McE2, [1]Md	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
Mecklenburg:				
MhB2, MhC2, [1]MuB	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Pits:				
Pt.				
Urban land:				
Ur.				
Vance:				
VaB, VaC, VaD, [1]VuB	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.
Wehadkee:				
Wh	Poor: wetness.	Poor: excess fines.	Unsuited	Poor: wetness.
Wilkes:				
WkC, WkD	Fair: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
WkE	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 10.--WATER MANAGEMENT

["Seepage" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Appling:							
ApB	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Not needed	Favorable	Favorable	Favorable.
ApC	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Not needed	Slope	Slope	Favorable.
Cecil:							
CcB, CcC, CcD, CeB2, CeC2, [1]CfB	Moderate: seepage.	Severe: compressible.	Severe: no water.	Not needed	Complex slope	Complex slope	Complex slope.
Chewacla:							
Ch	Moderate: seepage.	Moderate: piping.	Moderate: deep to water.	Poor outlets, floods.	Wetness, floods.	Not needed	Not needed.
Congaree:							
Co	Moderate: seepage.	Moderate: compressible, piping, low strength.	Severe: deep to water.	Not needed	Floods	Not needed	Not needed.
Coronaca:							
CrB	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Not needed	Complex slope	Favorable	Favorable.
CrC, [1]CuB	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Not needed	Complex slope	Complex slope	Slope.
Enon:							
EnB, EnC, EnD, EoB2, EoC2, EoD2, [1]Es, [1]EuB	Moderate: depth to rock.	Severe: shrink-swell, hard to pack.	Severe: deep to water.	Not needed	Percs slowly	Erodes easily, slope, percs slowly.	Percs slowly, erodes easily.
Helena:							
[1]HhB:							
Helena part	Moderate: depth to rock.	Moderate: shrink-swell, erodes easily.	Severe: no water.	Not needed	Erodes easily	Favorable	Favorable.
Sedgefield part	Slight	Moderate: low strength, erodes easily.	Severe: deep to water.	Not needed	Percs slowly		Percs slowly, erodes easily.
HeC	Moderate: depth to rock.	Moderate: shrink-swell, erodes easily.	Severe: no water.	Not needed	Erodes easily	Slope	Slope.

See footnote at end of table.

TABLE 10.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Iredell:							
IrB	Slight	Severe: compressible, shrink-swell.	Severe: deep to water.	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.
Madison:							
MaB, McB2	Moderate: seepage.	Moderate: hard to pack, piping.	Severe: no water.	Not needed	Favorable	Favorable	Favorable.
MaC, MaD, MaE, McC2, McD2, McE2, [1]Md	Moderate: seepage.	Moderate: hard to pack, piping.	Severe: no water.	Not needed	Slope, erodes easily.	Erodes easily, slope.	Slope.
[1]MeB	Moderate: seepage.	Moderate: hard to pack, piping.	Severe: no water.	Not needed	Slope, erodes easily.	Favorable	Favorable.
Mecklenburg:							
MhB2	Moderate: depth to rock, slope.	Severe: hard to pack, thin layer.	Severe: no water.	Not needed	Favorable	Favorable	Favorable.
MhC2	Moderate: depth to rock, slope.	Severe: hard to pack, thin layer.	Severe: no water.	Not needed	Slope	Slope	Slope.
[1]MuB	Moderate: depth to rock, slope.	Severe: hard to pack, thin layer.	Severe: no water.	Not needed	Slope	Favorable	Favorable.
Pits: Pt.							
Urban land: Ur.							
Vance:							
VaB, [1]VuB	Slight	Moderate: hard to pack.	Severe: no water.	Not needed	Percs slowly	Percs slowly, erodes easily.	Percs slowly.
VaC, VaD	Slight	Moderate: hard to pack.	Severe: no water.	Not needed	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
Wehadkee:							
Wh	Moderate: seepage.	Moderate: piping.	Slight	Poor outlets	Wetness	Not needed	Not needed.
Wilkes:							
WkC, WkD, WkE	Severe: depth to rock.	Severe: thin layer.	Severe: deep to water.	Not needed	Complex slope	Depth to rock, complex slope.	Slope.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 11.--RECREATIONAL DEVELOPMENT

