



United States Department of Agriculture  
Natural Resources Conservation Service

# Update for the Soil Survey of Cobb County, Georgia



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# Update for the Soil Survey of Cobb County, Georgia

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Prepared by Talbert R. Gerald and Kenneth S. Lawrence, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service

## Introduction

This publication provides updated information for the soil survey of Cobb County published in 1973 (3). The original soil survey was designed primarily to meet agricultural needs. Information about various soil properties is important in determining how land can be used most effectively and economically. This information is basic to modern agricultural practices and civil engineering and is becoming more important in the field of planning. The updated information was developed to be used in conjunction with the original survey. This publication is designed to meet the needs of foresters, wildlife game managers, engineers, planners, and others that make decisions about land use in Cobb County.

The soil maps at the back of the original survey and the interpretative tables in this publication serve as the basis for identifying the basic suitabilities and limitations of the soils. The interpretive tables provide information on the use of soils for crops and pasture, woodland, wildlife habitat, recreational areas, sanitary facilities, building sites, and construction materials. They also give information on water management, engineering index properties, physical and chemical properties of the soils, and soil and water features. This update includes lists of prime farmland and other important farmland and information about land capability classification.

Although the information in the original survey and in this publication can be used extensively, it has several limitations. The interpretations provided are not a substitute for sampling and testing needed on sites for certain engineering works involving extremely heavy loads or on sites where excavations will be more than 5 or 6 feet deep. Because of the scale of the photography

in the published maps, small areas of soils that differ from the dominant soil may not be shown and the actual soil boundaries may vary slightly from the boundaries delineated on the maps.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

## How to Use This Update

The updated information provided in this publication complements the information provided in the original survey. This publication was designed to be used in conjunction with the original survey.

The Soil Legend at the front and back of the map sheets in the original survey, the "Index to Map Units" and "Summary of Tables" at the front of this publication, and table 1 can be used to find the interpretations for a specific soil. The soils are listed alphabetically according to symbol. For example, if the area of interest is mapped as AmB, one can look at the Soil Legend to find the soil name corresponding to symbol AmB, which is Appling sandy loam, 2 to 6 percent slopes. One can look at the "Summary of Tables" in this publication to find the interpretive information on soils mapped AmB, or one can look at the "Index to Map Units" to find a brief description of this Appling soil.

## Locating Soils on the Maps

The soils of Cobb County are mapped on 44 individual map sheets, which are included at the back of the original survey. Each sheet is numbered to

correspond with a number on the Index to Map Sheets. This index is at the front and back of the map sheets. It can be used to locate the map sheet that includes the specific area of interest. Individual soils are outlined and identified by a symbol on the soil map. Areas identified by the same symbol are the same kind of soil.

## Use and Explanation of Soil Interpretations

Soil survey interpretations are predictions of soil behavior for specified land uses and specified management practices. They are based on the soil properties that directly influence the specified use of the soil. Soil survey interpretations allow users of soil surveys to plan reasonable alternatives for the use and management of soils. They are used to plan both broad categories of land use, such as cropland, pasture, woodland, or urban development, as well as specific elements of those land uses, such as irrigation of cropland, equipment use in woodland management, or installment of septic tank absorption fields.

When soil interpretations are used in connection with delineated soil areas on soil maps, the information pertains to the soil for which the soil area is named.

Other soils that are in areas too small to be mapped may occur within the delineated area. The interpretations ordinarily do not apply to the included soils. More detailed studies are required if small, specific sites are to be developed or used within a given soil delineation. For example, a soil delineation bearing the name Cecil sandy loam, 2 to 5 percent slopes, also can include small, unmappable areas of other soils, such as Appling and Madison soils. The interpretations apply to the Cecil part of the delineated soil area and not to the included soils.

The interpretations do not eliminate the need for onsite investigation and testing of specific sites for designing and constructing for specific purposes. They can be used as a guide to plan more detailed investigations and to avoid sites that are undesirable for an intended use. The soil map and the interpretations can be used to select sites that have the least limitations for an intended use. Not considered in the interpretations, but important for the final selection of a site for a specific use, are the size and shape of soil delineations and the pattern that they form with other soils on the landscape. For example, some areas of very desirable soils may not be suitable because they are too small, are too irregular in shape, or occur in a complex pattern with less desirable soils.

TABLE 1.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil map unit name	Acres	Percent
AL	Altavista silt loam, occasionally flooded-----	665	0.3
AlB	Altavista sandy loam, 0 to 4 percent slopes-----	2,570	1.2
AmB	Appling sandy loam, 2 to 6 percent slopes-----	6,600	3.0
AmC	Appling sandy loam, 6 to 10 percent slopes-----	8,865	4.0
AmD	Appling sandy loam, 10 to 15 percent slopes-----	3,595	1.6
AnB3	Appling sandy clay loam, 2 to 6 percent slopes, severely eroded-----	1,355	0.6
AnC3	Appling sandy clay loam, 6 to 10 percent slopes, severely eroded-----	2,420	1.1
Cah	Cartecay soils-----	8,880	4.0
Csw	Chewacla soils, wet variants-----	815	0.4
Cw	Cartecay silt loam, silty variant-----	1,355	0.6
CYB2	Cecil sandy loam, 2 to 6 percent slopes, eroded-----	4,165	1.9
CYC2	Cecil sandy loam, 6 to 10 percent slopes, eroded-----	5,920	2.7
DiB	Durham sandy loam, 2 to 6 percent slopes-----	1,050	0.5
GeB3	Gwinnett clay loam, 2 to 6 percent slopes, severely eroded-----	6,790	3.1
GeC3	Gwinnett clay loam, 6 to 10 percent slopes, severely eroded-----	12,805	5.8
GeD3	Gwinnett clay loam, 10 to 15 percent slopes, severely eroded-----	8,320	3.8
GeE2	Gwinnett clay loam, 15 to 25 percent slopes, eroded-----	4,620	2.1
GgB2	Gwinnett loam, 2 to 6 percent slopes, eroded-----	2,350	1.1
GgC2	Gwinnett loam, 6 to 10 percent slopes, eroded-----	2,645	1.2
GgD2	Gwinnett loam, 10 to 15 percent slopes, eroded-----	2,390	1.1
HSB	Hiwassee loam, 2 to 6 percent slopes-----	3,360	1.5
HTC2	Hiwassee clay loam, 6 to 10 percent slopes, eroded-----	3,050	1.4
HTD2	Hiwassee clay loam, 10 to 15 percent slopes, eroded-----	1,335	0.6
HYC	Helena sandy loam, 2 to 10 percent slopes-----	1,330	0.6
LDF	Louisburg stony sandy loam, 15 to 45 percent slopes-----	1,830	0.8
LkE	Louisa gravelly sandy loam, 10 to 25 percent slopes-----	3,870	1.8
LnE	Louisburg sandy loam, 10 to 25 percent slopes-----	3,860	1.8
LNF	Louisa soils, 25 to 60 percent slopes-----	3,930	1.8
MDC3	Madison clay loam, 6 to 10 percent slopes, severely eroded-----	12,815	5.8
MDE3	Madison clay loam, 15 to 25 percent slopes, severely eroded-----	5,955	2.7
MgB2	Madison sandy loam, 2 to 6 percent slopes, eroded-----	9,485	4.3
MgC2	Madison sandy loam, 6 to 10 percent slopes, eroded-----	6,200	2.8
MgD2	Madison sandy loam, 10 to 15 percent slopes, eroded-----	5,545	2.5
MID2	Musella gravelly soils, 6 to 15 percent slopes, eroded-----	2,295	1.0
MIE3	Musella gravelly soils, 15 to 25 percent slopes, severely eroded-----	995	0.5
MJF	Musella and Pacolet stony soils, 10 to 45 percent slopes-----	7,060	3.2
MsD3	Madison and Pacolet soils, 10 to 15 percent slopes, severely eroded-----	14,555	6.6
MsE2	Madison and Pacolet soils, 15 to 25 percent slopes, eroded-----	12,510	5.7
PfD	Pacolet sandy loam, 10 to 15 percent slopes-----	4,055	1.8
PgC3	Pacolet sandy clay loam, 6 to 10 percent slopes, severely eroded-----	4,455	2.0
Ron	Roanoke silt loam-----	1,165	0.5
Toc	Toccoa soils-----	7,545	3.4
Tod	Toccoa sandy loam, local alluvium-----	1,310	0.6
Ubp	Urban land and Borrow pits-----	2,400	1.1
Ud	Urban land-----	1,720	0.8
UeC	Urban land-Appling complex, 2 to 10 percent slopes-----	855	0.4
UfC	Urban land-Cecil complex, 2 to 10 percent slopes-----	2,265	1.0
UgC	Urban land-Gwinnett complex, 2 to 10 percent slopes-----	995	0.5
UhC	Urban land-Madison complex, 2 to 10 percent slopes-----	2,000	0.9
UiE	Urban land and Pacolet soils, 10 to 25 percent slopes-----	1,650	0.8
WjF	Wilkes stony sandy loam, 10 to 40 percent slopes-----	1,260	0.6
WvD	Wilkes sandy loam, clayey subsoil variant, 6 to 15 percent slopes-----	1,480	0.7
	Total-----	221,310	100.0



# Nontechnical Soil Descriptions

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Nontechnical soil descriptions provide information on certain soil properties that are important in managing each soil map unit. The following descriptions were designed for nontechnical users of soil survey information.

**AL—Altavista silt loam, occasionally flooded.** This very deep, moderately well drained soil is on stream terraces. The subsoil is loamy and extends to a depth of 30 to more than 60 inches. Depth to bedrock is more than 10 feet. A seasonal high water table occurs at a depth of 1.5 to 2.5 feet. Flooding is common. Permeability and the available water capacity are moderate.

**AIB—Altavista sandy loam, 0 to 4 percent slopes.** This very deep, moderately well drained soil is on stream terraces. The subsoil is loamy and extends to a depth of 30 to more than 60 inches. Depth to bedrock is more than 10 feet. A seasonal high water table occurs at a depth of 1.5 to 2.5 feet. Permeability and the available water capacity are moderate.

**AmB—Appling sandy loam, 2 to 6 percent slopes.** This very deep, well drained soil is on ridges and side slopes. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6 feet. Permeability and the available water capacity are moderate.

**AmC—Appling sandy loam, 6 to 10 percent slopes.** This very deep, well drained soil is on ridges and side slopes. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6 feet. Permeability and the available water capacity are moderate.

**AmD—Appling sandy loam, 10 to 15 percent slopes.** This very deep, well drained soil is on ridges and side slopes. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6 feet. Permeability and the available water capacity are moderate.

**AnB3—Appling sandy clay loam, 2 to 6 percent slopes, severely eroded.** This very deep, well drained soil is on ridges and side slopes. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6 feet. Permeability and the available water capacity are moderate.

**AnC3—Appling sandy clay loam, 6 to 10 percent slopes, severely eroded.** This very deep, well drained soil is on ridges and side slopes. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6 feet. Permeability and the available water capacity are moderate.

**Cah—Cartecay soils.** These very deep, somewhat poorly drained soils are on flood plains. The soils are mainly loamy but are stratified with sandy and loamy materials. A seasonal high water table occurs at a depth of 0.5 foot to 1.5 feet. Flooding is common. Slopes are 0 to 2 percent. Permeability is moderately rapid. The available water capacity is low.

**Csw—Chewacla soils, wet variants.** These very deep, somewhat poorly drained soils are on flood plains. The subsoil is loamy and extends to a depth of 15 to 70 inches. It is underlain with materials of variable texture. A seasonal high water occurs at a depth of 0.5 foot to 1.5 feet. Flooding is common. Slopes are 0 to 2 percent. Permeability is moderate. The available water capacity is high.

**Cw—Cartecay silt loam, silty variant.** This very deep, somewhat poorly drained soil is on flood plains. The soil is mainly loamy but is stratified with sandy and loamy materials. A seasonal high water table occurs at a depth of 0.5 foot to 1.5 feet. Flooding is common. Slopes are 0 to 2 percent. Permeability is moderately rapid. The available water capacity is low.

**CYB2—Cecil sandy loam, 2 to 6 percent slopes, eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6.5 feet.

Permeability and the available water capacity are moderate.

**CYC2—Cecil sandy loam, 6 to 10 percent slopes, eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6.5 feet. Permeability and the available water capacity are moderate.

**DiB—Durham sandy loam, 2 to 6 percent slopes.** This very deep, well drained soil is on uplands. The subsoil is loamy and extends to a depth of more than 40 inches. Depth to bedrock is more than 5 feet. Permeability is moderately slow. The available water capacity is moderate.

**GeB3—Gwinnett clay loam, 2 to 6 percent slopes, severely eroded.** This deep, well drained soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**GeC3—Gwinnett clay loam, 6 to 10 percent slopes, severely eroded.** This deep, well drained soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**GeD3—Gwinnett clay loam, 10 to 15 percent slopes, severely eroded.** This deep, well drained soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**GeE2—Gwinnett clay loam, 15 to 25 percent slopes, eroded.** This deep, well drained soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**GgB2—Gwinnett loam, 2 to 6 percent slopes, eroded.** This deep, well drained soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth

to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**GgC2—Gwinnett loam, 6 to 10 percent slopes, eroded.** This deep, well drained soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**GgD2—Gwinnett loam, 10 to 15 percent slopes, eroded.** This deep, well drained soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**HSB—Hiwassee loam, 2 to 6 percent slopes.** This very deep, well drained soil is on uplands and high terraces. The subsoil is clayey and extends to a depth of more than 40 inches. Permeability and the available water capacity are moderate.

**HTC2—Hiwassee clay loam, 6 to 10 percent slopes, eroded.** This very deep, well drained soil is on uplands and high terraces. The subsoil is clayey and extends to a depth of more than 40 inches. Permeability and the available water capacity are moderate.

**HTD2—Hiwassee clay loam, 10 to 15 percent slopes, eroded.** This very deep, well drained soil is on uplands and high terraces. The subsoil is clayey and extends to a depth of more than 40 inches. Permeability and the available water capacity are moderate.

**HYC—Helena sandy loam, 2 to 10 percent slopes.** This very deep, moderately well drained soil is on broad ridges and toe slopes. The subsoil is clayey and extends to a depth of 40 to 60 inches. Depth to bedrock is more than 5 feet. A seasonal high water table occurs at a depth of 1.5 to 2.5 feet. Permeability is slow. The available water capacity is moderate.

**LDF—Louisburg stony sandy loam, 15 to 45 percent slopes.** This deep, well drained soil is on ridges and side slopes. The subsoil is loamy and extends to a depth of 20 to 40 inches. Depth to bedrock is 20 to 40 inches. The surface layer is stony. Permeability is rapid. The available water capacity is low.

**LkE—Louisa gravelly sandy loam, 10 to 25 percent slopes.** This shallow, somewhat excessively drained

soil is on ridges and side slopes. The subsoil is loamy and extends to a depth of 10 to 20 inches. Depth to bedrock is 10 to 20 inches. Common or many mica flakes occur throughout the soil. Permeability is moderately rapid. The available water capacity is very low.

**LnE—Louisburg sandy loam, 10 to 25 percent slopes.** This deep, well drained soil is on ridges and side slopes. The subsoil is loamy and extends to a depth of 20 to 40 inches. Depth to bedrock is 20 to 40 inches. Permeability is rapid. The available water capacity is low.

**LNF—Louisa soils, 25 to 60 percent slopes.** These shallow, somewhat excessively drained soils are on ridges and side slopes. The subsoil is loamy and extends to a depth of 10 to 20 inches. Depth to bedrock is 10 to 20 inches. Common or many mica flakes occur throughout the profile. Permeability is moderately rapid. The available water capacity is very low.

**MDC3—Madison clay loam, 6 to 10 percent slopes, severely eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6 feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

**MDE3—Madison clay loam, 15 to 25 percent slopes, severely eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6 feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

**MgB2—Madison sandy loam, 2 to 6 percent slopes, eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6 feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

**MgC2—Madison sandy loam, 6 to 10 percent slopes, eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6 feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

**MgD2—Madison sandy loam, 10 to 15 percent slopes, eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6 feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

**MID2—Musella gravelly soils, 6 to 15 percent slopes, eroded.** These shallow, well drained soils are on ridges and side slopes. The subsoil is loamy and extends to a depth of 14 to 20 inches. Depth to bedrock is 14 to 20 inches. The soils have 5 to 35 percent rock fragments in the surface layer and 35 to 50 percent in the subsoil. The surface layer is gravelly. Permeability is moderate. The available water capacity is low.

**MIE3—Musella gravelly soils, 15 to 25 percent slopes, severely eroded.** These shallow, well drained soils are on ridges and side slopes. The subsoil is loamy and extends to a depth of 14 to 20 inches. Depth to bedrock is 14 to 20 inches. The soils have 5 to 35 percent rock fragments in the surface layer and 35 to 50 percent in the subsoil. The surface layer is gravelly. Permeability is moderate. The available water capacity is low.

**MJF—Musella and Pacolet stony soils, 10 to 45 percent slopes.** The soils of this map unit are not consistently associated geographically. An area can contain either or both of these soils.

