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SOIL SURVEY REPORT

FOR

NAVAL AUXILIARY LANDING FIELD

FENTRESS, VIRGINIA

Prepared By

USDA, Soil Conservation Service

Chesapeake, Virginia

In Cooperation with
Atlantic Division, Naval Facilities Engineering Command
Virginia Dare Soil and Water Conservation District
Research Division, Agronomy Department, VPI & SU, Blacksburg, Virginia
Naval Auxiliary Landing Field Fentress

1982

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DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

TELEPHONE NO.
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IN REPLY REFER TO:

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8 August 1983

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commanding Officer, Naval Air Station Oceana, Virginia Beach, Virginia 23460

Subj: Activity Soil Survey Report 1982 - NALF Fentress, Chesapeake, Virginia

Encl: (1) Subject Report (5 copies)

1. Enclosure (1) is forwarded for your use.

2. This Soil Survey Report is a basic natural resource management document, with application to land management, development, building and road construction, grounds maintenance, etc. Wide distribution and use is encouraged.

3. Arrangements for detailed review and discussion of the report with personnel of the Soil Conservation Service, U.S. Department of Agriculture, will be made if desired.

4. Please let us know if there are questions.

JAMES R. BURDEN
By direction

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FOREWORD AND ACKNOWLEDGEMENTS

Effective land management programs for Defense Department installations are important to insure wise and proper land use. The basis for such programs is found in an investigation and appraisal of the soils on the installation, and interpretation of their properties for a wide variety of uses. For this reason a soil survey (the second one) was made on installation lands at the Naval Auxiliary Landing Field, Fentress, Chesapeake, Virginia. The first survey of these lands was arranged by the Navy in 1960. Field work and report preparation were done by Soil Scientists of the United States Department of Agriculture, Soil Conservation Service. These lands were also covered by the published soil survey of Norfolk County.

The soil survey work for this report was done to revise the 1960 report. A new system of soil classification and improved methods of surveys and techniques have been adopted since earlier reports were made. Field work was done by Soil Scientist, Ian Rodiban and the report was prepared by Dallas Adams, SCS District Conservationist, Chesapeake, Virginia. The work was done during 1981 and 1982 in cooperation with the installation and the Atlantic Division, Naval Facilities Engineering Command, which arranged for the survey.

Soil conservation and erosion control effort are needed to protect and care for Navy facility lands, and is a requirement for all installations by the Naval Facilities Engineering Command, which is responsible for natural resource management. Soil sediment is probably the most common and one of the worst water pollutants. Soil erosion is a major problem on all lands in the United States, and its control is a matter of major national concern.

This report contains information which can be useful in future construction and maintenance work, in the management of installation natural resources, in land planning programs on installation lands, and to predict soil suitability and behavior for selected land uses. It also highlights limitations and hazards inherent in the soil, improvements needed to overcome limitations, and the effect of selected land uses on the environment. A copy of it should be kept in all offices having responsibilities for these programs.

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

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

These and many other soil properties that affect land use are described in this soil survey. The location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described and much information is given about each soil for specific uses. This soil survey can be useful in the conservation, development and productive use of soil, water and other resources. Additional information or assistance in using this report can be obtained from the local office of the Soil Conservation Service.

HOW TO USE THIS REPORT

1. Use the Aerial Photo Soil Survey Maps

   Locate the specific map which you want to study from the map index sheet. Soil boundaries are outlined by black lines, with a symbol for each soil mapping unit. The symbol is inside the soil boundary if there is enough room, otherwise, it is outside the area and a pointer shows the area where the symbol belongs. Make a note of the soil mapping unit symbol occurring in the specific area which you have selected.

2. Use Table 1 to Find Soil Name

   Look up the map symbol along the left-hand column. The symbols are listed numerically. When you have located the mapping symbol, read across for the soil name.

3. Use the Interpretive Tables 4-15 for Limitation Ratings for Various Uses of the Soils

   Soil interpretive tables are filed in numerical order. Slopes and textures are needed to arrive at the limitations for some soils and proposed uses. The explanation sheets precede the interpretive tables.

INTRODUCTION

The Naval Auxiliary Landing Field, Fentress, Virginia, is in the east central part of the City of Chesapeake, immediately south of the Chesapeake and Albermarle Canal. The total land area is approximately 2,558 acres or 4 square miles. The east boundary is formed by Mount Pleasant Road and Fentress Airfield Road; part of north boundary formed by Lockheed Avenue; part of west boundary formed by Carter Road, Blue Ridge Road and Whittamore Road. The remainder of the boundary is joined by private property.

It is located in the lower Atlantic Coastal Plain. The topography is nearly level with some gently sloping areas along low ridges and adjacent to streams. Elevations range from 5 feet to 15 feet above sea level. The drainage from this area goes into the North Landing River.