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Appling:				
ApB	Slight	Slight	Moderate: slope.	Slight.
ApC	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Cecil:				
CcB	Slight	Slight	Moderate: slope.	Slight.
CcC, CcD	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
CeB2	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
CeC2	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
[1]CfB	Moderate: too clayey.	Moderate: too clayey.	Severe: slope.	Moderate: too clayey.
Chewacla:				
Ch	Severe: wetness, floods.	Severe: floods.	Severe: wetness, floods.	Moderate: wetness, floods.
Congaree:				
Co	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.
Coronaca:				
CrB	Slight	Slight	Moderate: slope, too clayey.	Slight.
CrC	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
[1]CuB	Moderate: too clayey.	Moderate: too clayey.	Severe: slope.	Moderate: too clayey.
Enon:				
EnB, EoB2	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
EnC, EnD, EoC2, EoD2	Moderate: percs slowly.	Moderate: slope.	Severe: slope.	Slight.
[1]Es	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
[1]EuB	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
Helena:				
[1]HhB:				
Helena part	Moderate: percs slowly.	Moderate: wetness.	Moderate: percs slowly.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Helena:				
Sedgefield part	Moderate: percs slowly.	Moderate: wetness.	Moderate: percs slowly, wetness.	Moderate: wetness.
HeC	Moderate: percs slowly.	Moderate: slope, wetness.	Moderate: percs slowly, slope.	Moderate: wetness.
Iredell:				
IrB	Moderate: percs slowly, too clayey.	Moderate: too clayey.	Moderate: percs slowly, slope.	Moderate: too clayey, slope.
Madison:				
MaB	Slight	Slight	Moderate: slope.	Slight.
MaC, MaD	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MaE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
McB2	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey, slope.	Moderate: too clayey.
McC2, McD2	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: too clayey.
McE2, [1]Md	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
[1]MeB	Moderate: too clayey.	Moderate: too clayey.	Severe: slope.	Moderate: too clayey.
Mecklenburg:				
MhB2	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
MhC2	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Moderate: too clayey.
[1]MuB	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
Pits:				
Pt.				
Urban land:				
Ur.				
Vance:				
VaB	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight.
VaC, VaD	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope, percs slowly.	Slight.
[1]VuB	Moderate: percs slowly.	Slight	Severe: slope, percs slowly.	Slight.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Wehadkee:				
Wh	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Wilkes:				
WkC, WkD	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
WkE	Severe: slope.	Severe: slope.	Severe: slope.	Severe.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 12.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Appling:												
ApB	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
ApC	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
Cecil:												
CcB	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
CcC, CcD	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
CeB2, CeC2, [1]CfB	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
Chewacla:												
[2]Ch	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
Congaree:												
Co	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
Coronaca:												
CrB	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
CrC, [1]CuB	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
Enon:												
EnB	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
EnC, EnD, [1]EuB	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
EoB2	Poor	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.	---
EoC2, EoD2	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
[1]Es	Very poor.	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Helena:												
[1]HhB:												
Helena part	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
Sedgefield part	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
HeC	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
Iredell:												
IrB	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---

See footnotes at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Madison:												
MaB	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
MaC, MaD	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
MaE	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
McB2	Poor	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.	---
McC2, McD2, [1]MeB	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
McE2, [1]Md	Very poor.	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Mecklenburg:												
MhB2	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
MhC2, [1]MuB	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
Pits: Pt.												
Urban land: Ur.												
Vance:												
VaB	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
VaC, VaD, [1]VuB	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
Wehadkee:												
[2]Wh	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor	---
Wilkes:												
WkC, WkD	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.	---
WkE	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.	---