This shallow, well drained Musella soil is on ridges and side slopes. The subsoil is loamy and extends to a depth of 14 to 20 inches. Depth to bedrock is 14 to 20 inches. The soil has 5 to 35 percent rock fragments in the surface layer and 35 to 50 percent in the subsoil. The surface layer is stony. Permeability is moderate. The available water capacity is low.

This very deep, well drained Pacolet soil is on uplands. The subsoil is clayey and extends to a depth of 18 to 30 inches. Depth to bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**MsD3—Madison and Pacolet soils, 10 to 15 percent slopes, severely eroded.** The soils of this map unit are not consistently associated geographically. An area can contain either or both of these soils.

This very deep, well drained Madison soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6 feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

This very deep, well drained Pacolet soil is on uplands. The subsoil is clayey and extends to a depth of 18 to 30 inches. Depth to bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**MSe2—Madison and Pacolet soils, 15 to 25 percent slopes, eroded.** The soils of this map unit are not consistently associated geographically. An area can contain either or both of these soils.

This very deep, well drained Madison soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6 feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

This very deep, well drained Pacolet soil is on uplands. The subsoil is clayey and extends to a depth of 18 to 30 inches. Depth to bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**PfD—Pacolet sandy loam, 10 to 15 percent slopes.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of 18 to 30 inches. Depth to bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**PgC3—Pacolet sandy clay loam, 6 to 10 percent slopes, severely eroded.** This very deep, well drained soil is on uplands. The subsoil is clayey and extends to a depth of 18 to 30 inches. Depth to bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**Ron—Roanoke silt loam.** This very deep, poorly drained soil is on stream terraces and flood plains. The subsoil is clayey and extends to a depth of 40 to 60 inches. A seasonal high water table occurs within a depth of 1 foot. Flooding is common. Slopes are 0 to 2 percent. Permeability is very slow. The available water capacity is moderate.

**Toc—Toccoa soils.** These very deep, moderately well drained and well drained soils are on flood plains. The soils are mainly loamy material with strata of sandy material. A seasonal high water table occurs at a depth of 2.5 to 5.0 feet. Slopes are less than 4 percent. Flooding is common. Permeability is moderately rapid. The available water capacity is moderate.

**Tod—Toccoa sandy loam, local alluvium.** This very deep, moderately well drained and well drained soil is

on flood plains. The soil is mainly loamy material with strata of sandy material. A seasonal high water table occurs at a depth of 2.5 to 5.0 feet. Slopes are less than 4 percent. Permeability is moderately rapid. The available water capacity is moderate.

**Ubp—Urban land and Borrow pits.** The components of this map unit are so intermingled that they could not be mapped separately at the scale selected.

Urban land mainly consists of areas of business districts, shopping centers, industrial and commercial buildings, private dwellings, schools, churches, parking lots, streets, and sidewalks. The original soils have been altered by grading, cutting, filling, shaping, and smoothing.

Borrow pits are areas of pits or open excavations from which soil or soil parent materials have been removed. They vary in size and depth. Remaining materials have varying texture and depth. The original soil has been extremely altered by cutting, filling, removing, dredging, dumping, or reshaping. Permeability and the available water capacity vary widely from one area to another.

**Ud—Urban land.** Urban land mainly consists of areas of business districts; shopping centers, industrial and commercial buildings, private dwellings, schools, churches, parking lots, streets, and sidewalks. The original soils have been altered by grading, cutting, filling, shaping, and smoothing.

**UeC—Urban land-Appling complex, 2 to 10 percent slopes.** The components of this map unit are so intermingled that they could not be mapped separately at the scale selected.

Urban land mainly consists of areas of business districts, shopping centers, industrial and commercial buildings, private dwellings, schools, churches, parking lots, streets, and sidewalks. The original soils have been altered by grading, cutting, filling, shaping, and smoothing.

This very deep, well drained Appling soil is on ridges and side slopes. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6 feet. Permeability and the available water capacity are moderate.

**UfC—Urban land-Cecil complex, 2 to 10 percent slopes.** The components of this map unit are so intermingled that they could not be mapped separately at the scale selected.

Urban land mainly consists of areas of business districts, shopping centers, industrial and commercial buildings, private dwellings, schools, churches, parking

lots, streets, and sidewalks. The original soils have been altered by grading, cutting, filling, shaping, and smoothing.

This very deep, well drained Cecil soil is on uplands. The subsoil is clayey and extends to a depth of more than 40 inches. Depth to bedrock is more than 6.5 feet. Permeability and the available water capacity are moderate.

**UgC—Urban land-Gwinnett complex, 2 to 10 percent slopes.** The components of this map unit are so intermingled that they could not be mapped separately at the scale selected.

Urban land mainly consists of areas of business districts, shopping centers, industrial and commercial buildings, private dwellings, schools, churches, parking lots, streets, and sidewalks. The original soils have been altered by grading, cutting, filling, shaping, and smoothing.

This deep, well drained Gwinnett soil is on ridges. The subsoil is clayey and extends to a depth of 20 to 40 inches. Depth to soft bedrock is 40 to 60 inches. Depth to hard bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**UhC—Urban land-Madison complex, 2 to 10 percent slopes.** The components of this map unit are so intermingled that they could not be mapped separately at the scale selected.

Urban land mainly consists of areas of business districts, shopping centers, industrial and commercial buildings, private dwellings, schools, churches, parking lots, streets, and sidewalks. The original soils have been altered by grading, cutting, filling, shaping, and smoothing.

This very deep, well drained Madison soil is on uplands. The subsoil is clayey and extends to a depth of 20 to 50 inches. Depth to bedrock is more than 6

feet. Many mica flakes occur in the lower part of the soil. Permeability and the available water capacity are moderate.

**UiE—Urban land and Pacolet soils, 10 to 25 percent slopes.** The components of this map unit are not consistently associated geographically. An area can contain either or both of the components.

Urban land mainly consists of areas of business districts, shopping centers, industrial and commercial buildings, private dwellings, schools, churches, parking lots, streets, and sidewalks. The original soils have been altered by grading, cutting, filling, shaping, and smoothing.

These very deep, well drained Pacolet soils are on uplands. The subsoil is clayey and extends to a depth of 18 to 30 inches. Depth to bedrock is more than 5 feet. Permeability and the available water capacity are moderate.

**WjF—Wilkes stony sandy loam, 10 to 40 percent slopes.** This shallow, well drained soil is on ridges and side slopes. The subsoil is loamy or clayey and extends to a depth of less than 20 inches. Depth to rippable bedrock is less than 20 inches. Depth to hard bedrock is more than 40 inches. The surface layer is stony. Permeability is moderately slow. The available water capacity is very low.

**WvD—Wilkes sandy loam, clayey subsoil variant, 6 to 15 percent slopes.** This shallow, well drained soil is on ridges and side slopes. The subsoil is loamy or clayey and extends to a depth of less than 20 inches. Depth to rippable bedrock is less than 20 inches. Depth to hard bedrock is more than 40 inches. Permeability is moderately slow. The available water capacity is very low.



# Use and Management of the Soils

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## Interpretive Groups

The information given in table 2 can be used to plan the use and management of soils for crop production. Conservation planners and others using this information can evaluate the effect of crop management systems on productivity and on the environment in all or part of the county. This information can be used to maintain or create a land use pattern that is in harmony with the natural soil.

This section discusses land capability classification, prime farmland and additional farmland of statewide importance, and erosion factors.

## Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. In the capability system, soils are generally grouped at three levels—class, subclass, and unit. Only class and subclass are used in this survey area. The classification indicates the degree and kind of limitations that affect the use of soils. It evaluates the soils for mechanized farming systems that produce common cultivated field crops, such as corn, small grains, cotton, hay, and field-grown vegetables.

*Capability class*, the broadest category, indicates groups of soils that have the same general suitability for broad kinds of land use. The groups are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use.

Soils in classes 1, 2, 3, and 4 are suitable, under proper management, for the mechanized production of common field crops and for pasture and woodland production. The soils may have limitations that affect production and the risk of permanent soil deterioration, such as through erosion.

Soils in classes 5, 6, and 7 are generally not suited to the mechanized production of common field crops unless they have special management but are suitable for permanent cover, such as grasses and trees. Class 8 soils generally are not suitable for crops, pasture, or

woodland production without costly management. Class 8 soils may have potential for other uses, such as recreation or wildlife habitat.

*Capability subclasses* are soil groups within one class. They are designated by adding a letter, *E*, *W*, *S*, or *C*, to the class numeral, for example, 2E. The letter *E* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *W* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *S* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *C*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *W*, *S*, or *C* because the soils in class 5 have little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit in Cobb County is given in table 2 and in the yields tables.

## Prime Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cropland, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long

periods, and it either is not frequently flooded during the growing season or is protected from flooding.

The following list is map units in Cobb County that meet the soil requirements for prime farmland. Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by corrective measures, such as drainage or flood control.

AL	Altavista silt loam, occasionally flooded
AIB	Altavista sandy loam, 0 to 4 percent slopes
AmB	Appling sandy loam, 2 to 6 percent slopes
CYB2	Cecil sandy loam, 2 to 6 percent slopes, eroded
DiB	Durham sandy loam, 2 to 6 percent slopes
GgB2	Gwinnett loam, 2 to 6 percent slopes, eroded
HSB	Hiwassee loam, 2 to 6 percent slopes
MgB2	Madison sandy loam, 2 to 6 percent slopes, eroded

#### Additional Farmland of Statewide Importance

The following list is map units in Cobb County that are considered additional farmland of statewide importance. This farmland is land, in addition to prime farmland, important for the production of food, feed, fiber, forage, and oilseed crops. Generally, it includes soils that nearly qualify as prime farmland and that can economically produce high yields of crops when proper management and acceptable farming methods are applied. Some of these soils can produce yields as high as those of prime farmland soils if conditions are favorable.

AmC	Appling sandy loam, 6 to 10 percent slopes
Cah	Cartecay soils (where not flooded during the growing season more than 1 year out of 3 years and where sufficiently drained)
Cw	Cartecay silt loam, silty variant (where not flooded during the growing season more than 1 year out of 3 years and where sufficiently drained)

CYC2	Cecil sandy loam, 6 to 10 percent slopes, eroded
GgC2	Gwinnett loam, 6 to 10 percent slopes, eroded
HYC	Helena sandy loam, 2 to 10 percent slopes
MgC2	Madison sandy loam, 6 to 10 percent slopes, eroded
Ron	Roanoke silt loam (where not flooded during the growing season more than 1 year out of 3 years and where sufficiently drained)
Toc	Toccoa soils (where not flooded during the growing season more than 1 year out of 3 years)

#### Erosion Factors

Erosion factors can be used to predict the extent of soil loss on cropland as a result of erosion caused by rainfall. The predictions are useful as a guide in selecting practices for soil and water conservation.

*Erosion factor K* indicates the susceptibility of a soil to sheet and rill erosion by water. Soil properties that influence erodibility by water are those that affect infiltration rate, movement of water through the soil, and water storage capacity and those that resist dispersion, splashing, abrasion, and transporting forces from rainfall and runoff. Soil losses are expressed in tons per acre per year. These estimates are based on percentage of silt plus very fine sand, percentage of organic matter, and percentage of sand coarser than very fine sand and on soil structure and permeability.

*Erosion factor T* is an estimate of the maximum annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons of soil loss per acre per year. Rates of 1 through 5 are used, depending upon soil properties and prior erosion. Soil-loss tolerances were subjectively evaluated, based on the following general guides: maintenance of an adequate rooting depth for crop production, potential crop yield reduction, maintenance of water-control structures affected by sedimentation, prevention of gullies, and value of nutrients lost.

TABLE 2.--INTERPRETIVE GROUPS

Map symbol	Map unit name	Component name	Land capability	Prime farmland	K factor	T factor
AL	Altavista silt loam, occasionally flooded	Altavista	2W	1	.32	5
AlB	Altavista sandy loam, 0 to 4 percent slopes	Altavista	2E	1	.24	5
AmB	Appling sandy loam, 2 to 6 percent slopes	Appling	2E	1	.24	4
AmC	Appling sandy loam, 6 to 10 percent slopes	Appling	3E	0	.24	4
AmD	Appling sandy loam, 10 to 15 percent slopes	Appling	4E	0	.24	4
AnB3	Appling sandy clay loam, 2 to 6 percent slopes, severely eroded	Appling	2E	0	.28	3
AnC3	Appling sandy clay loam, 6 to 10 percent slopes, severely eroded	Appling	3E	0	.28	3
Cah	Cartecay soils	Cartecay	5W	0	.24	5
Csw	Chewacla soils, wet variants	Chewacla variant	4W	0	.28	5
Cw	Cartecay silt loam, silty variant	Cartecay variant	3W	0	.32	5
CYB2	Cecil sandy loam, 2 to 6 percent slopes, eroded	Cecil	2E	1	.28	4
CYC2	Cecil sandy loam, 6 to 10 percent slopes, eroded	Cecil	3E	0	.28	4
DiB	Durham sandy loam, 2 to 6 percent slopes	Durham	2E	1	.24	5
GeB3	Gwinnett clay loam, 2 to 6 percent slopes, severely eroded	Gwinnett	3E	0	.28	4
GeC3	Gwinnett clay loam, 6 to 10 percent slopes, severely eroded	Gwinnett	3E	0	.28	4
GeD3	Gwinnett clay loam, 10 to 15 percent slopes, severely eroded	Gwinnett	4E	0	.28	4
GeE2	Gwinnett clay loam, 15 to 25 percent slopes, eroded	Gwinnett	6E	0	.28	4
GgB2	Gwinnett loam, 2 to 6 percent slopes, eroded	Gwinnett	3E	1	.28	4
GgC2	Gwinnett loam, 6 to 10 percent slopes, eroded	Gwinnett	4E	0	.28	4
GgD2	Gwinnett loam, 10 to 15 percent slopes, eroded	Gwinnett	6E	0	.28	4
HSB	Hiwassee loam, 2 to 6 percent slopes	Hiwassee	2E	1	.28	5
HTC2	Hiwassee clay loam, 6 to 10 percent slopes, eroded	Hiwassee	4E	0	.28	5
HTD2	Hiwassee clay loam, 10 to 15 percent slopes, eroded	Hiwassee	6E	0	.28	5
HYC	Helena sandy loam, 2 to 10 percent slopes	Helena	3E	0	.24	4

TABLE 2.--INTERPRETIVE GROUPS--Continued

Map symbol	Map unit name	Component name	Land capability	Prime farm-land	K factor	T factor
LDF	Louisburg stony sandy loam, 15 to 45 percent slopes	Louisburg	6S	0	.10	3
LkE	Louisa gravelly sandy loam, 10 to 25 percent slopes	Louisa	7E	0	.17	2
LnE	Louisburg sandy loam, 10 to 25 percent slopes	Louisburg	7E	0	.24	3
LNF	Louisa soils, 25 to 60 percent slopes	Louisa	7E	0	.17	2
MDC3	Madison clay loam, 6 to 10 percent slopes, severely eroded	Madison	4E	0	.28	3
MDE3	Madison clay loam, 15 to 25 percent slopes, severely eroded	Madison	7E	0	.28	3
MgB2	Madison sandy loam, 2 to 6 percent slopes, eroded	Madison	2E	1	.24	4
MgC2	Madison sandy loam, 6 to 10 percent slopes, eroded	Madison	3E	0	.24	4
MgD2	Madison sandy loam, 10 to 15 percent slopes, eroded	Madison	4E	0	.24	4
MID2	Musella gravelly soils, 6 to 15 percent slopes, eroded	Musella	6E	0	.20	2
MIE3	Musella gravelly soils, 15 to 25 percent slopes, severely eroded	Musella	7E	0	.20	2
MJF	Musella and Pacolet stony soils, 10 to 45 percent slopes	Musella	7E	0	.20	2
		Pacolet	7E	0	.24	2
MsD3	Madison and Pacolet soils, 10 to 15 percent slopes, severely eroded	Madison	6E	0	.28	3
		Pacolet	6E	0	.24	2
MsE2	Madison and Pacolet soils, 15 to 25 percent slopes, eroded	Madison	6E	0	.24	4
		Pacolet	6E	0	.20	3
PfD	Pacolet sandy loam, 10 to 15 percent slopes	Pacolet	4E	0	.20	3
PgC3	Pacolet sandy clay loam, 6 to 10 percent slopes, severely eroded	Pacolet	4E	0	.24	2
Ron	Roanoke silt loam	Roanoke	5W	0	.37	5
Toc	Toccoa soils	Toccoa	2W	0	.10	4
Tod	Toccoa sandy loam, local alluvium	Toccoa	2W	0	.10	4
Ubp	Urban land and Borrow pits	Urban land		0		
		Borrow pits		0		
Ud	Urban land	Urban land		0		

TABLE 2.--INTERPRETIVE GROUPS--Continued

Map symbol	Map unit name	Component name	Land capability	Prime farmland	K factor	T factor
UeC	Urban land-Appling complex, 2 to 10 percent slopes	Urban land		0		
		Appling	3E	0	.28	3
UfC	Urban land-Cecil complex, 2 to 10 percent slopes	Urban land		0		
		Cecil	4E	0	.28	3
UgC	Urban land-Gwinnett complex, 2 to 10 percent slopes	Urban land		0		
		Gwinnett	4E	0	.28	4
UhC	Urban land-Madison complex, 2 to 10 percent slopes	Urban land		0		
		Madison	4E	0	.28	3
UiE	Urban land and Pacolet soils, 10 to 25 percent slopes	Urban land		0		
		Pacolet	7E	0	.24	2
WjF	Wilkes stony sandy loam, 10 to 40 percent slopes	Wilkes	7S	0	.17	2
WvD	Wilkes sandy loam, clayey subsoil variant, 6 to 15 percent slopes	Wilkes variant	6E	0	.24	2

## Yields per Acre of Crops and Pasture

The average yields per acre that can be expected of the principal crops and pasture plants in Cobb County under a high level of management are presented in tables 3 and 4. In any given year, yields may be higher or lower than those indicated in the tables because of variations in rainfall and other climatic factors. The land capability classification also is shown in the tables. (For information on capability classification, see the section "Interpretive Groups.")