Geology

The Naval Auxiliary Landing Field is located in the Mount Pleasant Flat Morphologic subdivision of southeastern Virginia. 1/ "The Mount Pleasant flat is named for the community of Mount Pleasant, City of Chesapeake. In Virginia it forms a broad, generally undissected area 5 to 9 miles wide from east to west, and 18 to 20 miles long from north to south. This flat lies east of the Hickory scarp, south of the Diamond Springs scarp and west of the Sandridge and mud-flat complex. It includes the area between the shore and Oceana ridge north of the Sandridge and mud-flat complex and it can be traced south into North Carolina at least to Albermarle Sound.

The surface of the Mount Pleasant flat lies between 10 and 11 feet above sea level. It is incompletely dissected and poorly drained although broad stream valleys traverse it. The surface is so flat over large areas that it has been ditched extensively to provide drainage. Lagoonal sediments of the upper member of the Sand Bridge Formation form the surface over most of the flat. Deep ditches commonly expose sand of the lower member of the Sand Bridge Formation, and rarely, lagoonal clay of the older London Bridge Formation."

The soils are closely related in many aspects to the geology, elevations, topography, drainage sequences and landscapes.

The field was established in 1937 as an auxiliary landing field for the U. S. Navy. Prior use of the land was general farming.

1/ Bulletin 82, Virginia Division of Mineral Resources

NAVAL AUXILIARY LANDING FIELD - FENTRESS

TABLE 1

SOIL INDEX AND ACREAGE

SOIL INDEX SYMBOL	SOIL NAME	APPROXIMATE ACRES	PERCENT OF TOTAL
2	Urban Land	113.3	4.4
12	Udorthents, loamy	9.2	0.4
21	Tarboro	10.3	0.4
24	Bojac fine sandy loam	52.8	2.1
31	Seabrook loamy fine sand	7.1	0.3
34	Munden fine sandy loam	155.6	6.1
36	Tetotum fine sandy loam	3.9	0.2
42	Dragston fine sandy loam	165.0	6.5
45	Augusta fine sandy loam	32.6	1.3
52	Nimmo fine sandy loam	194.9	7.5
55	Tomotley loam	640.4	25.0
57	Acredale loam	573.5	22.3
65	Portsmouth loam	122.8	4.80
67	Hyde silt loam	1.6	0.1
76	Dorovan Muck	413.5	16.2
81	Nawney silt loam	61.5	2.4
	TOTAL	2,558 Acres	100%

CLIMATE OF NAVAL AUXILIARY LANDING FIELD, FENTRESS, VIRGINIA

The winters are mild while the autumn and spring seasons usually are delightful. Summers, though warm and long, frequently are tempered by cool periods often associated with northeasterly winds off the Atlantic. Temperatures of 100° or higher are of very infrequent occurrence. Cold waves seldom penetrate to this area and during the period of continuous official record now available, a temperature of zero has never been recorded. Occasional winters pass without a measurable amount of snowfall. Most of the snow generally occurs in light falls, which usually melt and disappear within 24 hours. Average seasonal snowfall is 8.5 inches.

From an agricultural standpoint, this area, with its long frost-free period and prolonged growing season, averaging 244 days is exceptionally well favored. The average date of the last freezing temperature in the spring is March 22, while the average date of the first in autumn is November 21. The average annual amount of rainfall is about 45 inches and considerably more than one-half of it falls in well distributed amounts during the crop growing season, April to October, inclusive, a fact of great importance to agricultural interests.

The average relative humidity in midafternoon is about 62 percent, humidity is higher at night, and the average at dawn is about 78 percent. During the course of a year there is an average of 110 clear days, 103 partly cloudy days and 152 cloudy days. The prevailing wind is from the southwest. The average wind speed for a year is 10.5 mph. The highest 12.3 mph recorded in March and the lowest 8.8 mph recorded in July and August.

Table 2 gives information on temperature and precipitation for the survey area as recorded at Norfolk International Airport for the period 1941-1980.

Table 3 shows probable dates of the first freeze in the fall and the last freeze in the spring along with the length of the growing season.

TABLE 2

AVERAGE TEMPERATURE, PRECIPITATION & SNOWFALL RECORDED IN THE PERIOD 1941-1980

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temp.	41.4	42.1	48.9	57.5	66.7	74.6	78.6	77.6	72.5	62.1	52.1	43.6
Precip.	3.32	3.33	3.78	3.20	3.73	4.01	5.70	5.33	3.89	3.13	2.62	3.19

Average Annual Temp. 59.8
Total Annual Precip. 45.23

SNOWFALL

Record	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Mean	0.0	0.0	0.0	0.0	T	1.1	3.2	2.9	1.3	T

Record	May	June	Total
Mean	0.0	0.0	8.5

TABLE 3

FREEZE DATA

PROBABILITY	LAST FROST IN SPRING Temp. 32°	FIRST FROST IN FALL Temp. 32°	GROWING SEASON
9 yrs. in 10	April 8	November 2	208 days
5 yrs. in 10	March 22	November 21	244 days
1 yr. in 10	March 5	December 9	279 days

AVERAGE GROWING SEASON IS 244 DAYS

HOW THE SURVEY WAS MADE

The soils of Naval Auxiliary Landing Field (NALF) Fentress, were studied, classified, and mapped by Soil Scientists of the USDA-Soil Conservation Service with assistance from Virginia Polytechnic Institute and State University Research Division Personnel. They made this survey to learn what kind of soils are in the area; where they are located; and how they can be used.