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

[2]Drained and unflooded.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means 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	
Appling:											
ApB, ApC	0-8	Sandy loam	SM, SM-SC	A-2	0-5	86-100	80-100	55-75	15-35	<27	[1]NP-5
	8-53	Sandy clay, clay loam, clay.	MH, CL, ML, SC	A-7	0-5	95-100	95-100	70-92	50-75	41-74	15-30
	53-72	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Cecil:											
CcB, CcC, CcD	0-6	Sandy loam	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
	6-52	Clay	MH, ML	A-7	0	97-100	92-100	72-99	55-95	41-80	9-37
	52-85	Weathered bedrock.	---	---	---	---	---	---	---	---	---
CeB2, CeC2, [2]CfB	0-6	Sandy clay loam	SM, SC, CL, ML	A-4	0	74-100	72-100	68-95	38-81	21-28	3-10
	6-52	Clay	MH, ML	A-7	0	97-100	92-100	72-99	55-95	41-80	9-37
	52-85	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Chewacla:											
Ch	0-18	Sandy loam	SM, SM-SC	A-2, A-4	0	98-100	95-100	60-90	30-50	<35	NP-7
	18-50	Sandy clay loam, loam, sandy loam.	SM, CL-ML, SM-SC, ML	A-4	0	96-100	95-100	60-80	36-70	<35	NP-7
	50-70	Silt loam, clay loam, silty clay loam.	ML, CL, MH	A-4, A-5, A-6, A-7	0	96-100	95-100	80-100	51-98	36-56	4-20
	70-90	Variable	---	---	0	---	---	---	---	---	---
Congaree:											
Co	0-8	Loam	CL-ML, ML, CL	A-4	0	95-100	95-100	70-100	51-90	20-35	3-10
	8-49	Silty clay loam, fine sandy loam, loam.	SM, SC, ML, CL	A-4, A-6, A-7	0	95-100	95-100	70-100	40-90	25-50	4-22
	49-80	Variable	---	---	---	---	---	---	---	---	---
Coronaca:											
CrB	0-8	Loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-2	90-100	90-100	85-98	36-75	20-35	5-15
	8-95	Clay	ML, MH	A-7	0-1	95-100	90-100	80-99	65-90	41-60	12-25
CrC, [2]CuB	0-8	Clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-2	90-100	90-100	85-98	36-75	20-35	5-15
	8-95	Clay	ML, MH	A-7	0-1	95-100	90-100	80-99	65-90	41-60	12-25
Enon:											
EnB, EnC, EnD	0-8	Fine sandy loam	SM, SM-SC, SC	A-2-4, A-4, A-6	0-5	80-100	80-100	60-85	25-49	<30	NP-15
	8-33	Clay loam, clay	CH	A-7-6	0-5	85-100	80-100	75-95	65-95	51-75	25-50
	33-75	Sandy loam, loam, clay loam.	SC, CL, SM	A-2, A-4, A-6, A-7-6	2-10	75-100	60-100	40-95	30-85	20-50	8-25
EoB2, EoC2, EoD2, [2]Es, [2]EuB	0-8	Clay loam	ML, CL, CL-ML	A-4, A-6	0-5	80-100	80-100	70-90	50-80	20-40	4-20
	8-33	Clay loam, clay	CH	A-7-6	0-5	85-100	80-100	75-95	65-95	51-75	25-50
	33-75	Sandy loam, loam, clay loam.	SC, CL, SM	A-2, A-4, A-6, A-7-6	2-10	75-100	60-100	40-95	30-85	20-50	8-25