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

The management needed to obtain the indicated yields of the various crops and pasture plants depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable

high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, or green manure crops; and harvesting that ensures the smallest possible loss.

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

Under good management, proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing and pasture renovation are also important management practices.

TABLE 3.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS

(Absence of a entry indicates that the soil is not suited to the crop  
or the crop is generally not grown on the soil)

Map symbol and soil name	Land capability	Corn	Wheat
		<u>Bu</u>	<u>Bu</u>
AL----- Altavista	2W	125	55
AlB----- Altavista	2E	115	55
AmB----- Appling	2E	95	45
AmC----- Appling	3E	80	40
AmD----- Appling	4E	70	35
AnB3----- Appling	2E	80	40
AnC3----- Appling	3E	65	35
Cah----- Cartecay	5W		
Csw----- Chewacla variants	4W	80	30
Cw----- Cartecay variant	3W	85	45
CYB2----- Cecil	2E	95	45
CYC2----- Cecil	3E	90	40
DiB----- Durham	2E	85	45
GeB3----- Gwinnett	3E	75	50
GeC3----- Gwinnett	3E	75	50
GeD3----- Gwinnett	4E	65	40
GeE2----- Gwinnett	6E		
GgB2----- Gwinnett	3E	75	45
GgC2----- Gwinnett	4E	65	40
GgD2----- Gwinnett	6E		

TABLE 3.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Map symbol and soil name	Land capability	Corn	Wheat
		<u>Bu</u>	<u>Bu</u>
HSB----- Hiwassee	2E	110	55
HTC2----- Hiwassee	4E	85	45
HTD2----- Hiwassee	6E		
HYC----- Helena	3E	70	40
LDF----- Louisburg	6S		
LkE----- Louisa	7E		
LnE----- Louisburg	7E		
LNF----- Louisa	7E		
MDC3----- Madison	4E	60	40
MDE3----- Madison	7E		
MgB2----- Madison	2E	90	50
MgC2----- Madison	3E	80	45
MgD2----- Madison	4E	70	40
MID2----- Musella	6E		
MIE3----- Musella	7E		
MJF----- Musella and Pacolet	7E		
MsD3----- Madison and Pacolet	6E		
MsE2----- Madison and Pacolet	6E		
PfD----- Pacolet	4E	65	30
PgC3----- Pacolet	4E	50	30
Ron----- Roanoke	5W		

TABLE 3.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Map symbol and soil name	Land capability	Corn	Wheat
		<u>Bu</u>	<u>Bu</u>
Toc----- Toccoa	2W	90	45
Tod----- Toccoa	2W	90	45
Ubp. Urban land and Borrow pits			
Ud. Urban land			
UeC: Urban land.			
Appling-----	3E	65	35
UfC: Urban land.			
Cecil-----	4E	60	40
UgC: Urban land.			
Gwinnett-----	4E	65	40
UhC: Urban land.			
Madison-----	4E	60	40
UiE: Urban land.			
Pacolet-----	7E		
WjF----- Wilkes	7S		
WvD----- Wilkes variant	6E		

TABLE 4.--LAND CAPABILITY AND YIELDS PER ACRE OF PASTURE

(Absence of an entry indicates that the soil is not suited to the crop or the crop is generally not grown on the soil)

Map symbol and soil name	Land capability	Tall fescue	Improved bermudagrass	Grass-legume hay
		<u>AUM*</u>	<u>AUM*</u>	<u>Tons</u>
AL----- Altavista	2W	9.0	10.0	
AlB----- Altavista	2E	9.0	10.0	
AmB----- Appling	2E	7.5	9.0	4.8
AmC----- Appling	3E	7.0	8.0	4.5
AmD----- Appling	4E	6.5	7.0	4.2
AnB3----- Appling	2E	7.0	9.0	4.5
AnC3----- Appling	3E	6.5	7.0	4.2
Cah----- Cartecay	5W	7.0		
Csw----- Chewacla variants	4W			4.0
Cw----- Cartecay variant	3W	7.0		
CYB2----- Cecil	2E	7.5	9.0	3.2
CYC2----- Cecil	3E	7.0	8.0	3.0
DiB----- Durham	2E			
GeB3----- Gwinnett	3E	6.0	7.5	
GeC3----- Gwinnett	3E	5.5	8.5	
GeD3----- Gwinnett	4E	5.0	7.0	
GeE2----- Gwinnett	6E	4.0	6.5	
GgB2----- Gwinnett	3E	6.0	7.5	
GgC2----- Gwinnett	4E	5.5	7.5	

\* See footnote at end of table.

TABLE 4.--LAND CAPABILITY AND YIELDS PER ACRE OF PASTURE--Continued

Map symbol and soil name	Land capability	Tall fescue	Improved bermudagrass	Grass-legume hay
		<u>AUM*</u>	<u>AUM*</u>	<u>Tons</u>
GgD2----- Gwinnett	6E	4.0	6.5	
HSB----- Hiwassee	2E			3.9
HTC2----- Hiwassee	4E			3.0
HTD2----- Hiwassee	6E			3.0
HYC----- Helena	3E	5.5	6.0	3.2
LDF----- Louisburg	6S	3.0		
LkE----- Louisa	7E			
LnE----- Louisburg	7E			
LNF----- Louisa	7E			
MDC3----- Madison	4E	6.5	7.5	3.0
MDE3----- Madison	7E			
MgB2----- Madison	2E	7.0	8.5	4.5
MgC2----- Madison	3E	6.5	7.5	3.9
MgD2----- Madison	4E			3.6
MID2----- Musella	6E	4.8	7.0	
MIE3----- Musella	7E			
MJF----- Musella and Pacolet	7E			
MsD3----- Madison and Pacolet	6E			2.7
MsE2----- Madison and Pacolet	6E			
PfD----- Pacolet	4E	5.5	5.8	

\* See footnote at end of table.

TABLE 4.--LAND CAPABILITY AND YIELDS PER ACRE OF PASTURE--Continued

Map symbol and soil name	Land capability	Tall fescue	Improved bermudagrass	Grass-legume hay
		<u>AUM*</u>	<u>AUM*</u>	<u>Tons</u>
PgC3----- Pacolet	4E	5.0	5.5	
Ron----- Roanoke	5W	5.0		2.0
Toc----- Toccoa	2W	6.5	7.5	4.0
Tod----- Toccoa	2W	6.5	7.5	4.0
Ubp. Urban land and Borrow pits				
Ud. Urban land				
UeC: Urban land.				
Appling-----	3E			4.2
UFC: Urban land.				
Cecil-----	4E			2.2
UgC: Urban land.				
Gwinnett-----	4E	5.5	7.5	
UhC: Urban land.				
Madison-----	4E			3.0
UiE: Urban land.				
Pacolet-----	7E			
WjF----- Wilkes	7S			
WvD----- Wilkes variant	6E			4.2

\* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

## Woodland Management and Productivity

Table 5 provides information about management concerns and productivity for map units in the survey area that are suitable for producing timber. The ratings of *slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations to be considered in forest management.

Table 5 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *X* indicates a soil that has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The soil may have restricted drainage, a high water table, or flooding. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable species. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The soil has equipment limitations, has a low moisture-holding capacity, and commonly is low in available plant nutrients. The letter *F* indicates a soil that has a large amount of rock fragments. It includes flaggy soils. The letter *A* indicates a soil having no significant restrictions or limitations that affect forest use or management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventative measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional care in planning harvesting and reforestation activities, and the use of special equipment.

Ratings of *equipment limitation* indicate limits for the use of forest management equipment, year-round or seasonal. The rating is *slight* if the use of equipment is not restricted to a particular time of year and special equipment is not needed. The rating is *moderate* if the use of equipment is limited for a short seasonal period or if some modification is needed for managing the equipment. The rating is *severe* if the use of equipment has seasonal limitations, if special equipment or management is needed, or if the use of equipment is hazardous.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of sufficient rainfall, as influenced by kinds of soil or topographic features. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over because of excessive soil wetness and many trees to break; and *severe* if moderate or strong winds commonly blow trees over because of excessive soil wetness.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. The risk is *slight* if competition from undesirable plants is minor. The risk is *moderate* if competition from undesirable plants hinders the development of a fully stocked stand of desirable trees. The risk is *severe* if competition from undesirable plants prevents the establishment of a desirable stand unless the site is intensively prepared and maintained.

The *potential productivity* of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence.

The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil. It is used to determine the ordination class.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. Site indexes shown in table 5 are averages based on measurements made at sites that are representative of the soil series and that are free from past fire and disturbances. When comparing the site index and woodland productivity of

different soils, the values for the same tree species should be compared.

The *productivity class* is the yield likely to be produced by the most important trees, expressed in cubic meters per hectare per year calculated at the age

of culmination of mean annual increment.

*Trees to plant* are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY

Map symbol and soil name	Ordi-nation symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Plant competi-tion	Common trees	Site index	Produc-tivity class	
AL----- Altavista	9A	Slight	Slight	Slight	Slight	Moderate	Red maple----- American beech--- Sweetgum----- Yellow-poplar--- Shortleaf pine--- Longleaf pine--- White oak----- Southern red oak- Water oak----- Loblolly pine---	87 77 91	8 4 9	Loblolly pine.
AlB----- Altavista	9A	Slight	Slight	Slight	Slight	Moderate	Red maple----- American beech--- Sweetgum----- Yellow-poplar--- Shortleaf pine--- Longleaf pine--- White oak----- Southern red oak- Water oak----- Loblolly pine---	87 77 91	8 4 9	Loblolly pine.
AmB----- Appling	8A	Slight	Slight	Slight	Slight	Moderate	Hickory----- Sweetgum----- Yellow-poplar--- Virginia pine--- White oak----- Scarlet oak----- Southern red oak- Shortleaf pine--- Loblolly pine---	88 74 64 74 65 84	6 8 3 4 7 8	Loblolly pine.
AmC----- Appling	8A	Slight	Slight	Slight	Slight	Moderate	Hickory----- Sweetgum----- Yellow-poplar--- Virginia pine--- White oak----- Scarlet oak----- Southern red oak- Shortleaf pine--- Loblolly pine---	88 74 64 74 65 84	6 8 3 4 7 8	Loblolly pine.
AmD----- Appling	8A	Slight	Slight	Slight	Slight	Moderate	Hickory----- Sweetgum----- Yellow-poplar--- Virginia pine--- White oak----- Scarlet oak----- Southern red oak- Shortleaf pine--- Loblolly pine---	88 74 64 74 65 84	6 8 3 4 7 8	Loblolly pine.
AnB3----- Appling	7C	Slight	Moderate	Moderate	Slight	Moderate	Virginia pine--- Shortleaf pine--- Loblolly pine---	65 60 74	7 6 7	Loblolly pine.
AnC3----- Appling	7C	Slight	Moderate	Moderate	Slight	Moderate	Virginia pine--- Shortleaf pine--- Loblolly pine---	65 60 74	7 6 7	Loblolly pine.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class	
Cah----- Cartecay	10	Slight	Moderate	Slight	Slight	Moderate	Southern red oak-----	85	5	Sweetgum, yellow-poplar, loblolly pine, water oak, American sycamore.
							Sweetgum-----	95	8	
							Yellow-poplar-----	105	8	
							Loblolly pine-----	95	10	
Csw----- Chewacla variants	7W	Slight	Moderate	Slight	Moderate	Severe	Red maple-----			Sweetgum, yellow-poplar, loblolly pine, American sycamore.
							Green ash-----			
							Blackgum-----			
							Southern red oak-----			
							Water oak-----	80	5	
							Willow oak-----			
Cw----- Cartecay variant	10	Slight	Moderate	Slight	Slight	Moderate	Southern red oak-----	85	5	Sweetgum, yellow-poplar, loblolly pine, water oak, American sycamore.
							Sweetgum-----	95	8	
							Yellow-poplar-----	105	8	
							Loblolly pine-----	95	10	
CYB2----- Cecil	8A	Slight	Slight	Slight	Slight	Moderate	Sweetgum-----	76	5	Loblolly pine.
							Yellow-poplar-----	92	6	
							Virginia pine-----	71	8	
							White oak-----	79	4	
							Scarlet oak-----	81	4	
							Southern red oak-----	79	4	
							Northern red oak-----	81	4	
							Post oak-----	72	4	
							Shortleaf pine-----	69	8	
							Loblolly pine-----	83	8	
CYC2----- Cecil	8A	Slight	Slight	Slight	Slight	Moderate	Sweetgum-----	76	5	Loblolly pine.
							Yellow-poplar-----	92	6	
							Virginia pine-----	71	8	
							White oak-----	79	4	
							Scarlet oak-----	81	4	
							Southern red oak-----	79	4	
							Northern red oak-----	81	4	
							Post oak-----	72	4	
							Shortleaf pine-----	69	8	
							Loblolly pine-----	83	8	
DiB----- Durham	8A	Slight	Slight	Slight			Sweetgum-----	80	6	Yellow-poplar, loblolly pine.
							Shortleaf pine-----	72	8	
							White oak-----	70	4	
							Southern red oak-----	80	4	
							Post oak-----	70	4	
							Yellow-poplar-----	80	5	
Loblolly pine-----	80	8								
GeB3----- Gwinnett	8A	Slight	Slight	Slight	Slight	Slight	White oak-----	69	4	Loblolly pine, yellow-poplar, Virginia pine.
							Southern red oak-----	72	4	
							Loblolly pine-----	81	8	

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	Produc- tivity class	
GeC3----- Gwinnett	7C	Moderate	Moderate	Moderate	Slight	Moderate	Shortleaf pine---	65	7	Loblolly pine, Virginia pine.
							Loblolly pine---	75	7	
							Virginia pine---	65	7	
GeD3----- Gwinnett	7C	Moderate	Moderate	Moderate	Slight	Moderate	Shortleaf pine---	65	7	Loblolly pine, Virginia pine.
							Loblolly pine---	75	7	
							Virginia pine---	65	7	
GeE2----- Gwinnett	4R	Severe	Severe	Moderate	Slight	Moderate	Loblolly pine---	65	7	
							Virginia pine---	65	7	
GgB2----- Gwinnett	8A	Slight	Slight	Slight	Slight	Slight	White oak-----	69	4	Loblolly pine, yellow-poplar, Virginia pine.
							Southern red oak-	72	4	
							Loblolly pine---	81	8	
GgC2----- Gwinnett	7C	Moderate	Moderate	Moderate	Slight	Moderate	Shortleaf pine---	65	7	Loblolly pine, Virginia pine.
							Loblolly pine---	75	7	
							Virginia pine---	65	7	
GgD2----- Gwinnett	7C	Moderate	Moderate	Moderate	Slight	Moderate	Shortleaf pine---	65	7	Loblolly pine, Virginia pine.
							Loblolly pine---	75	7	
							Virginia pine---	65	7	
HSB----- Hiwassee	8A	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar----	85	6	Loblolly pine.
							White oak-----	80	4	
							Southern red oak-	80	4	
							Northern red oak-	80	4	
							Shortleaf pine---	75	8	
							Loblolly pine---	85	8	
HTC2----- Hiwassee	7C	Slight	Moderate	Moderate	Slight	Slight	White oak-----	70	4	Loblolly pine.
							Southern red oak-	75	4	
							Northern red oak-	75	4	
							Shortleaf pine---	68	7	
							Loblolly pine---	71	7	
HTD2----- Hiwassee	7C	Slight	Moderate	Moderate	Slight	Slight	White oak-----	70	4	Loblolly pine.
							Southern red oak-	75	4	
							Northern red oak-	75	4	
							Shortleaf pine---	68	7	
							Loblolly pine---	71	7	
HYC----- Helena	8A	Slight	Slight	Slight	Slight	Severe	Hickory-----			Yellow-poplar, loblolly pine.
							Sweetgum-----			
							Shortleaf pine---	66	7	
							Virginia pine---			
							White oak-----			
							Southern red oak-			
							Northern red oak-			
							Black oak-----			
							Yellow-poplar----			
							Loblolly pine---	84	8	
LDF----- Louisburg	7X	Moderate	Severe	Slight	Severe	Moderate	Shortleaf pine---	69	8	Yellow-poplar, loblolly pine, Virginia pine.
							White oak-----	68	4	
							Southern red oak-	70	4	
							Yellow-poplar----	84	6	
							Loblolly pine---	77	7	
							Virginia pine---	71	8	

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi-nation symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Plant competi-tion	Common trees	Site index	Produc-tivity class	
LkE----- Louisa	7R	Moderate	Moderate	Moderate	Severe	Moderate	Yellow-poplar----	85	6	Loblolly pine.
							Shortleaf pine----	67	7	
							Longleaf pine----	67	5	
							Southern red oak-	70	4	
							Loblolly pine----	72	7	
LnE----- Louisburg	7R	Moderate	Moderate	Slight	Severe	Moderate	Shortleaf pine----	69	8	Yellow-poplar,
							White oak-----	68	4	loblolly pine,
							Southern red oak-	72	4	Virginia pine.
							Yellow-poplar----	84	6	
							Loblolly pine----	77	7	
							Virginia pine----	71	8	
LNf----- Louisa	7R	Moderate	Moderate	Moderate	Severe	Moderate	Yellow-poplar----	85	6	Loblolly pine.
							Shortleaf pine----	67	7	
							Longleaf pine----	67	5	
							Southern red oak-	70	4	
							Loblolly pine----	72	7	
MDC3----- Madison	6C	Slight	Moderate	Moderate	Slight	Severe	Virginia pine----	66	7	Loblolly pine.
							White oak-----			
							Northern red oak-	66	3	
							Shortleaf pine----	62	6	
							Loblolly pine----	72	7	
MDE3----- Madison	6R	Moderate	Moderate	Moderate	Slight	Severe	Virginia pine----	66	7	Loblolly pine.
							White oak-----			
							Northern red oak-	66	3	
							Shortleaf pine----	62	6	
							Loblolly pine----	72	7	
MgB2----- Madison	7A	Slight	Slight	Slight	Slight	Severe	Yellow-poplar----	96	7	Loblolly pine.
							Virginia pine----	71	8	
							White oak-----	75	4	
							Southern red oak-	75	4	
							Northern red oak-	75	4	
							Shortleaf pine----	64	7	
							Loblolly pine----	80	8	
MgC2----- Madison	7A	Slight	Slight	Slight	Slight	Severe	Yellow-poplar----	96	7	Loblolly pine.
							Virginia pine----	71	8	
							White oak-----	75	4	
							Southern red oak-	75	4	
							Northern red oak-	75	4	
							Shortleaf pine----	64	7	
							Loblolly pine----	80	8	
MgD2----- Madison	7A	Slight	Slight	Slight	Slight	Severe	Yellow-poplar----	96	7	Loblolly pine.
							Virginia pine----	71	8	
							White oak-----	75	4	
							Southern red oak-	75	4	
							Northern red oak-	75	4	
							Shortleaf pine----	64	7	
							Loblolly pine----	80	8	
MID2----- Musella	7R	Moderate	Moderate	Moderate	Moderate	Slight	Loblolly pine----	72	7	Loblolly pine,
							Virginia pine----	65	7	Virginia pine.
MIE3----- Musella	7R	Moderate	Moderate	Moderate	Moderate	Slight	Loblolly pine----	72	7	Loblolly pine,
							Virginia pine----	65	7	Virginia pine.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class	
MJF: Musella-----	7X	Slight	Moderate	Moderate	Moderate	Slight	Loblolly pine----- Virginia pine-----	72 65	7 7	Loblolly pine, Virginia pine.
Pacolet-----	8R	Moderate	Moderate	Slight	Slight	Slight	Hickory----- Virginia pine----- White oak----- Northern red oak----- Yellow-poplar----- Shortleaf pine--- Loblolly pine-----	90 70 78	6 8 8	Yellow-poplar, loblolly pine.
MsD3: Madison-----	6C	Slight	Moderate	Moderate	Slight	Severe	Virginia pine----- White oak----- Northern red oak----- Shortleaf pine--- Loblolly pine-----	66 66 62 72	7 3 6 7	Loblolly pine.
Pacolet-----	6C	Slight	Moderate	Moderate	Slight	Slight	Yellow-poplar----- Shortleaf pine--- Loblolly pine-----	80 60 70	5 6 6	Yellow-poplar, loblolly pine.
MsE2: Madison-----	7R	Moderate	Moderate	Slight	Slight	Severe	Yellow-poplar----- Virginia pine----- White oak----- Southern red oak----- Northern red oak----- Shortleaf pine--- Loblolly pine-----	96 71 75 75 75 64 80	7 8 4 4 4 7 8	Loblolly pine.
Pacolet-----	8R	Moderate	Moderate	Slight	Slight	Slight	Hickory----- Virginia pine----- White oak----- Northern red oak----- Yellow-poplar----- Shortleaf pine--- Loblolly pine-----	90 70 78	6 8 8	Yellow-poplar, loblolly pine.
PfD----- Pacolet	8A	Slight	Slight	Slight	Slight	Slight	Hickory----- Virginia pine----- White oak----- Northern red oak----- Yellow-poplar----- Shortleaf pine--- Loblolly pine-----	90 70 78	6 8 8	Yellow-poplar, loblolly pine.
PgC3----- Pacolet	6C	Slight	Moderate	Moderate	Slight	Slight	Yellow-poplar----- Shortleaf pine--- Loblolly pine-----	80 60 70	5 6 6	Yellow-poplar, loblolly pine.
Ron----- Roanoke	7W	Slight	Severe	Severe	Slight	Severe	White oak----- Willow oak----- Sweetgum-----	75 76 90	4 4 7	Sweetgum.
Toc----- Toccoa	9A	Slight	Slight	Slight	Slight	Moderate	Sweetgum----- Southern red oak----- Yellow-poplar----- Loblolly pine-----	100 107 90	10 8 9	Yellow-poplar, loblolly pine, American sycamore, cherrybark oak.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi-nation symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Plant competi-tion	Common trees	Site index	Produc-tivity class	
Tod----- Toccoa	9A	Slight	Slight	Slight	Slight	Moderate	Sweetgum----- Southern red oak- Yellow-poplar---- Loblolly pine----	100 107 90	10 8 9	Yellow-poplar, loblolly pine, American sycamore, cherrybark oak.
Ubp. Urban land and Borrow pits										
Ud. Urban land										
UeC: Urban land.										
Appling-----	7C	Slight	Moderate	Moderate	Slight	Moderate	Virginia pine---- Shortleaf pine--- Loblolly pine----	65 60 74	7 6 7	Loblolly pine.
UfC: Urban land.										
Cecil-----	7C	Slight	Moderate	Moderate	Slight	Moderate	Virginia pine---- White oak----- Northern red oak- Shortleaf pine--- Loblolly pine----	65 64 63 72	7 3 7 7	Loblolly pine.
UgC: Urban land.										
Gwinnett-----	7C	Moderate	Moderate	Moderate	Slight	Moderate	Shortleaf pine--- Loblolly pine---- Virginia pine----	65 75 65	7 7 7	Loblolly pine, Virginia pine.
UhC: Urban land.										
Madison-----	6C	Slight	Moderate	Moderate	Slight	Severe	Virginia pine---- White oak----- Northern red oak- Shortleaf pine--- Loblolly pine----	66 66 62 72	7 3 6 7	Loblolly pine.
UiE: Urban land.										
Pacolet-----	6R	Moderate	Moderate	Moderate	Slight	Slight	Yellow-poplar---- Shortleaf pine--- Loblolly pine----	80 60 70	5 6 6	Yellow-poplar, loblolly pine.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class	
WjF----- Wilkes	7R	Moderate	Moderate	Moderate	Moderate	Moderate	Shagbark hickory-			Loblolly pine, Virginia pine.
							Sweetgum-----	82	6	
							Shortleaf pine---	63	7	
							White oak-----			
							Southern red oak-	76	4	
							Blackjack oak----			
							Post oak-----	79	4	
							Eastern redcedar-			
Loblolly pine----	75	7								
Virginia pine----										
WvD----- Wilkes variant	7D	Slight	Slight	Slight			Hickory-----			Loblolly pine, Virginia pine.
							Sweetgum-----	82	6	
							Shortleaf pine---	63	7	
							White oak-----			
							Southern red oak-	76	4	
							Post oak-----	79	4	
							Loblolly pine----	75	7	
							Virginia pine----			

## Recreation

In table 6, the soils of the survey area are rated according to the limitations that affect their suitability for camp areas, picnic areas, playgrounds, and paths and trails. Not considered in these ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and either access to public sewer lines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of height, duration, and frequency of flooding is essential.

In table 6, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. Good performance and low maintenance can be expected. *Moderate* means that soil properties are moderately favorable. Limitations can be overcome or alleviated by planning, design, or special maintenance. During some part of the year, the expected performance is less desirable than that for soils rated slight. *Severe* means that soil properties are unfavorable. Severe limitations include steep slopes, bedrock near the surface, flooding, and a seasonal high water table. The limitations can be offset only by costly soil reclamation, special design, intensive maintenance, or by a combination of these measures.

*Camp areas* require site preparation, such as shaping

and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soils are rated on the basis of soil properties that influence the ease of developing a camping area and the performance of the camping area after development. Soil properties that affect trafficability and the growth of vegetation after heavy use are also important.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on soil properties that affect the cost of shaping the site, trafficability, and the growth of vegetation after development. The soils used as picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

*Playgrounds* require soils that have no stones on the surface and that can withstand heavy foot traffic and still maintain adequate vegetation. The ratings are based on soil properties that affect the cost of shaping, trafficability, and the growth of vegetation. Slope and stoniness are the main concerns in developing playgrounds. The soils used as playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

*Paths and trails* for hiking, horseback riding, and similar uses should require little or no cutting and filling in site preparation. The ratings are based on soil properties that affect trafficability and erodibility. The soils used for paths and trails should remain firm under foot traffic and not be dusty when dry.

TABLE 6.--RECREATIONAL DEVELOPMENT

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
AL----- Altavista	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.
ALB----- Altavista	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.
AmB----- Appling	Slight-----	Slight-----	Moderate: slope, small stones.	Slight.
AmC----- Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
AmD----- Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
AnB3----- Appling	Slight-----	Slight-----	Moderate: slope, small stones.	Slight.
AnC3----- Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Cah----- Cartecay	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness.
Csw----- Chewacla variants	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.
Cw----- Cartecay variant	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
CYB2----- Cecil	Slight-----	Slight-----	Moderate: slope, small stones.	Slight.
CYC2----- Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
DiB----- Durham	Slight-----	Slight-----	Moderate: slope.	Slight.
GeB3----- Gwinnett	Slight-----	Slight-----	Moderate: slope, small stones.	Slight.
GeC3----- Gwinnett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
GeD3----- Gwinnett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
GeE2----- Gwinnett	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
GgB2----- Gwinnett	Slight-----	Slight-----	Moderate: slope, small stones.	Slight.
GgC2----- Gwinnett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
GgD2----- Gwinnett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
HSB----- Hiwassee	Slight-----	Slight-----	Moderate: slope.	Slight.
HTC2----- Hiwassee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
HTD2----- Hiwassee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
HYC----- Helena	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.
LDF----- Louisburg	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
LkE----- Louisa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
LnE----- Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
LNF----- Louisa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
MDC3----- Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MDE3----- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
MgB2----- Madison	Slight-----	Slight-----	Moderate: slope, small stones.	Slight.
MgC2----- Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MgD2----- Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MID2----- Musella	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
MIE3----- Musella	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
MJF: Musella-----	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MsD3: Madison-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Pacolet-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MsE2: Madison-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
PFD----- Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
PgC3----- Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Ron----- Roanoke	Severe: flooding, wetness, percs slowly.	Severe: wetness, too acid, percs slowly.	Severe: wetness, flooding, percs slowly.	Severe: wetness.
Toc----- Toccoa	Severe: flooding.	Slight-----	Moderate: flooding.	Slight.
Tod----- Toccoa	Slight-----	Slight-----	Slight-----	Slight.
Ubp. Urban land and Borrow pits				
Ud. Urban land				
UeC: Urban land.				
Appling-----	Slight-----	Slight-----	Severe: slope.	Slight.
UFC: Urban land.				
Cecil-----	Slight-----	Slight-----	Severe: slope.	Slight.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
UgC: Urban land.				
Gwinnett-----	Slight-----	Slight-----	Severe: slope.	Slight.
UhC: Urban land.				
Madison-----	Slight-----	Slight-----	Severe: slope.	Slight.
UiE: Urban land.				
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
WjF----- Wilkes	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, slope, small stones.	Severe: slope.
WvD----- Wilkes variant	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight.

## Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, water, and living space. If any one of these elements is missing, inadequate, or inaccessible, wildlife will be scarce or will not inhabit the area. Wildlife habitat can be created or improved by planting appropriate vegetation, properly managing the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 7, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife and in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat.

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

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

*Grain and seed crops* are annual seed-producing plants. Examples are corn, wheat, rye, oats, barley, millet, buckwheat, and sunflowers.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes. Examples are fescue, bluegrass, brome grass, timothy, orchardgrass, clover, alfalfa, trefoil, reed canarygrass, and crownvetch.

*Wild herbaceous plants* are native or naturally established herbaceous grasses and forbs, including

weeds. Examples are bluestem, indiagrass, blueberry, goldenrod, lambsquarters, dandelions, blackberry, ragweed, wheatgrass, fescue, and nightshade.

*Hardwood trees* and woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage. Examples of native plants are oak, poplar, cherry, apple, birch, beech, maple, hickory, hazelnut, black walnut, and viburnum. Examples of fruit-bearing shrubs that are commercially available and suitable for planting on soils rated *good* are hawthorn, honeysuckle, sumac, silky dogwood, highbush cranberry, autumn olive, and crabapple.

*Coniferous plants* are trees, shrubs, or ground cover that furnish browse, seed, or fruitlike cones. Examples are pine and cedar.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Examples of wetland plants are smartweed, wild millet, rushes, sedges, reeds, wildrice, arrowhead, waterplantain, pickerelweed, and cattail.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams or levees or by water-control structures in marshes or streams. Examples of shallow water areas are muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

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

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

*Habitat for woodland wildlife* consists of areas of hardwoods or conifers or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, owl, tree squirrels, gray fox, porcupine, raccoon, deer, and black bear.

*Habitat for wetland wildlife* consists of open, marshy or swampy, shallow water areas. Wildlife attracted to these areas include ducks, geese, herons, bitterns, rails, kingfishers, muskrat, otter, mink, and beaver.

TABLE 7.--WILDLIFE HABITAT

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AL----- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
AlB----- Altavista	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AmB----- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AmC----- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AmD----- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AnB3----- Appling	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
AnC3----- Appling	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Cah----- Cartecay	Poor	Fair	Fair	Good	Good	Fair	Poor	Fair	Good	Fair.
Csw----- Chewacla variants	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Cw----- Cartecay variant	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Fair.
CYB2----- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CYC2----- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DiB----- Durham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GeB3----- Gwinnett	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GeC3----- Gwinnett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GeD3----- Gwinnett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GeE2----- Gwinnett	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GgB2----- Gwinnett	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GgC2----- Gwinnett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GgD2----- Gwinnett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HSB----- Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 7.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
HTC2----- Hiwassee	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
HTD2----- Hiwassee	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
HYC----- Helena	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LDF----- Louisburg	Very poor.	Poor	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
LkE----- Louisa	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
LnE----- Louisburg	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
LNF----- Louisa	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
MDC3----- Madison	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MDE3----- Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MgB2----- Madison	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MgC2----- Madison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MgD2----- Madison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MID2----- Musella	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
MIE3----- Musella	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
MJF: Musella-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Pacolet-----	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MsD3: Madison-----	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Pacolet-----	Very poor.	Poor	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
MsE2: Madison-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pacolet-----	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

TABLE 7.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
PfD----- Pacolet	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PgC3----- Pacolet	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ron----- Roanoke	Poor	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Toc----- Toccoa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Tod----- Toccoa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ubp. Urban land and Borrow pits										
Ud. Urban land										
UeC: Urban land.										
Appling----- Appling	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
UfC: Urban land.										
Cecil----- Cecil	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
UgC: Urban land.										
Gwinnett----- Gwinnett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UhC: Urban land.										
Madison----- Madison	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
UiE: Urban land.										
Pacolet----- Pacolet	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
WjF----- Wilkes	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
WvD----- Wilkes variant	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

## Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

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

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

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

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

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

## Building Site Development

Table 8 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns, landscaping, and golf fairways. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for pipelines, sewer lines, power lines, basements, open ditches, graves, and other purposes. The excavations are most commonly made by trenching machines or backhoes. The ratings are based on the soil properties that affect the ease of digging and the resistance of the excavation walls or banks to sloughing or caving.

*Dwellings and small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. The ratings are based on soil properties that affect soil strength, shrink-swell potential, and frost action potential and those that affect the ease of excavating and grading.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. The ratings are based on soil properties that affect the ease of excavating and grading and the traffic-supporting capacity of the soil.