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Helena:											
[2]HhB:											
Helena part-----	0-7	Sandy loam------	SM, SM-SC	A-2, A-4	0	95-100	90-100	51-86	27-46	<25	NP-7
	7-38	Clay loam, sandy clay, clay.	CH, MH	A-7	0	95-100	95-100	73-93	56-80	50-85	24-50
	38-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Sedgefield part-	0-12	Sandy loam------	SM, SM-SC	A-2, A-4	0-5	85-100	85-100	51-86	27-46	<25	NP-7
	12-16	Sandy clay, clay loam, clay.	CL, CH	A-7	0-5	95-100	95-100	73-93	60-85	45-80	25-48
	16-33	Sandy loam, sandy clay loam, clay loam.	SC, CL, SM	A-6, A-7	0-5	95-100	90-100	60-90	36-65	20-45	11-25
	33-48	Weathered bedrock.	---	---	---	---	---	---	---	---	---
HeC---------------	0-7	Sandy loam------	SM, SM-SC	A-2, A-4	0	95-100	90-100	51-86	27-46	<25	NP-7
	7-38	Clay loam, sandy clay, clay.	CH, MH	A-7	0	95-100	95-100	73-93	56-80	50-85	24-50
	38-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Iredell:											
IrB---------------	0-7	Fine sandy loam	SM, SM-SC	A-2-4, A-4	0-1	90-98	80-90	65-80	30-50	<35	NP-9
	7-24	Clay------------	CH	A-7-6	0	99-100	85-100	80-100	65-95	60-115	30-85
	24-27	Loam, sandy clay loam, clay loam.	CL, CH, SC	A-7-6	0-1	98-100	85-100	70-95	40-75	41-60	20-45
	27	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Madison:											
MaB, MaC, MaD, MaE	0-5	Sandy loam------	SC, SM-SC, SM	A-2, A-4	0-3	85-100	80-100	60-90	26-49	<35	NP-8
	5-34	Clay, clay loam	MH	A-7	0-3	90-100	85-100	75-97	57-85	43-82	12-43
	34-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---
McB2, McC2, McD2, McE2, [2]Md, [2]MeB---	0-5	Clay loam-------	CL	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	10-20
	5-34	Clay, clay loam	MH	A-7	0-3	90-100	85-100	75-97	57-85	43-82	12-43
	34-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Mecklenburg:											
MhB2, MhC2, [2]MuB--	0-7	Sandy clay loam	CL	A-6	0-5	100	100	80-100	50-80	25-49	11-20
	7-38	Clay------------	MH, CL, ML, CH	A-7	0-5	90-100	85-100	80-100	75-95	45-75	15-35
	38-70	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Pits:											
Pt.											
Urban land:											
Ur.											
Vance:											
VaB, VaC, VaD, [2]VuB--------------	0-6	Sandy loam------	SM, SM-SC	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-5
	6-40	Clay loam, sandy clay, clay.	CH, MH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	40-72	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Wehadkee:											
Wh----------------	0-8	Silt loam-------	CL, MH, ML	A-6, A-7	0	100	98-100	85-100	51-95	20-58	11-22
	8-48	Loam, sandy clay loam.	ML, CL	A-6, A-7	0	100	99-100	90-100	51-85	30-45	11-20
	48-80	Sandy loam------	SM, ML	A-4	0	95-100	95-100	65-97	36-60	---	NP
Wilkes:											
WkC, WkD, WkE-----	0-7	Sandy loam------	ML, CL-ML, SM, SM-SC	A-2, A-4	0-10	94-100	80-100	60-92	25-55	<25	NP-7
	7-18	Clay loam, clay, sandy clay loam.	CL, CH, MH, ML	A-6, A-7	0-10	80-100	80-100	75-95	50-80	30-60	11-32
	18-52	Weathered bedrock.	---	---	---	---	---	---	---	---	---