*Lawns, landscaping, and golf fairways* require soils on which turf and ornamental trees and shrubs can be established and maintained. Traps, trees, roughs, and greens are not considered part of the golf fairway. The ratings are based on soil properties that affect plant growth and trafficability after vegetation is established.

TABLE 8.--BUILDING SITE DEVELOPMENT

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns, landscaping, and golf fairways
AL----- Altavista	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
AlB----- Altavista	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, low strength.	Moderate: wetness.
AmB----- Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
AmC----- Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AmD----- Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AnB3----- Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
AnC3----- Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Cah----- Cartecay	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Csw----- Chewacla variants	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Cw----- Cartecay variant	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
CYB2----- Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
CYC2----- Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
DiB----- Durham	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
GeB3----- Gwinnett	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
GeC3----- Gwinnett	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns, landscaping, and golf fairways
GeD3----- Gwinnett	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
GeE2----- Gwinnett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GgB2----- Gwinnett	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
GgC2----- Gwinnett	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
GgD2----- Gwinnett	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
HSB----- Hiwassee	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
HTC2----- Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
HTD2----- Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
HYC----- Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
LDF----- Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
LkE----- Louisa	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
LnE----- Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LNF----- Louisa	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
MDC3----- Madison	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
MDE3----- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MgB2----- Madison	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight
MgC2----- Madison	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns, landscaping, and golf fairways
MgD2----- Madison	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
MID2----- Musella	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, low strength, slope.	Severe: depth to rock.
MIE3----- Musella	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
MJF: Musella-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MsD3: Madison-----	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Pacolet-----	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
MsE2: Madison-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PfD----- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
PgC3----- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Ron----- Roanoke	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: too acid, wetness, flooding.
Toc----- Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Tod----- Toccoa	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Slight.
Ubp. Urban land and Borrow pits						
Ud. Urban land						

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns, landscaping, and golf fairways
UeC: Urban land.						
Appling-----	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
UfC: Urban land.						
Cecil-----	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
UgC: Urban land.						
Gwinnett-----	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
UhC: Urban land.						
Madison-----	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
UiE: Urban land.						
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WjF-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope, depth to rock.
WvD-----	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Severe: depth to rock.

### Sanitary Facilities

Table 9 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 9 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils.

Features and properties are listed that affect absorption of the effluent, that affect the construction and maintenance of a system, and that can affect public health.

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

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

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

*Daily cover for landfill* is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The suitability of a soil for use as cover is based on properties that affect the ease of removing and spreading the material during wet and dry periods.

TABLE 9.--SANITARY FACILITIES

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AL----- Altavista	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
AlB----- Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
AmB----- Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
AmC----- Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
AmD----- Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
AnB3----- Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
AnC3----- Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Cah----- Cartecay	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
Csw----- Chewacla variants	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
Cw----- Cartecay variant	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
CYB2----- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
CYC2----- Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
DiB----- Durham	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
GeB3----- Gwinnett	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GeC3----- Gwinnett	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
GeD3----- Gwinnett	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
GeE2----- Gwinnett	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
GgB2----- Gwinnett	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
GgC2----- Gwinnett	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
GgD2----- Gwinnett	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
HSB----- Hiwassee	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
HTC2----- Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
HTD2----- Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
HYC----- Helena	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
LDF----- Louisburg	Severe: slope.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope, thin layer.
LkE----- Louisa	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope, depth to rock.	Poor: slope, thin layer, depth to rock.
LnE----- Louisburg	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope, thin layer.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LNF----- Louisa	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope, depth to rock.	Poor: slope, thin layer, depth to rock.
MDC3----- Madison	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey.
MDE3----- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MgB2----- Madison	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
MgC2----- Madison	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey.
MgD2----- Madison	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey.
MID2----- Musella	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
MIE3----- Musella	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
MJF: Musella-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MsD3: Madison-----	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey.
Pacolet-----	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
MsE2: Madison-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pacolet-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PfD----- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PgC3----- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
Ron----- Roanoke	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Toc----- Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
Tod----- Toccoa	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Good.
Ubp. Urban land and Borrow pits					
Ud. Urban land					
UeC: Urban land.					
Appling----- Urban land.	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
UfC: Urban land.					
Cecil----- Urban land.	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
UgC: Urban land.					
Gwinnett----- Urban land.	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
UhC: Urban land.					
Madison----- Urban land.	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
UiE: Urban land.					
Pacolet----- Urban land.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WjF----- Wilkes	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
WvD----- Wilkes variant	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.

### Construction Materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

The ratings are for the soil material below the surface layer to a depth of about 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Soils are rated according to the amount of material available for excavation, the ease of excavation, and how well the material performs after it is in place.

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

*Sand* and *gravel* are natural soil aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the sand for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source

of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments.

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

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content.

Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

TABLE 10.--CONSTRUCTION MATERIALS

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AL----- Altavista	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
ALB----- Altavista	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
AmB----- Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AmC----- Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AmD----- Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AnB3----- Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AnC3----- Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Cah----- Cartecay	Fair: wetness.	Probable-----	Improbable: too sandy.	Fair: wetness.
Csw----- Chewacla variants	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Cw----- Cartecay variant	Fair: wetness.	Probable-----	Improbable: too sandy.	Fair: wetness.
CYB2----- Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CYC2----- Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DiB----- Durham	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
GeB3----- Gwinnett	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GeC3----- Gwinnett	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GeD3----- Gwinnett	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GeE2----- Gwinnett	Moderate: slope, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
GgB2----- Gwinnett	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
GgC2----- Gwinnett	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GgD2----- Gwinnett	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HSB----- Hiwassee	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HTC2----- Hiwassee	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HTD2----- Hiwassee	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HYC----- Helena	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LDF----- Louisburg	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
LkE----- Louisa	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, depth to rock.
LnE----- Louisburg	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
LNF----- Louisa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, depth to rock.
MDC3----- Madison	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MDE3----- Madison	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
MgB2----- Madison	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MgC2----- Madison	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MgD2----- Madison	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MID2----- Musella	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
MIE3----- Musella	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
MJF: Musella-----	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Pacolet-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
MsD3: Madison-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Pacolet-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MsE2: Madison-----	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pacolet-----	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
PfD----- Pacolet	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
PgC3----- Pacolet	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ron----- Roanoke	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness, too acid.
Toc----- Toccoa	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Tod----- Toccoa	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Ubp. Urban land and Borrow pits				
Ud. Urban land				
UeC: Urban land.				
Appling-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
UfC: Urban land.				
Cecil-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
UgC: Urban land.				
Gwinnett-----	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
UhC: Urban land.				
Madison-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
UiE: Urban land.				
Pacolet-----	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
WjF-----	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, large stones.
WvD-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.

## Water Management

Table 11 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

mixed and compacted during construction.

*Aquifer-fed excavated ponds* are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff or embankment ponds that impound water 3 feet or more above the original surface.

*Drainage* is the removal of excess surface and subsurface water from the soil. Soil features are listed that affect grading and excavating and the stability of trench sides and ditchbanks. Also listed are features that can affect the productivity of the soil after drainage. Availability of drainage outlets is not considered in the ratings.

*Irrigation* is the controlled application of water to supplement rainfall and support plant growth. Soil features are listed that affect the design and layout of an irrigation system, the construction of a system, and the performance of a system.

*Terraces and diversions* are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Soil features are listed that affect the construction of terraces and diversions and that can adversely affect maintenance.

*Grassed waterways* are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Soil features are listed that affect the construction of grassed waterways and that affect the growth and maintenance of the grass after construction.

TABLE 11.--WATER MANAGEMENT

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AL----- Altavista	Moderate: seepage.	Severe: piping, wetness.	Moderate: deep to water, slow refill.	Limitation: flooding.	Limitation: wetness.	Limitation: wetness.	Favorable.
AlB----- Altavista	Moderate: seepage.	Severe: piping, wetness.	Moderate: deep to water, slow refill.	Favorable-----	Limitation: wetness.	Limitation: wetness, soil blowing.	Favorable.
AmB----- Appling	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: soil blowing.	Favorable.
AmC----- Appling	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, soil blowing.	Limitation: slope.
AmD----- Appling	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, soil blowing.	Limitation: slope.
AnB3----- Appling	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Favorable-----	Favorable.
AnC3----- Appling	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
Cah----- Cartecay	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Limitation: flooding.	Limitation: wetness, flooding.	Limitation: wetness, soil blowing.	Limitation: wetness.
Csw----- Chewacla variants	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Moderate: slow refill.	Limitation: flooding.	Limitation: wetness, flooding.	Limitation: wetness.	Limitation: wetness.
Cw----- Cartecay variant	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Limitation: flooding.	Limitation: wetness, flooding.	Limitation: wetness.	Limitation: wetness.
CYB2----- Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope, soil blowing.	Limitation: soil blowing.	Favorable.
CYC2----- Cecil	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope, soil blowing.	Limitation: slope, soil blowing.	Limitation: slope.
DiB----- Durham	Slight-----	Slight-----	Severe: no water.	Limitation: deep to water.	Favorable-----	Favorable-----	Favorable.
GeB3----- Gwinnett	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Favorable-----	Favorable.
GeC3----- Gwinnett	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
GeD3----- Gwinnett	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
GeE2----- Gwinnett	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
GgB2----- Gwinnett	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope, soil blowing.	Limitation: soil blowing.	Favorable.
GgC2----- Gwinnett	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope, soil blowing.	Limitation: slope, soil blowing.	Limitation: slope.
GgD2----- Gwinnett	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope, soil blowing.	Limitation: slope, soil blowing.	Limitation: slope.
HSB----- Hiwassee	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Favorable-----	Favorable.
HTC2----- Hiwassee	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
HTD2----- Hiwassee	Severe: slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
HYC----- Helena	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Limitation: percs slowly, slope.	Limitation: slope, wetness, percs slowly.	Limitation: wetness, percs slowly.	Limitation: percs slowly.
LDF----- Louisburg	Severe: seepage, slope.	Severe: large stones.	Severe: no water.	Limitation: deep to water.	Limitation: large stones, droughty.	Limitation: slope, large stones.	Limitation: large stones, slope, droughty.
LkE----- Louisa	Severe: slope, seepage, depth to rock.	Severe: thin layer.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: slope, depth to rock.	Limitation: slope, depth to rock.
LnE----- Louisburg	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope, droughty.	Limitation: slope, soil blowing.	Limitation: slope, droughty.
LNF----- Louisa	Severe: slope, seepage, depth to rock.	Severe: thin layer.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: slope, depth to rock.	Limitation: slope, depth to rock.
MDC3----- Madison	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, erodes easily.	Limitation: slope, erodes easily.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
MDE3----- Madison	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, erodes easily.	Limitation: slope, erodes easily.
MgB2----- Madison	Moderate: seepage, slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: erodes easily.	Limitation: erodes easily.
MgC2----- Madison	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, erodes easily.	Limitation: slope, erodes easily.
MgD2----- Madison	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, erodes easily.	Limitation: slope, erodes easily.
MID2----- Musella	Severe: depth to rock, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: slope, large stones, depth to rock.	Limitation: large stones, slope, depth to rock.
MIE3----- Musella	Severe: depth to rock, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: slope, large stones, depth to rock.	Limitation: large stones, slope, depth to rock.
MJF: Musella--	Severe: depth to rock, slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: slope, large stones, depth to rock.	Limitation: large stones, slope, depth to rock.
Pacolet--	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
MsD3: Madison--	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, erodes easily.	Limitation: slope, erodes easily.
Pacolet--	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.
MsE2: Madison--	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, erodes easily.	Limitation: slope, erodes easily.
Pacolet--	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, soil blowing.	Limitation: slope.
PfD----- Pacolet	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope, soil blowing.	Limitation: slope.
PgC3----- Pacolet	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ron----- Roanoke	Severe: seepage.	Severe: wetness,	Severe: slow refill, cutbanks cave.	Limitation: percs slowly, flooding, too acid.	Limitation: wetness, percs slowly, erodes easily.	Limitation: erodes easily, wetness, percs slowly.	Limitation: wetness, erodes easily, percs slowly.
Toc----- Toccoa	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Limitation: flooding.	Limitation: flooding.	Favorable-----	Favorable.
Tod----- Toccoa	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Limitation: deep to water.	Favorable-----	Favorable-----	Favorable.
Ubp. Urban land and Borrow pits							
Ud. Urban land.							
UeC: Urban land.							
Appling--	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Favorable-----	Favorable.
UfC: Urban land.							
Cecil----	Moderate: seepage, slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Favorable-----	Favorable.
UgC: Urban land.							
Gwinnett-	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Favorable-----	Favorable.
UhC: Urban land.							
Madison--	Moderate: seepage, slope.	Severe: piping, hard to pack.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: erodes easily.	Limitation: erodes easily.
UiE: Urban land.							
Pacolet--	Severe: slope.	Severe: piping.	Severe: no water.	Limitation: deep to water.	Limitation: slope.	Limitation: slope.	Limitation: slope.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WjF----- Wilkes	Severe: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: depth to rock, large stones, slope.	Limitation: depth to rock, large stones, slope.
WvD----- Wilkes variant	Severe: slope, depth to rock.	Severe: thin layer.	Severe: no water.	Limitation: deep to water.	Limitation: slope, depth to rock.	Limitation: slope, depth to rock.	Limitation: slope, depth to rock.

# Soil Properties

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

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

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

## Engineering Index Properties

Table 12 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet. Part 1 of table 12 gives information on USDA texture and on Unified and AASHTO classification. Part 2 gives information on rock fragments larger than 3 inches, percentage passing designated sieves, liquid limit, and plasticity index.

*Depth* to the upper and lower boundaries of each layer is indicated.

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly."

*Classification* of the soils is determined according to

the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

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

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

laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit and plasticity index (Atterberg limits)*

indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 1

Map symbol and soil name	Depth (inches)	USDA texture*	Classification	
			Unified	AASHTO
AL----- Altavista	0-12	SIL	CL-ML, CL	A-4, A-6
	12-42	CL, SCL, L	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7
	42-60	VAR		
AlB----- Altavista	0-12	SL	ML, CL-ML, SM, SC-SM	A-4
	12-42	CL, SCL, L	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7
	42-60	VAR		
AmB----- Appling	0-9	SL	SM, SC-SM	A-2
	9-35	SC, CL, C	MH, ML, CL	A-7
	35-46	SC, CL, SCL	SC, CL	A-4, A-6, A-7
	46-65	VAR		
AmC----- Appling	0-9	SL	SM, SC-SM	A-2
	9-35	SC, CL, C	MH, ML, CL	A-7
	35-46	SC, CL, SCL	SC, CL	A-4, A-6, A-7
	46-65	VAR		
AmD----- Appling	0-9	SL	SM, SC-SM	A-2
	9-35	SC, CL, C	MH, ML, CL	A-7
	35-46	SC, CL, SC	SC, CL	A-4, A-6, A-7
	46-65	VAR		
AnB3----- Appling	0-9	SCL	CL, SC, CL-ML, SC-SM	A-6, A-4
	9-35	SC, CL, C	MH, ML, CL	A-7
	35-46	SC, CL, SCL	SC, CL	A-4, A-6, A-7
	46-65	VAR		
AnC3----- Appling	0-9	SCL	CL, SC, CL-ML, SC-SM	A-6, A-4
	9-35	SC, CL, C	MH, ML, CL	A-7
	35-46	SC, CL, SCL	SC, CL	A-4, A-6, A-7
	46-65	VAR		
Cah----- Cartecay	0-9	FSL	SM, SC-SM, ML	A-2, A-4
	9-40	SL, FSL, L	SM, SC, SC, SM	A-2, A-4
	40-60	LS, S, SL	SM, SP-SM	A-2, A-1, A-3
Csw----- Chewacla variants	0-8	SIL	ML, CL, CL-ML	A-4, A-6, A-7
	8-24	SIL, SICL, CL	ML, CL	A-4, A-6, A-7
	24-34	SCL, L, SL	SM, SC-SM, ML, CL	A-4, A-7-6, A-6
	34-58	SIL, CL, SICL	ML, MH, CL, CH	A-4, A-6, A-7
	58-70	VAR		
Cw----- Cartecay variant	0-9	SIL	ML, CL, CL-ML	A-4, A-6
	9-40	SL, FSL, L	SM, SC, SC, SM	A-2, A-4
CYB2----- Cecil	0-7	SL	SM, SC-SM	A-2, A-4
	7-11	SCL, CL	SM, SC, ML, CL	A-4, A-6
	11-50	C, CL	MH, ML, CH	A-7, A-5
	50-75	VAR		
CYC2----- Cecil	0-7	SL	SM, SC-SM	A-2, A-4
	7-11	SCL, CL	SM, SC, ML, CL	A-4, A-6
	11-50	C, CL	MH, ML, CH	A-7, A-5
	50-75	VAR		
DiB----- Durham	0-16	SL	SM, SC-SM	A-2, A-4
	16-36	SCL, CL	SC, CL	A-2, A-6, A-7
	36-42	CL, SC, SCL	SC, CL	A-6, A-7
	42-48	SCL, SL	SM, SC, SC-SM	A-2, A-4
	48-60	LS, SL, SCL	SM, SC-SM	A-2, A-4

\* See footnote at end of table.