[1]Nonplastic.
[2]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means greater then. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
Appling:									
ApB, ApC	0-8	2.0-6.0	0.10-0.15	4.5-5.5	Low	Moderate	Moderate	0.20	4
	8-53	0.6-2.0	0.15-0.17	4.5-5.5	Moderate	Moderate	Moderate	0.24	
	53-72	---	---	---	---	---	---	---	
Cecil:									
CcB, CcC, CcD	0-6	2.0-6.0	0.12-0.14	4.5-6.0	Low	Moderate	Moderate	0.32	4
	6-52	0.6-2.0	0.13-0.15	4.5-5.5	Moderate	Moderate	Moderate	0.28	
	52-85	---	---	---	---	---	---	---	
CeB2, CeC2, [1]CfB	0-6	0.6-2.0	0.13-0.15	4.5-6.0	Low	Moderate	Moderate	0.32	3
	6-52	0.6-2.0	0.13-0.15	4.5-5.5	Moderate	Moderate	Moderate	0.28	
	52-85	---	---	---	---	---	---	---	
Chewacla:									
Ch	0-18	0.6-2.0	0.10-0.15	5.1-6.5	Low	High	Moderate	0.28	5
	18-50	0.6-2.0	0.12-0.20	5.1-6.5	Low	High	Moderate	0.28	
	50-70	0.6-2.0	0.15-0.24	5.1-6.5	Low	High	Moderate	---	
	70-90	---	---	---	---	---	---	---	
Congaree:									
Co	0-8	0.6-2.0	0.12-0.20	5.1-6.5	Low	Moderate	Moderate	0.28	5
	8-49	0.6-2.0	0.12-0.20	5.1-6.5	Low	Moderate	Moderate	0.28	
	49-80	---	---	---	---	---	---	---	
Coronaca:									
CrB, CrC, [1]CuB	0-8	0.6-2.0	0.12-0.18	5.6-7.3	Low	Moderate	Moderate	0.24	5
	8-95	0.6-2.0	0.12-0.16	5.6-7.3	Moderate	High	Moderate	0.24	
Enon:									
EnB, EnC, EnD	0-8	2.0-6.0	0.11-0.15	5.1-6.5	Low	High	Moderate	0.37	4
	8-33	0.06-0.2	0.15-0.20	5.1-7.3	High	High	Moderate	0.28	
	33-75	0.2-0.6	0.13-0.18	6.1-7.3	Moderate	High	Low	0.37	
EoB2, EoC2, EoD2, [1]Es, [1]EuB	0-8	0.6-2.0	0.15-0.20	5.1-6.5	Low	High	Moderate	0.37	2
	8-33	0.06-0.2	0.15-0.20	5.1-7.8	High	High	Moderate	0.28	
	33-75	0.2-0.6	0.13-0.18	6.1-7.8	Moderate	High	Low	0.37	
Helena:									
[1]HhB:									
Helena part	0-7	2.0-6.0	0.10-0.12	4.5-6.5	Low	High	Moderate	0.37	3
	7-38	0.06-0.2	0.13-0.15	4.5-5.5	High	High	High	0.32	
	38-80	---	---	---	---	---	---	---	
Sedgefield part	0-12	2.0-6.0	0.10-0.14	4.5-6.5	Low	High	Moderate	0.37	3
	12-16	0.06-0.2	0.14-0.18	4.5-6.5	High	Low	Moderate	0.32	
	16-33	0.6-2.0	0.12-0.15	5.6-8.4	Moderate	Low	Low	0.32	
	33-48	---	---	---	---	---	---	---	
HeC	0-7	2.0-6.0	0.10-0.12	4.5-6.5	Low	High	Moderate	0.37	3
	7-38	0.06-0.2	0.13-0.15	4.5-5.5	High	High	High	0.32	
	38-80	---	---	---	---	---	---	---	
Iredell:									
IrB	0-7	2.0-6.0	0.12-0.15	5.6-7.3	Low	Moderate	Low	0.32	3
	7-24	0.06-0.2	0.16-0.22	5.6-7.3	Very high	High	Low	0.20	
	24-27	0.06-0.6	0.14-0.18	6.1-7.8	High	High	Low	0.28	
	27	---	---	---	---	---	---	---	
Madison:									
MaB, MaC, MaD, MaE	0-5	2.0-6.0	0.11-0.15	4.5-6.0	Low	High	Moderate	0.28	4
	5-34	0.6-2.0	0.13-0.18	4.5-5.5	Low	High	Moderate	0.32	
	34-80	---	---	---	---	---	---	---	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
Madison:									
McB2, McC2, McD2, McE2, [1]Md, [1]MeB	0-5	0.6-2.0	0.12-0.16	4.5-6.0	Low	High	Moderate	0.28	3
	5-34	0.6-2.0	0.13-0.18	4.5-5.5	Low	High	Moderate	0.32	
	34-80	---	---	---	---	---	---	---	
Mecklenburg:									
MhB2, MhC2, [1]MuB	0-7	0.6-2.0	0.12-0.14	5.6-7.3	Low	High	Moderate	0.32	2
	7-38	0.06-0.2	0.12-0.14	5.6-7.3	Moderate	High	Moderate	0.32	
	38-70	---	---	---	---	---	---	---	
Pits:									
Pt.									
Urban land:									
Ur.									
Vance:									
VaB, VaC, VaD, [1]VuB	0-6	2.0-6.0	0.10-0.14	4.5-6.0	Low	High	Moderate	0.28	3
	6-40	0.06-0.2	0.12-0.15	4.5-5.5	Moderate	High	High	0.37	
	40-72	---	---	---	---	---	---	---	
Wehadkee:									
Wh	0-8	2.0-6.0	0.14-0.18	5.6-7.3	Low	High	Moderate	0.28	5
	8-48	0.6-2.0	0.16-0.20	5.6-7.3	Low	High	Moderate	0.28	
	48-80	2.0-6.0	0.14-0.16	5.6-7.3	Low	High	Moderate	---	
Wilkes:									
WkC, WkD, WkE	0-7	2.0-6.0	0.11-0.15	5.6-6.5	Low	Moderate	Moderate	0.28	2
	7-18	0.2-0.6	0.15-0.20	5.6-6.5	Moderate	Moderate	Moderate	0.32	
	18-52	---	---	---	---	---	---	---	

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 15.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See text for descriptions of symbols and such terms as "rare," "brief," and "perched." The symbol < means less than; > means greater than]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness
					Ft			In	
Appling: ApB, ApC	B	None	---	---	>6.0	---	---	>60	---
Cecil: CcB, CcC, CcD, CeB2, CeC2, [1]CfB	B	None	---	---	>6.0	---	---	>60	---
Chewacla: Ch	C	Common	Brief	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---
Congaree: Co	B	Frequent	Brief	Nov-Apr	2.5-4.0	Apparent	Nov-Apr	>60	---
Coronaca: CrB, CrC, [1]CuB	B	None	---	---	>6.0	---	---	>60	---
Enon: EnB, EnC, EnD, EoB2, EoC2, EoD2, [1]Es, [1]EuB	C	None	---	---	1.0-2.0	Perched	Dec-Mar	>60	---
Helena: [1]HhB: Helena part	C	None	---	---	1.0-2.5	Perched	Jan-Mar	>48	Rippable
Sedgefield part	C	None	---	---	1.0-1.5	Perched	Jan-Mar	>48	Hard
HeC	C	None	---	---	1.0-2.5	Perched	Jan-Mar	>48	Rippable
Iredell: IrB	D	None	---	---	>6.0	---	---	20-40	Rippable
Madison: MaB, MaC, MaD, MaE, McB2, McC2, McD2, McE2, [1]Md, [1]MeB	B	None	---	---	>6.0	---	---	>60	---
Mecklenburg: MhB2, MhC2, [1]MuB	C	None	---	---	>6.0	---	---	48-60	Hard
Pits: [2]Pt.									
Urban land: [2]Ur.									
Vance: VaB, VaC, VaD, [1]VuB	C	None	---	---	>6.0	---	---	>60	---
Wehadkee: Wh	D	Common	Brief	Nov-Jun	0-2.5	Apparent	Nov-Jun	>60	---
Wilkes: WkC, WkD, WkE	C	None	---	---	>6.0	---	---	40-80	Hard

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

[2]Features too variable to estimate.

TABLE 16.--ENGINEERING TEST DATA

[Tests performed by North Carolina State Highway Commission according to standard procedures of the American Association of State Highway and Transportation Officials (AASHTO)]