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 1--Continued

Map symbol and soil name	Depth (inches)	USDA texture*	Classification	
			Unified	AASHTO
GeB3----- Gwinnett	0-7	CL	SC, ML, SC-SM, CL-ML	A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
GeC3----- Gwinnett	0-7	CL	SC, ML, SC-SM, CL-ML	A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
GeD3----- Gwinnett	0-7	CL	SC, ML, SC-SM, CL-ML	A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
GeE2----- Gwinnett	0-7	CL	SC, ML, SC-SM, CL-ML	A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
GgB2----- Gwinnett	0-7	L	SM, SC, SC-SM, ML	A-2, A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
GgC2----- Gwinnett	0-7	L	SM, SC, SC-SM, ML	A-2, A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
GgD2----- Gwinnett	0-7	L	SM, SC, SC-SM, ML	A-2, A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
HSB----- Hiwassee	0-7	L	CL, ML, CL-ML	A-7-6, A-6, A-4
	7-61	C, SIC, CL	ML, MH	A-7-5, A-7-6
	61-70	SL, L, SCL	SM, ML, SC-SM, CL	A-4, A-6, A-7
HTC2----- Hiwassee	0-7	CL	CL, ML, CL-ML	A-7-6, A-6, A-4
	7-61	C, SIC, CL	ML, MH	A-7-5, A-7-6
	61-70	SL, L, SCL	SM, ML, SC-SM, CL	A-4, A-6, A-7
HTD2----- Hiwassee	0-7	CL	CL, ML, CL-ML	A-7-6, A-6, A-4
	7-61	C, SIC, CL	ML, MH	A-7-5, A-7-6
	61-70	SL, L, SCL	SM, ML, SC-SM, CL	A-4, A-6, A-7
HYC----- Helena	0-12	SL	SM, SC-SM, SC, ML	A-2, A-4
	12-19	SCL, CL	CL, SC	A-6, A-7
	19-43	CL, SC, C	CH	A-7
	43-60	VAR		
LDF----- Louisburg	0-7	ST-SL	SM	A-2, A-1-b
	7-24	ST-SL	SM, SC-SM	A-2, A-4
	24-60	WB		
LkE----- Louisa	0-4	GR-SL	SM	A-1, A-2, A-4
	4-12	GR-L, GR-SL	SM	A-2, A-4
	12-18	CNV-L, CN-L	GM, GC, SM	A-2, A-4, A-1-b
	18-60	WB		
LnE----- Louisburg	0-7	SL	SM, SC-SM	A-2
	7-24	SL	SM, SC-SM	A-2, A-4
	24-60	WB		
LNF----- Louisa	0-4	GR-SL	SM	A-1, A-2, A-4
	4-12	GR-L, GR-SL	SM	A-2, A-4
	12-18	CNV-L, CN-L	GM, GC, SM	A-2, A-4, A-1-b
	18-60	WB		

\* See footnote at end of table.

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 1--Continued

Map symbol and soil name	Depth (inches)	USDA texture*	Classification	
			Unified	AASHTO
MDC3----- Madison	0-6	CL	CL, ML, SC	A-4, A-6, A-7-6
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4
MDE3----- Madison	0-6	CL	CL, ML, SC	A-4, A-6, A-7-6
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4
MgB2----- Madison	0-6	SL	SM, ML	A-2, A-4
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4
MgC2----- Madison	0-6	SL	SM, ML	A-2, A-4
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4
MgD2----- Madison	0-6	SL	SM, ML	A-2, A-4
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4
MID2----- Musella	0-4	GR-CL	SM, SC, SC-SM	A-2, A-4
	4-14	GR-CL, CL	ML, CL, SM, SC	A-6, A-7
	14-18	GRV-CL	SM, SC, GC	A-4, A-6
	18-60	WB		
MIE3----- Musella	0-4	GR-CL	SM, SC, SC-SM	A-2, A-4
	4-14	GR-CL, CL	ML, CL, SM, SC	A-6, A-7
	14-18	GRV-CL	SM, SC, GC	A-4, A-6
	18-60	WB		
MJF: Musella-----	0-4	ST-CL	SM, SC, SC-SM	A-2, A-4
	4-14	GR-CL	ML, CL, SM, SC	A-6, A-7
	14-18	GRV-CL	SM, SC, GC	A-4, A-6
	18-60	WB		
Pacolet-----	0-3	CL	SC-SM, SC	A-4, A-6
	3-29	SC, CL, C	ML, MH, CL	A-6, A-7
	29-52	CL, SCL, SL	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6
	52-70	SL, FSL, L	SM, SC-SM	A-4, A-2-4
MsD3: Madison-----	0-6	SCL	CL, ML, SC	A-4, A-6, A-7-6
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4
Pacolet-----	0-3	CL	SC-SM, SC	A-4, A-6
	3-29	SC, CL, C	ML, MH, CL	A-6, A-7
	29-52	CL, SCL, SL	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6
	52-70	SL, FSL, L	SM, SC-SM	A-4, A-2-4
MsE2: Madison-----	0-6	SL	SM, ML	A-2, A-4
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4

\* See footnote at end of table.

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 1--Continued

Map symbol and soil name	Depth (inches)	USDA texture*	Classification	
			Unified	AASHTO
MsE2:				
Pacolet-----	0-3	SL	SM, SC-SM	A-2, A-1-b, A-4
	3-29	SC, CL, C	ML, MH, CL	A-6, A-7
	29-52	CL, SCL, SL	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6
	52-70	SL, FSL, L	SM, SC-SM	A-4, A-2-4
PfD-----	0-3	SL	SM, SC-SM	A-2, A-1-b, A-4
Pacolet	3-29	SC, CL, C	ML, MH, CL	A-6, A-7
	29-52	CL, SCL, SL	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6
	52-70	SL, FSL, L	SM, SC-SM	A-4, A-2-4
PgC3-----	0-3	SCL	SC-SM, SC	A-4, A-6
Pacolet	3-29	SC, CL, C	ML, MH, CL	A-6, A-7
	29-52	CL, SCL, SL	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6
	52-70	SL, FSL, L	SM, SC-SM	A-4, A-2-4
Ron-----	0-7	SIL	SC-SM, CL-ML, CL, SC	A-4, A-6
Roanoke	7-12	CL, SICL	CL	A-6, A-7
	12-50	C, SIC, CL	CH, CL	A-7
	50-72	SR, S, C	CL-ML, GM-GC, CH, SM	A-1, A-2, A-4
Toc-----	0-10	SL	SM	A-2, A-4
Toccoa	10-60	SL, L	SM, ML	A-2, A-4
Tod-----	0-10	SL	SM	A-2, A-4
Toccoa	10-60	SL, L	SM, ML	A-2, A-4
Ubp. Urban land and Borrow pits				
Ud. Urban land				
UeC: Urban land.				
Appling-----	0-9	SCL	CL, SC, CL-ML, SC-SM	A-6, A-4
	9-35	SC, CL, C	MH, ML, CL	A-7
	35-46	SC, CL, SCL	SC, CL	A-4, A-6, A-7
	46-65	VAR		
UfC: Urban land.				
Cecil-----	0-7	SCL	SM, SC, CL, ML	A-4, A-6
	7-11	SCL, CL	SM, SC, ML, CL	A-4, A-6
	11-50	C, CL	MH, ML, CH	A-7, A-5
	50-75	VAR		
UgC: Urban land.				
Gwinnett-----	0-7	SCL	SC, ML, SC-SM, CL-ML	A-4, A-6
	7-35	C, SC, CL	MH, ML, CL, CH	A-7, A-6
	35-45	SCL, CL, L	ML, CL, SC	A-4, A-6
UhC: Urban land.				

\* See footnote at end of table.

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 1--Continued

Map symbol and soil name	Depth (inches)	USDA texture*	Classification	
			Unified	AASHTO
UhC: Madison-----	0-6	CL	CL, ML, SC	A-4, A-6, A-7-6
	6-30	C, CL, SC	MH, ML	A-7
	30-35	L, SCL, CL	CL	A-4, A-6
	35-66	FSL, SL, L	SM, ML	A-2, A-4
UiE: Urban land.				
Pacolet-----	0-3	CL	SC-SM, SC	A-4, A-6
	3-29	SC, CL, C	ML, MH, CL	A-6, A-7
	29-52	CL, SCL, SL	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6
	52-70	SL, FSL, L	SM, SC-SM	A-4, A-2-4
WjF-----	0-6	STV-SL	SM, SC-SM	A-2, A-4, A-1-b
Wilkes	6-13	SICL, ST-C, ST-SCL	CL, CH, MH	A-6, A-7
	13-48	WB		
WvD-----	0-6	SL	ML, SM	A-2, A-4
Wilkes variant	6-13	CL, C, SCL	CL, CH	A-6, A-7
	13-48	WB		

\* USDA texture names are as follows:

C -- clay	SICL -- silty clay loam
CL -- clay loam	SIL -- silt loam
FSL -- fine sandy loam	SR S C -- stratified sand and clay
GR-CL -- gravelly clay loam	SL -- sandy loam
GR-L -- gravelly loam	ST-C -- stony clay
GR-SL -- gravelly sandy loam	ST-CL -- stony clay loam
GRV-CL -- very gravelly clay loam	ST-SCL -- stony sandy clay loam
L -- loam	ST-SL -- stony sandy loam
LS -- loamy sand	STV-SL -- very stony sandy loam
S -- sand	VAR -- variable
SC -- sandy clay	VFSL -- very fine sandy loam
SCL -- sandy clay loam	WB -- weathered bedrock
SIC -- silty clay	

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 2

Map symbol and soil name	Depth (inches)	Fragments > 3 inches (pct)	Percent passing sieve number--				Liquid limit (pct)	Plasticity index
			4	10	40	200		
AL----- Altavista	0-12	0-0	95-100	95-100	80-100	51-90	15-30	4-12
	12-42	0-0	95-100	95-100	60-99	45-75	20-45	5-28
	42-60	---	---	---	---	---	---	---
AlB----- Altavista	0-12	0-0	95-100	90-100	65-99	35-60	15-23	0-7
	12-42	0-0	95-100	95-100	60-99	45-75	20-45	5-28
	42-60	---	---	---	---	---	---	---
AmB----- Appling	0-9	0-5	86-100	80-100	55-91	15-35	15-35	0-7
	9-35	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	35-46	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	46-65	---	---	---	---	---	---	---
AmC----- Appling	0-9	0-5	86-100	80-100	55-91	15-35	15-35	0-7
	9-35	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	35-46	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	46-65	---	---	---	---	---	---	---
AmD----- Appling	0-9	0-5	86-100	80-100	55-91	15-35	15-35	0-7
	9-35	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	35-46	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	46-65	---	---	---	---	---	---	---
AnB3----- Appling	0-9	0-5	95-100	85-100	70-95	40-70	20-40	6-20
	9-35	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	35-46	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	46-65	---	---	---	---	---	---	---
AnC3----- Appling	0-9	0-5	95-100	85-100	70-95	40-70	20-40	6-20
	9-35	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	35-46	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	46-65	---	---	---	---	---	---	---
Cah----- Cartecay	0-9	0-0	95-100	95-100	60-85	30-60	15-30	0-7
	9-40	0-0	90-100	75-100	60-85	25-50	15-30	0-10
	40-60	0-0	80-100	35-95	25-80	5-35	---	0-0
Csw----- Chewacla variants	0-8	0-0	98-100	95-100	70-100	55-90	25-49	4-20
	8-24	0-0	96-100	95-100	80-100	51-98	30-49	4-22
	24-34	0-0	96-100	95-100	60-100	36-70	20-45	2-15
	34-58	0-0	85-100	75-100	60-100	51-98	22-61	4-28
	58-70	---	---	---	---	---	---	---
Cw----- Cartecay variant	0-9	0-0	98-100	95-100	90-100	51-95	15-40	0-15
	9-40	0-0	90-100	75-100	60-85	25-50	15-30	0-10
	40-60	0-0	80-100	35-95	25-80	5-35	---	0-0
CYB2----- Cecil	0-7	0-5	84-100	80-100	67-90	26-42	15-30	0-7
	7-11	0-5	75-100	75-100	68-95	38-81	21-35	3-17
	11-50	0-5	97-100	92-100	72-100	55-95	41-80	9-37
	50-75	---	---	---	---	---	---	---
CYC2----- Cecil	0-7	0-5	84-100	80-100	67-90	26-42	15-30	0-7
	7-11	0-5	75-100	75-100	68-95	38-81	21-35	3-17
	11-50	0-5	97-100	92-100	72-100	55-95	41-80	9-37
	50-75	---	---	---	---	---	---	---
DiB----- Durham	0-16	0-3	95-100	90-100	50-85	18-40	15-20	0-7
	16-36	0-3	95-100	90-100	65-90	30-55	20-47	10-25
	36-42	0-3	95-100	90-100	70-95	36-70	30-49	13-28
	42-48	0-3	95-100	90-100	50-85	18-49	15-20	0-10
	48-60	0-3	95-100	85-100	45-80	15-49	15-20	0-7

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 2--Continued

Map symbol and soil name	Depth (inches)	Fragments > 3 inches (pct)	Percent passing sieve number--				Liquid limit (pct)	Plasticity index
			4	10	40	200		
GeB3----- Gwinnett	0-7	0-3	95-100	85-100	70-90	40-80	20-35	4-12
	7-35	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	35-45	0-6	90-100	85-100	80-90	35-80	25-40	7-22
GeC3----- Gwinnett	0-7	0-3	95-100	85-100	70-90	40-80	20-35	4-12
	7-35	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	35-45	0-6	90-100	85-100	80-90	35-80	25-40	7-22
GeD3----- Gwinnett	0-7	0-3	95-100	85-100	70-90	40-80	20-35	4-12
	7-35	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	35-45	0-6	90-100	85-100	80-90	35-80	25-40	7-22
GeE2----- Gwinnett	0-7	0-3	95-100	85-100	70-90	40-80	20-35	4-12
	7-35	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	35-45	0-6	90-100	85-100	80-90	35-80	25-40	7-22
GgB2----- Gwinnett	0-7	0-3	95-100	85-100	65-90	30-60	0-32	0-12
	7-35	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	35-45	0-6	90-100	85-100	80-90	35-80	25-40	7-22
GgC2----- Gwinnett	0-7	0-3	95-100	85-100	65-90	30-60	0-32	0-12
	7-35	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	35-45	0-6	90-100	85-100	80-90	35-80	25-40	7-22
GgD2----- Gwinnett	0-7	0-3	95-100	85-100	65-90	30-60	0-32	0-12
	7-35	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	35-45	0-6	90-100	85-100	80-90	35-80	25-40	7-22
HSB----- Hiwassee	0-7	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	7-61	0-2	95-100	95-100	80-100	51-95	40-80	12-36
	61-70	0-5	90-100	85-99	60-90	36-70	20-49	4-20
HTC2----- Hiwassee	0-7	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	7-61	0-2	95-100	95-100	80-100	51-95	40-80	12-36
	61-70	0-5	90-100	85-99	60-90	36-70	20-49	4-20
HTD2----- Hiwassee	0-7	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	7-61	0-2	95-100	95-100	80-100	51-95	40-80	12-36
	61-70	0-5	90-100	85-99	60-90	36-70	20-49	4-20
HYC----- Helena	0-12	0-5	90-100	90-100	51-95	26-75	15-35	0-10
	12-19	0-5	95-100	95-100	70-90	38-70	30-49	15-26
	19-43	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	43-60	---	---	---	---	---	---	---
LDF----- Louisburg	0-7	25-38	83-95	70-83	43-65	14-23	---	0-0
	7-24	25-38	83-95	75-83	50-70	25-39	15-40	0-7
	24-60	---	---	---	---	---	---	---
LkE----- Louisa	0-4	0-5	75-90	60-75	40-55	20-40	0-14	0-0
	4-12	0-5	80-95	60-80	50-70	20-45	0-14	0-0
	12-18	25-40	70-90	60-70	40-60	20-40	0-14	0-0
	18-60	---	---	---	---	---	0-14	---
LnE----- Louisburg	0-7	0-15	80-100	75-95	50-80	25-35	15-30	0-6
	7-24	0-15	85-100	75-98	53-78	25-40	15-40	0-7
	24-60	---	---	---	---	---	---	---
LNF----- Louisa	0-4	0-5	75-90	60-75	40-55	20-40	0-14	0-0
	4-12	0-5	80-95	60-80	50-70	20-45	0-14	0-0
	12-18	25-40	70-90	60-70	40-60	20-40	0-14	0-0
	18-60	---	---	---	---	---	0-14	---