Soil name and location	Parent material	Report No.	Depth	Horizon	Moisture-density data 1/: Maximum dry density	Moisture-density data 1/: Optimum moisture	Mechanical analysis 2/ — Percentage passing sieve--: No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO 3/	Classification: Unified 4
			In		Pcf	Pct									Pct			
Chewacla sandy loam: 3.5 miles northeast of Colfax on State Road 2016, 0.7 mile north of State Road 2016 on State Road 2063, 200 feet east of Reedy Fork Creek and 200 feet north of woods.	Alluvial deposits (recent).	S71NC-41 16-1	0-9	Ap	116	13	100	96	66	30	29	24	14	9	31	7	A-2-4(0)	SM-SC
		16-4	18-50	B21g	95	24	---	100	99	74	67	50	31	24	46	13	A-7-5(10)	ML
		16-6	58-70	B3g	103	20	---	100	99	78	71	64	40	33	39	13	A-6(9)	ML
Enon fine sandy loam: 1 mile southwest of Greensboro, 25 feet north of State Road 1662, 450 feet east of State Road 1387.	Mixed acid and basic crystalline rock.	S70NC-41 4-2	3-8	A2	129	11	95	87	68	50	41	23	9	5	---	5NP	A-4(3)	ML
		4-4	11-21	B21t	101	21	93	89	84	76	71	63	51	45	71	47	A-7-6(20)	CH
		4-6	33-75	C	110	19	---	100	88	62	55	39	20	15	47	19	A-7-6(10)	ML
Helena sandy loam: 2 miles south of Kimesville on State Road 3349, 80 feet west of State Road 3349, 40 feet southwest of power pole No. 29 TAP-P-26.	Residuum from apilitic granite.	S71NC-41 13-1	0-7	Ap	123	10	99	93	57	34	32	26	19	14	24	7	A-2-4(0)	SM-SC
		13-3	16-32	B22t	92	25	100	98	81	75	74	71	58	52	82	47	A-7-5(20)	CH
		13-5	38-80	C	98	22	100	98	79	69	68	61	44	38	65	31	A-7-5(18)	MH
Mecklenburg loam: 1 mile southwest of Greensboro in the Sedgefield area, 0.5 mile east of High Point Road (US 29A and 70A) on State Road 1581, 700 feet southeast of end of road in cultivated field.	Basic crystalline rock.	S70NC-41 8-1	0-7	Ap	113	16	95	90	75	52	47	40	29	22	32	12	A-6(4)	CL
		8-3	16-33	B22t	81	32	---	100	98	94	91	81	60	52	80	34	A-7-5(20)	MH
		8-5	38-70	C	86	32	---	100	99	92	88	76	46	35	66	27	A-7-5(19)	MH
Vance sandy loam: 1.25 miles east of McLeansville on State Road 2755, 100 feet southeast of junction of State Road 2755 and 2814, 50 feet southeast of telephone pole.	Acid crystalline rock.	S71NC-41 14-1	0-6	Ap	121	9	96	94	74	29	25	16	8	5	---	NP	A-2-4(0)	SM
		14-2	6-18	B21t	96	24	100	99	85	70	68	66	57	52	71	39	A-7-5(18)	CH
		14-6	50-72	C2	98	22	100	99	85	66	65	61	42	37	62	29	A-7-5(14)	MH
Wehadkee silt loam: 3.5 miles southeast of Kimesville on State Road 3343; 300 feet north of State Road 3343 and 155 feet west of Stinking Quarter Creek in pasture.	Alluvial deposits (recent)	S71NC-41 17-1	0-8	Ap	89	27	100	100	99	97	95	84	43	24	52	16	A-7-5(13)	MH
		17-5	20-48	B24g	114	14	100	97	86	71	68	53	32	19	28	8	A-4-(7)	CL
			48-80	Cg	114	14	100	98	89	75	71	59	32	21	29	9	A-4(8)	CL

See footnotes at end of table.

TABLE 16.--ENGINEERING TEST DATA--Continued

Soil name and location	Parent material	Report No.	Depth	Horizon	Moisture-density data 1/: Maximum dry density	Moisture-density data 1/: Optimum moisture	Mechanical analysis 2/ — Percentage passing sieve--: No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO 3/	Unified 4/
			In		Pcf	Pct									Pct			
Wilkes sandy loam:		S71NC-41																
3 miles east of High Point on State Road 1141 between Register Creek and Deep River; 30 feet southeast of State Road 1141 and 30 feet southeast of power pole No. T-43.	Basic crystalline rock.	15-1	0-7	Ap	123	10	95	83	60	34	30	21	13	8	---	NP	A-2-4(0)	SM
		15-3	11-18	B2t	107	17	100	95	81	63	60	52	39	33	39	17	A-6(8)	CL
		15-5	26-52	C2	119	13	97	83	46	25	22	14	9	7	29	7	A-2-4(0)	SM-SC

1/Based on AASHTO Designation T 99, Method A. (1).

2/Mechanical analyses according to AASHTO Designation T 88 (1). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

3/Based on AASHTO Designation M 145 (1).

4/Based on the Unified soil classification system (2).

5/Nonplastic.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Appling	Clayey, kaolinitic, thermic Typic Hapludults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
Coronaca	Fine, kaolinitic, thermic Rhodic Paleudalfs
Enon	Fine, mixed, thermic Ultic Hapludalfs
Helena	Clayey, mixed, thermic Aquic Hapludults
Iredell	Fine, montmorillonitic, thermic Typic Hapludalfs
Madison	Clayey, kaolinitic, thermic Typic Hapludults
Mecklenburg	Fine, mixed, thermic Ultic Hapludalfs
Sedgefield	Clayey, mixed, thermic Aquultic Hapludalfs
Vance	Clayey, mixed, thermic Typic Hapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
Wilkes	Loamy, mixed, thermic, shallow Typic Hapludalfs

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