TABLE 12.--ENGINEERING INDEX PROPERTIES, PART 2--Continued

Map symbol and soil name	Depth (inches)	Fragments > 3 inches (pct)	Percent passing sieve number--				Liquid limit (pct)	Plasticity index
			4	10	40	200		
MDC3----- Madison	0-6 6-30 30-35 35-66	0-3 0-3 0-3 0-5	90-100 90-100 90-100 85-100	85-100 85-100 85-100 80-100	70-95 75-100 70-95 60-90	46-80 57-85 50-80 26-55	30-50 43-75 20-40 15-35	7-20 12-35 7-20 0-7
MDE3----- Madison	0-6 6-30 30-35 35-66	0-3 0-3 0-3 0-5	90-100 90-100 90-100 85-100	85-100 85-100 85-100 80-100	70-95 75-100 70-95 60-90	46-80 57-85 50-80 26-55	30-50 43-75 20-40 15-35	7-20 12-35 7-20 0-7
MgB2----- Madison	0-6 6-30 30-35 35-66	0-3 0-3 0-3 0-5	85-100 90-100 90-100 85-100	80-100 85-100 85-100 80-100	60-90 75-100 70-95 60-90	26-55 57-85 50-80 26-55	15-35 43-75 20-40 15-35	0-8 12-35 7-20 0-7
MgC2----- Madison	0-6 6-30 30-35 35-66	0-3 0-3 0-3 0-5	85-100 90-100 90-100 85-100	80-100 85-100 85-100 80-100	60-90 75-100 70-95 60-90	26-55 57-85 50-80 26-55	15-35 43-75 20-40 15-35	0-8 12-35 7-20 0-7
MgD2----- Madison	0-6 6-30 30-35 35-66	0-3 0-3 0-3 0-5	85-100 90-100 90-100 85-100	80-100 85-100 85-100 80-100	60-90 75-100 70-95 60-90	26-55 57-85 50-80 26-55	15-35 43-75 20-40 15-35	0-8 12-35 7-20 0-7
MID2----- Musella	0-4 4-14 14-18 18-60	5-15 10-20 20-40 ---	75-90 75-90 60-80 ---	60-90 60-85 50-65 ---	50-70 55-80 40-50 ---	30-45 43-64 36-45 ---	15-37 34-48 30-40 ---	0-10 11-20 8-15 ---
MIE3----- Musella	0-4 4-14 14-18 18-60	5-15 10-20 20-40 ---	75-90 75-90 60-80 ---	60-90 60-85 50-65 ---	50-70 55-80 40-50 ---	30-45 43-64 36-45 ---	15-37 34-48 30-40 ---	0-10 11-20 8-15 ---
MJF: Musella-----	0-4 4-14 14-18 18-60	5-20 10-20 20-40 ---	75-90 75-90 60-80 ---	60-90 60-85 50-65 ---	50-70 55-80 40-50 ---	30-45 43-64 36-45 ---	15-37 34-48 30-40 ---	0-10 11-20 8-15 ---
Pacolet-----	0-3 3-29 29-52 52-70	0-1 0-1 0-2 0-2	95-100 80-100 80-100 80-100	90-100 80-100 70-100 70-100	65-85 60-95 60-80 60-90	36-50 51-75 30-60 25-50	20-40 38-65 20-35 15-28	4-17 11-33 5-15 0-6
MsD3: Madison-----	0-6 6-30 30-35 35-66	0-3 0-3 0-3 0-5	90-100 90-100 90-100 85-100	85-100 85-100 85-100 80-100	70-95 75-100 70-95 60-90	46-80 57-85 50-80 26-55	30-50 43-75 20-40 15-35	7-20 12-35 7-20 0-7
Pacolet-----	0-3 3-29 29-52 52-70	0-1 0-1 0-2 0-2	95-100 80-100 80-100 80-100	90-100 80-100 70-100 70-100	65-87 60-100 60-80 60-90	36-50 51-75 30-60 25-50	20-40 38-65 20-35 15-28	4-17 11-33 5-15 0-6
MsE2: Madison-----	0-6 6-30 30-35 35-66	0-3 0-3 0-3 0-5	85-100 90-100 90-100 85-100	80-100 85-100 85-100 80-100	60-90 75-100 70-95 60-90	26-55 57-85 50-80 26-55	15-35 43-75 20-40 15-35	0-8 12-35 7-20 0-7





## Physical and Chemical Properties

Table 13 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

*Moist bulk density* is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at  $\frac{1}{3}$ -bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter.

*Permeability* refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture.

*Available water capacity* refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone.

*Soil reaction* is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses.

*Shrink-swell potential* is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil.

*Erosion factor K* indicates the susceptibility of a soil to sheet and rill erosion by water. (For more information, see the section "Interpretive Groups.")

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year. (For more information, see the section "Interpretive Groups.")

*Wind erodibility groups* are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The susceptibility of soil to wind erosion is directly related to the percentage of the surface layer that is dry, nonerodible aggregates larger than 0.84 millimeter in diameter. The wind erodibility index is determined from this percentage. It represents the ability of soil aggregates to resist breakdown by tillage and abrasion from wind erosion. Soils of the same wind erodibility group have similar percentages of dry soil aggregates larger than 0.84 millimeter. Soils are grouped as follows:

1. Very fine sands, fine sands, sands, and coarse sands. The surface layer is 1 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 310 tons per acre per year.
2. Loamy very fine sands, loamy fine sands, loamy sands, loamy coarse sands, and sapric soil material. The surface layer is 10 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 134 tons per acre per year.
3. Very fine sandy loams, fine sandy loams, sandy loams, and coarse sandy loams. The surface layer is 25 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 86 tons per acre per year.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. The surface layer is 25 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 86 tons per acre per year.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams. The surface layer is 25 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 86 tons per acre per year.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. The surface layer is 40 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 56 tons per acre per year.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. The surface layer is 45 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 48 tons per acre per year.
7. Silts, noncalcareous silty clay loams that are more than 35 percent clay, and fibric soil material. The surface layer is 50 percent dry soil aggregates larger than 0.84 millimeter. The wind erodibility index is 38 tons per acre per year.
8. Soils that are not subject to wind erosion because of rock fragments on the surface or because of

surface wetness. They are not suitable for cultivation.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In table 13, the

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

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factor		Wind erodibility	Organic matter group
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AL----- Altavista	0-12	10-25	1.30-1.45	2.00-6.00	0.15-0.22	3.6-6.5	Low	.32	5	5	0.5-3.0
	12-42	18-35	1.30-1.50	0.60-2.00	0.12-0.20	3.6-6.0	Low	.24			---
	42-60	---	---	---	---	---	---				---
ALB----- Altavista	0-12	10-24	1.30-1.50	2.00-6.00	0.12-0.20	3.6-6.5	Low	.24	5	3	0.5-3.0
	12-42	18-35	1.30-1.50	0.60-2.00	0.12-0.20	3.6-6.0	Low	.24			---
	42-60	---	---	---	---	---	---				---
AmB----- Appling	0-9	5-20	1.40-1.65	2.00-6.00	0.10-0.15	4.5-6.5	Low	.24	4	3	0.5-2.0
	9-35	35-60	1.25-1.45	0.60-2.00	0.15-0.17	4.5-5.5	Low	.28			---
	35-46	20-50	1.25-1.45	0.60-2.00	0.12-0.16	4.5-5.5	Low	.28			---
	46-65	---	---	---	---	---	---				---
AmC----- Appling	0-9	5-20	1.40-1.65	2.00-6.00	0.10-0.15	4.5-6.5	Low	.24	4	3	0.5-2.0
	9-35	35-60	1.25-1.45	0.60-2.00	0.15-0.17	4.5-5.5	Low	.28			---
	35-46	20-50	1.25-1.45	0.60-2.00	0.12-0.16	4.5-5.5	Low	.28			---
	46-65	---	---	---	---	---	---				---
AmD----- Appling	0-9	5-20	1.40-1.65	2.00-6.00	0.10-0.15	4.5-6.5	Low	.24	4	3	0.5-2.0
	9-35	35-60	1.25-1.45	0.60-2.00	0.15-0.17	4.5-5.5	Low	.28			---
	35-46	20-50	1.25-1.45	0.60-2.00	0.12-0.16	4.5-5.5	Low	.28			---
	46-65	---	---	---	---	---	---				---
AnB3----- Appling	0-9	20-35	1.30-1.45	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28	3	5	0.5-1.0
	9-35	35-60	1.25-1.45	0.60-2.00	0.15-0.17	4.5-5.5	Low	.28			---
	35-46	20-50	1.25-1.45	0.60-2.00	0.12-0.16	4.5-5.5	Low	.28			---
	46-65	---	---	---	---	---	---				---
AnC3----- Appling	0-9	20-35	1.30-1.45	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28	3	5	0.5-1.0
	9-35	35-60	1.25-1.45	0.60-2.00	0.15-0.17	4.5-5.5	Low	.28			---
	35-46	20-50	1.25-1.45	0.60-2.00	0.12-0.16	4.5-5.5	Low	.28			---
	46-65	---	---	---	---	---	---				---
Cah----- Cartecay	0-9	10-20	1.20-1.40	6.00-20.00	0.08-0.12	5.1-6.5	Low	.24	5		1.0-2.0
	9-40	8-18	1.30-1.50	2.00-6.00	0.09-0.12	5.1-6.5	Low	.24			---
	40-60	2-16	1.30-1.55	6.00-20.00	0.06-0.09	5.1-6.5	Low	.15			---
Csw----- Chewacla variants	0-8	10-35	1.30-1.60	0.60-2.00	0.15-0.24	4.5-6.5	Low	.28	5	5	1.0-4.0
	8-24	18-35	1.30-1.50	0.60-2.00	0.15-0.24	4.5-6.5	Low	.32			---
	24-34	18-35	1.30-1.60	0.60-2.00	0.12-0.20	4.5-6.5	Low	.28			---
	34-58	18-35	1.30-1.50	0.60-2.00	0.15-0.24	4.5-7.8	Low	.32			---
	58-70	---	---	---	---	---	---				---
Cw----- Cartecay variant	0-9	20-35	1.25-1.45	2.00-6.00	0.12-0.16	5.1-6.5	Low	.32	5		2.0-3.0
	9-40	8-18	1.30-1.50	2.00-6.00	0.09-0.12	5.1-6.5	Low	.24			---
	40-60	2-16	1.30-1.55	6.00-20.00	0.06-0.09	5.1-6.5	Low	.15			---
CYB2----- Cecil	0-7	5-20	1.30-1.50	2.00-6.00	0.12-0.14	4.5-6.5	Low	.28	4	3	0.5-1.0
	7-11	20-35	1.30-1.50	0.60-2.00	0.13-0.15	4.5-5.5	Low	.28			---
	11-50	35-70	1.30-1.50	0.60-2.00	0.13-0.15	4.5-5.5	Low	.28			---
	50-75	---	---	---	---	---	---				---
CYC2----- Cecil	0-7	5-20	1.30-1.50	2.00-6.00	0.12-0.14	4.5-6.5	Low	.28	4	3	0.5-1.0
	7-11	20-35	1.30-1.50	0.60-2.00	0.13-0.15	4.5-5.5	Low	.28			---
	11-50	35-70	1.30-1.50	0.60-2.00	0.13-0.15	4.5-5.5	Low	.28			---
	50-75	---	---	---	---	---	---				---

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available	Soil reaction	Shrink-swell potential	Erosion factor		Wind erodibility group	Organic matter
					water capacity			K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
DiB----- Durham	0-16	5-20	1.30-1.60	2.00-6.00	0.08-0.12	4.5-6.0	Low	.24	5		0.5-2.0
	16-36	18-35	1.30-1.60	0.60-2.00	0.12-0.16	4.5-5.5	Low	.20			---
	36-42	25-45	1.20-1.50	0.20-0.60	0.14-0.18	4.5-5.5	Low	.20			---
	42-48	8-30	1.30-1.50	0.60-2.00	0.08-0.14	4.5-5.5	Low	.20			---
	48-60	5-20	1.60-1.80	0.60-2.00	0.06-0.10	4.5-5.5	Low	.17			---
GeB3----- Gwinnett	0-7	20-40	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	5	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
GeC3----- Gwinnett	0-7	20-40	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	5	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
GeD3----- Gwinnett	0-7	20-40	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	5	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
GeE2----- Gwinnett	0-7	20-40	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	5	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
GgB2----- Gwinnett	0-7	15-25	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	3	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
GgC2----- Gwinnett	0-7	15-25	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	3	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
GgD2----- Gwinnett	0-7	15-25	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	3	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
HSB----- Hiwassee	0-7	10-35	1.35-1.55	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28	5	6	0.5-2.0
	7-61	35-60	1.30-1.45	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28			---
	61-70	7-35	1.45-1.65	0.60-2.00	0.10-0.14	4.5-6.5	Low	.28			---
HTC2----- Hiwassee	0-7	10-35	1.35-1.55	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28	5	6	0.5-2.0
	7-61	35-60	1.30-1.45	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28			---
	61-70	7-35	1.45-1.65	0.60-2.00	0.10-0.14	4.5-6.5	Low	.28			---
HTD2----- Hiwassee	0-7	10-35	1.35-1.55	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28	5	6	0.5-2.0
	7-61	35-60	1.30-1.45	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28			---
	61-70	7-35	1.45-1.65	0.60-2.00	0.10-0.14	4.5-6.5	Low	.28			---
HYC----- Helena	0-12	5-20	1.58-1.62	2.00-6.00	0.10-0.12	3.6-6.5	Low	.24	4	5	0.5-2.0
	12-19	20-35	1.46-1.56	0.20-0.60	0.13-0.15	3.6-5.5	Moderate	.28			---
	19-43	35-60	1.44-1.55	0.06-0.20	0.13-0.15	3.6-5.5	High	.28			---
	43-60	---	---	---	---	---	---				---
LDF----- Louisburg	0-7	2-15	1.25-1.45	6.00-20.00	0.03-0.07	4.5-6.0	Low	.10	3		0.5-2.0
	7-24	7-18	1.30-1.50	6.00-20.00	0.06-0.10	4.5-6.0	Low	.24			---
	24-60	---	---	0.00-0.06	---	---	---				---
LkE----- Louisa	0-4	10-25	1.25-1.55	2.00-6.00	0.10-0.14	4.5-6.0	Low	.17	2	3	0.5-2.0
	4-12	12-27	1.35-1.55	2.00-6.00	0.10-0.15	4.5-6.0	Low	.24			---
	12-18	10-25	1.40-1.60	2.00-6.00	0.08-0.12	4.5-6.0	Low	.17			---
	18-60	---	---	0.00-0.06	---	---	---				---

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factor		Wind erodibility	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH		K	T	group	Pct
LnE----- Louisburg	0-7	5-15	1.25-1.45	6.00-20.00	0.09-0.12	4.5-6.0	Low	.24	3		0.5-2.0
	7-24	7-18	1.30-1.50	6.00-20.00	0.10-0.12	4.5-6.0	Low	.24			---
	24-60	---	---	0.00-0.06	---	---					---
LNF----- Louisa	0-4	10-25	1.25-1.55	2.00-6.00	0.10-0.14	4.5-6.0	Low	.17	2	3	0.5-2.0
	4-12	12-27	1.35-1.55	2.00-6.00	0.10-0.15	4.5-6.0	Low	.24			---
	12-18	10-25	1.40-1.60	2.00-6.00	0.08-0.12	4.5-6.0	Low	.17			---
	18-60	---	---	0.00-0.06	---	---					---
MDC3----- Madison	0-6	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.5	Low	.28	3	6	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---
MDE3----- Madison	0-6	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.5	Low	.28	3	6	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---
MgB2----- Madison	0-6	5-20	1.45-1.65	2.00-6.00	0.11-0.15	4.5-6.5	Low	.24	4	5	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---
MgC2----- Madison	0-6	5-20	1.45-1.65	2.00-6.00	0.11-0.15	4.5-6.5	Low	.24	4	5	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---
MgD2----- Madison	0-6	5-20	1.45-1.65	2.00-6.00	0.11-0.15	4.5-6.5	Low	.24	4	5	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---
MID2----- Musella	0-4	20-30	1.25-1.55	0.60-2.00	0.13-0.15	5.1-6.5	Low	.20	2		0.5-2.0
	4-14	27-35	1.35-1.55	0.60-2.00	0.10-0.13	5.1-6.5	Low	.32			---
	14-18	27-35	1.35-1.55	0.60-2.00	0.09-0.12	5.1-6.5	Low	.28			---
	18-60	---	---	0.00-6.00	---	---					---
MIE3----- Musella	0-4	20-30	1.25-1.55	0.60-2.00	0.13-0.15	5.1-6.5	Low	.20	2		0.5-2.0
	4-14	27-35	1.35-1.55	0.60-2.00	0.10-0.13	5.1-6.5	Low	.32			---
	14-18	27-35	1.35-1.55	0.60-2.00	0.09-0.12	5.1-6.5	Low	.28			---
	18-60	---	---	0.00-6.00	---	---					---
MJF: Musella-----	0-4	20-30	1.25-1.55	0.60-2.00	0.12-0.14	5.6-6.5	Low	.20	2		0.5-2.0
	4-14	27-35	1.35-1.55	0.60-2.00	0.10-0.13	5.6-6.5	Low	.32			---
	14-18	27-35	1.35-1.55	0.60-2.00	0.09-0.12	5.6-6.5	Low	.28			---
	18-60	---	---	0.00-6.00	---	---					---
Pacolet-----	0-3	20-35	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.5	Low	.24	2	5	0.5-1.0
	3-29	35-65	1.30-1.50	0.60-2.00	0.12-0.15	4.5-6.0	Low	.28			---
	29-52	15-30	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
	52-70	10-25	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
MsD3: Madison-----	0-6	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.5	Low	.28	3	6	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available	Soil	Shrink-swell	Erosion factor		Wind erod-ability	Organic matter
					water capacity			reaction	K		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
MsD3:											
Pacolet-----	0-3	20-35	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.5	Low	.24	2	5	0.5-1.0
	3-29	35-65	1.30-1.50	0.60-2.00	0.12-0.15	4.5-6.0	Low	.28			---
	29-52	15-30	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
	52-70	10-25	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
MsE2:											
Madison-----	0-6	5-20	1.45-1.65	2.00-6.00	0.11-0.15	4.5-6.5	Low	.24	4	5	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---
Pacolet-----	0-3	8-20	1.00-1.50	2.00-6.00	0.08-0.12	4.5-6.5	Low	.20	3	3	0.5-2.0
	3-29	35-65	1.30-1.50	0.60-2.00	0.12-0.15	4.5-6.0	Low	.28			---
	29-52	15-30	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
	52-70	10-25	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
PfD-----	0-3	8-20	1.00-1.50	2.00-6.00	0.08-0.12	4.5-6.5	Low	.20	3	3	0.5-2.0
Pacolet	3-29	35-65	1.30-1.50	0.60-2.00	0.12-0.15	4.5-6.0	Low	.28			---
	29-52	15-30	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
	52-70	10-25	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
PgC3-----	0-3	20-35	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.5	Low	.24	2	5	0.5-1.0
Pacolet	3-29	35-65	1.30-1.50	0.60-2.00	0.12-0.15	4.5-6.0	Low	.28			---
	29-52	15-30	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
	52-70	10-25	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
Ron-----	0-7	10-27	1.20-1.50	0.60-2.00	0.14-0.20	3.6-5.5	Low	.37	5	5	0.5-2.0
Roanoke	7-12	20-35	1.20-1.50	0.00-20.00	0.16-0.19	3.6-5.5	Moderate	.24	4		---
	12-50	35-60	1.35-1.65	0.00-0.20	0.10-0.19	3.6-5.5	Moderate	.24			---
	50-72	5-50	1.20-1.50	0.06-20.00	0.04-0.14	3.6-6.5	Moderate	.24			---
Toc-----	0-10	2-15	1.40-1.55	2.00-6.00	0.09-0.12	5.1-6.5	Low	.10	4		1.0-2.0
Toccoa	10-60	2-19	1.40-1.50	2.00-6.00	0.09-0.12	5.1-6.5					---
Tod-----	0-10	2-15	1.40-1.55	2.00-6.00	0.09-0.12	5.1-6.5	Low	.10	4		1.0-2.0
Toccoa	10-60	2-19	1.40-1.50	2.00-6.00	0.09-0.12	5.1-6.5					---
Ubp. Urban land and Borrow pits											
Ud. Urban land											
UeC: Urban land.											
Appling-----	0-9	20-35	1.30-1.45	0.60-2.00	0.12-0.15	4.5-6.5	Low	.28	3	5	0.5-1.0
	9-35	35-60	1.25-1.45	0.60-2.00	0.15-0.17	4.5-5.5	Low	.28			---
	35-46	20-50	1.25-1.45	0.60-2.00	0.12-0.16	4.5-5.5	Low	.28			---
	46-65	---	---	---	---	---					---
UfC: Urban land.											
Cecil-----	0-7	20-35	1.30-1.50	0.60-2.00	0.13-0.15	4.5-6.5	Low	.28	3	5	0.5-1.0
	7-11	20-35	1.30-1.50	0.60-2.00	0.13-0.15	4.5-5.5	Low	.28			---
	11-50	35-70	1.30-1.50	0.60-2.00	0.13-0.15	4.5-5.5	Low	.28			---
	50-75	---	---	---	---	---					---

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factor		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
UgC: Urban land.											
Gwinnett-----	0-7	20-40	1.35-1.55	0.60-2.00	0.11-0.17	5.1-6.5	Low	.28	4	5	1.0-3.0
	7-35	35-60	1.30-1.45	0.60-2.00	0.11-0.16	5.1-6.5	Low	.28			---
	35-45	24-40	1.35-1.50	0.60-2.00	0.12-0.18	5.1-6.5	Low	.28			---
UhC: Urban land.											
Madison-----	0-6	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.5	Low	.28	3	6	0.5-2.0
	6-30	30-50	1.20-1.40	0.60-2.00	0.13-0.18	4.5-5.5	Low	.32			---
	30-35	25-35	1.30-1.40	0.60-2.00	0.12-0.16	4.5-6.0	Low	.28			---
	35-66	5-20	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.0	Low	.37			---
UiE: Urban land.											
Pacolet-----	0-3	20-35	1.30-1.50	0.60-2.00	0.10-0.14	4.5-6.5	Low	.24	2	5	0.5-1.0
	3-29	35-65	1.30-1.50	0.60-2.00	0.12-0.15	4.5-6.0	Low	.28			---
	29-52	15-30	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
	52-70	10-25	1.20-1.50	0.60-2.00	0.08-0.15	4.5-6.0	Low	.28			---
WjF-----	0-6	5-20	1.30-1.50	2.00-6.00	0.11-0.15	5.1-6.5	Low	.17	2	8	0.5-2.0
Wilkes	6-13	20-40	1.40-1.60	0.20-0.60	0.15-0.20	5.6-7.8	Moderate	.28			---
	13-48	---	---	---	---	---	---				---
WvD-----	0-6	5-20	1.30-1.50	2.00-6.00	0.11-0.15	5.1-6.5	Low	.24	2	5	0.5-2.0
Wilkes variant	6-13	20-40	1.40-1.60	0.20-0.60	0.15-0.20	6.1-7.8	Moderate	.32			---
	13-48	---	---	---	---	---	---				---

## Water Features

Table 14 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

Soil properties that influence runoff potential are depth to a seasonal high water table, intake rate, permeability after prolonged wetting, and depth to a very slowly permeable layer. The influences of ground cover and slope are not considered in determining hydrologic soil groups. In the definitions of the groups, infiltration rate is the rate at which water enters the soil at the surface and it is controlled by surface conditions. Transmission rate is the rate at which water moves through the soil, and it is controlled by properties of the soil layers.

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

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

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

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

*Flooding*, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high

tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in a closed depression is considered ponding.

Table 14 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none*, *rare*, *occasional*, or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). *Common* is used when the frequent and occasional classes are grouped for certain purposes. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

*High water table (seasonal)* is the highest level of a saturated zone in most years. Table 14 lists water tables that are at least 6 inches thick, are seasonally high for more than a few weeks, and are within 6 feet of the soil surface. Indicated in table 14 are the depth to the seasonal high water table; the kind of water table, that is, *apparent* or *perched*; and the months of the year that the water table commonly is highest.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in a freshly dug, uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

TABLE 14.--WATER FEATURES

Map symbol and soil name	Hydro- logic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
AL----- Altavista	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Apr
AlB----- Altavista	C	None		---	1.5-2.5	Apparent	Dec-Apr
AmB----- Appling	B	None		---	>6.0		---
AmC----- Appling	B	None		---	>6.0		---
AmD----- Appling	B	None		---	>6.0		---
AnB3----- Appling	B	None		---	>6.0		---
AnC3----- Appling	B	None		---	>6.0		---
Cah----- Cartecay	C	Frequent	Brief	Dec-Mar	0.5-1.5	Apparent	Jan-Apr
Csw----- Chewacla variants	C	Frequent	Brief	Nov-Apr	0.5-1.5	Apparent	Nov-Apr
Cw----- Cartecay variant	C	Occasional	Brief	Dec-Mar	0.5-1.5	Apparent	Jan-Apr
CYB2----- Cecil	B	None		---	>6.0		---
CYC2----- Cecil	B	None		---	>6.0		---
DiB----- Durham	B	None		---	>6.0		---
GeB3----- Gwinnett	B	None		---	>6.0		---
GeC3----- Gwinnett	B	None		---	>6.0		---
GeD3----- Gwinnett	B	None		---	>6.0		---
GeE2----- Gwinnett	B	None		---	>6.0		---
GgB2----- Gwinnett	B	None		---	>6.0		---
GgC2----- Gwinnett	B	None		---	>6.0		---
GgD2----- Gwinnett	B	None		---	>6.0		---

TABLE 14.--WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
HSB----- Hiwassee	B	None		---	>6.0		---
HTC2----- Hiwassee	B	None		---	>6.0		---
HTD2----- Hiwassee	B	None		---	>6.0		---
HYC----- Helena	C	None		---	1.5-2.5	Perched	Jan-Apr
LDF----- Louisburg	B	None		---	>6.0		---
LkE----- Louisa	B	None		---	>6.0		---
LnE----- Louisburg	B	None		---	>6.0		---
LNf----- Louisa	B	None		---	>6.0		---
MDC3----- Madison	B	None		---	>6.0		---
MDE3----- Madison	B	None		---	>6.0		---
MgB2----- Madison	B	None		---	>6.0		---
MgC2----- Madison	B	None		---	>6.0		---
MgD2----- Madison	B	None		---	>6.0		---
MID2----- Musella	B	None		---	>6.0		---
MIE3----- Musella	B	None		---	>6.0		---
MJF: Musella-----	B	None		---	>6.0		---
Pacolet-----	B	None		---	>6.0		---
MsD3: Madison-----	B	None		---	>6.0		---
Pacolet-----	B	None		---	>6.0		---
MsE2: Madison-----	B	None		---	>6.0		---
Pacolet-----	B	None		---	>6.0		---

TABLE 14.--WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
PfD----- Pacolet	B	None		---	>6.0		---
PgC3----- Pacolet	B	None		---	>6.0		---
Ron----- Roanoke	D	Frequent	Long	Nov-Jun	0-1.0	Apparent	Nov-May
Toc----- Toccoa	B	Occasional	Brief	Jan-Dec	2.5-5.0	Apparent	Dec-Apr
Tod----- Toccoa	B	None		---	2.5-5.0	Apparent	Dec-Apr
Ubp. Urban land and Borrow pits							
Ud. Urban land							
UeC: Urban land.							
Appling-----	B	None		---	>6.0		---
UfC: Urban land.							
Cecil-----	B	None		---	>6.0		---
UgC: Urban land.							
Gwinnett-----	B	None		---	>6.0		---
UhC: Urban land.							
Madison-----	B	None		---	>6.0		---
UiE: Urban land.							
Pacolet-----	B	None		---	>6.0		---
WjF----- Wilkes	C	None		---	>6.0		---
WvD----- Wilkes variant	C	None		---	>6.0		---

## Soil Features

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

*Depth to bedrock* is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations made during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion

of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

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

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

TABLE 15.--SOIL FEATURES

Map symbol and soil name	Bedrock		Risk of corrosion	
	Depth	Hardness	Uncoated steel	Concrete
	In			
AL----- Altavista	>60		Moderate	Moderate
AlB----- Altavista	>60		Moderate	Moderate
AmB----- Appling	>60		Moderate	Moderate
AmC----- Appling	>60		Moderate	Moderate
AmD----- Appling	>60		Moderate	Moderate
AnB3----- Appling	>60		Moderate	Moderate
AnC3----- Appling	>60		Moderate	Moderate
Cah----- Cartecay	>60		Low	Moderate
Csw----- Chewacla variants	>60		High	Moderate
Cw----- Cartecay variant	>60		Low	Moderate
CYB2----- Cecil	>60		High	High
CYC2----- Cecil	>60		High	High
DiB----- Durham	>60		Moderate	Moderate
GeB3----- Gwinnett	40-60	Soft	High	Moderate
GeC3----- Gwinnett	40-60	Soft	High	Moderate
GeD3----- Gwinnett	40-60	Soft	High	Moderate
GeE2----- Gwinnett	40-60	Soft	High	Moderate
GgB2----- Gwinnett	40-60	Soft	High	Moderate
GgC2----- Gwinnett	40-60	Soft	High	Moderate
GgD2----- Gwinnett	40-60	Soft	High	Moderate

TABLE 15.--SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Risk of corrosion	
	Depth	Hardness	Uncoated steel	Concrete
	In			
HSB----- Hiwassee	>60		Moderate	Moderate
HTC2----- Hiwassee	>60		Moderate	Moderate
HTD2----- Hiwassee	>60		Moderate	Moderate
HYC----- Helena	>60		High	High
LDF----- Louisburg	40-40	Hard	Low	Moderate
LkE----- Louisa	10-20	Soft	Low	Moderate
LnE----- Louisburg	40-40	Hard	Low	Moderate
LNF----- Louisa	10-20	Soft	Low	Moderate
MDC3----- Madison	>60		High	Moderate
MDE3----- Madison	>60		High	Moderate
MgB2----- Madison	>60		High	Moderate
MgC2----- Madison	>60		High	Moderate
MgD2----- Madison	>60		High	Moderate
MID2----- Musella	14-20	Soft	Moderate	Moderate
MIE3----- Musella	14-20	Soft	Moderate	Moderate
MJF: Musella-----	14-20	Soft	Moderate	Moderate
Pacolet-----	>60		High	High
MsD3: Madison-----	>60		High	Moderate
Pacolet-----	>60		High	High
MsE2: Madison-----	>60		High	Moderate
Pacolet-----	>60		High	High

TABLE 15.--SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Risk of corrosion	
	Depth	Hardness	Uncoated steel	Concrete
	<u>In</u>			
PfD----- Pacolet	>60		High	High
PgC3----- Pacolet	>60		High	High
Ron----- Roanoke	>60		High	High
Toc----- Toccoa	>60		Low	Moderate
Tod----- Toccoa	>60		Low	Moderate
Ubp. Urban land and Borrow pits				
Ud. Urban land				
UeC: Urban land.				
Appling-----	>60		Moderate	Moderate
UfC: Urban land.				
Cecil-----	>60		High	High
UgC: Urban land.				
Gwinnett-----	40-60	Soft	High	Moderate
UhC: Urban land.				
Madison-----	>60		High	Moderate
UiE: Urban land.				
Pacolet-----	>60		High	High
WjF----- Wilkes	10-20	Soft	Moderate	Moderate
WvD----- Wilkes variant	10-20	Soft	Moderate	Moderate



# References

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- (1) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.
- (2) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.
- (3) United States Department of Agriculture. 1973. Soil survey of Cobb County, Georgia.



# Glossary

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**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Complex, soil.** A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

**Cutbanks cave** (in tables). The walls of excavations tend to cave in or slough.

**Depth to rock** (in tables). Bedrock is too near the surface for the specified use.

**Diversion (or diversion terrace).** A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Drainage class** (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained.*—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

*Somewhat excessively drained.*—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious.

Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

*Well drained.*—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

*Moderately well drained.*—Water is removed from

the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

*Somewhat poorly drained.*—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

*Poorly drained.*—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

*Very poorly drained.*—Water is removed 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.

**Excess fines** (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

**Fibric soil material (peat).** The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest

bulk density and the highest water content at saturation of all organic soil material.

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Forb.** Any herbaceous plant that is not a grass or a sedge.

**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 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Hemic soil material (mucky peat).** Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

**Large stones** (in tables). Rock fragments that are 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

**Liquid limit.** The water content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Low strength.** The soil is not strong enough to support loads.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition.

**Percs slowly** (in tables). The slow movement of water through the soil adversely affects the specified use.

**Permeability.** The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow .....	less than 0.06 inch
Slow.....	0.06 to 0.2 inch
Moderately slow .....	0.2 to 0.6 inch
Moderate .....	0.6 inch to 2.0 inches
Moderately rapid.....	2.0 to 6.0 inches
Rapid .....	6.0 to 20 inches
Very rapid .....	more than 20 inches

**Piping** (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Reaction, soil.** A measure of the 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 degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid .....	below 4.5
Very strongly acid .....	4.5 to 5.0
Strongly acid.....	5.1 to 5.5
Moderately acid .....	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral .....	6.6 to 7.3
Slightly alkaline .....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline .....	8.5 to 9.0
Very strongly alkaline .....	9.1 and higher

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sapric soil material (muck).** The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

**Seepage** (in tables). The movement of water through the soil adversely affects the specified use.

**Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay

(0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey area, the following slope classes are recognized:

Nearly level.....	0 to 2 percent
Very gently sloping.....	2 to 6 percent
Gently sloping.....	6 to 10 percent
Strongly sloping.....	10 to 15 percent
Moderately steep.....	15 to 25 percent
Steep.....	25 to 45 percent
Very steep.....	45 to 70 percent

**Slope** (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specified use.

**Slow refill** (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

**Small stones** (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.

**Terrace.** An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

**Thin layer** (in tables). An otherwise suitable soil material that is too thin for the specified use.

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