As the Soil Scientists traveled over the land, they observed steepness, length, and shape of slopes; kinds of native plants or crops; and many other facts about the soils. They studied soils along roadbanks, pipelines and other excavated areas where the soil layers were undisturbed. They dug many holes to expose the sequence of soil layers that make up the soil profile. The soils were classified by first examining the soil and comparing the thickness and arrangement of soil layers with soils already mapped and classified in other counties and other states. Scientific classification of the soils was then completed by use of the National Comprehensive System of Soil Classification.

Soils having similar features make up a soil series. All major layers of the soils of each series are similar in thickness, arrangement and other identifying features. All soils in the United States having the same series name are essentially alike in these features. Each soil series is named for a town or other geographic feature near the place where the series was first identified.

After the soils of the survey area were identified and classified, the soil scientist made the soil map by walking over the land and examining features of the soils in many different places. Lines were drawn on aerial photographs to show the boundaries between different mapping units. Each mapping unit consists of one or more dominant kinds of soil, but includes small areas of different soils that were not practical to map separately at the scale used.

DESCRIPTIONS OF THE SOILS

A brief description of each soil series on NALF is given following the prime farmland report. These descriptions point out general features that are most likely to affect the use and management of the individual soils. The important characteristics of the major layers of a typical soil are described. This is the same profile for which estimates of engineering properties are given in the columns listing the physical and chemical properties. The names of the units in each series are listed at the top of the sheet.

SOIL MAP UNIT DESCRIPTIONS

2 - ACREDALE-URBAN LAND COMPLEX

This complex consists of deep, poorly drained Acredale soils and areas of Urban land. The complex is on broad inland flats. Areas of this complex commonly are irregular shaped and range from 2 to 1,000 acres. The Acredale soils and Urban land are so intermingled that it was not practical to map them separately. This complex is about 40 percent Acredale soils, 35 percent Urban land, and 25 percent other soils. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is grayish brown silt loam about 18 centimeters thick. The subsoil extends to a depth of 50 inches. It is mainly gray silt loam and silty clay loam with yellowish brown mottles. The substratum is mottled gray and yellowish brown very fine sandy loam to a depth of at least 165 centimeters.

Urban land consists of areas where the soils are covered by asphalt, concrete, buildings, or other impervious materials.

Included with this complex in mapping are areas of Udorthents, poorly drained Tomotley soils, and somewhat poorly drained Augusta and Chapanoke soils. The Tomotley soils have less silt in the subsoil. The Augusta and Chapanoke soils are on areas at slightly higher elevations. The Udorthents are on areas where the natural soils have been disturbed by grading, excavating, or filling. Included soils make up about 25 percent of the unit.

The permeability of the Acredale soil is slow in the subsoil and moderately rapid in the substratum. Available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. Tilth is fair and the soil tends to dry out slowly. The subsoil has a moderate shrink-swell potential. The soil is moderate in organic matter content and medium in natural fertility. The surface layer ranges from extremely acid through strongly acid but the reaction may vary because of local liming practices. The subsoil and substratum range from very strongly acid through neutral. The root zone extends to a depth of 150 centimeters or more. A seasonal high water table is between the surface and a depth of one foot during winter and spring.

The Acredale soils in this complex are mostly used for open space, lawns, gardens, and parks.

The seasonal high water table, slow permeability, and low strength are the main limitations of the Acredale soil for community development. The seasonal high water table and slow permeability limit use of the soil as a site for septic tank absorption fields, but these limitations may be overcome with adequate artifical drainage and proper design and installation of drainfields. The seasonal high water table limits use of the soil as a building site and for many types of recreation, but this limitation may be overcome with proper landscaping and artifical drainage. The seasonal high water table and low strength limit use of the soil material for roads and streets. Strengthening or replacing the base material and installation of adequate artifical drainage improve the usefulness of this soil for roads and streets. The silty surface of this soil may become very dry and hard during the summer months and become a limiting factor for lawns and gardens.

A capability subclass is not assigned to this unit.

2 - TOMOTLEY-URBAN LAND COMPLEX

This complex consists of deep, nearly level, poorly drained Tomotley soils and areas of Urban land. It is on broad inland flats. Areas of the complex commonly are irregular shaped and range from 2 to 260 acres. The Tomotley soils and Urban land are so intermingled that it was not practical to map them separately. This complex is about 40 percent Tomotley soils, 35 percent Urban land, and 25 percent other soils. Slope ranges from 0 to 2 percent.

Typically, the surface layer of the Tomotley soil is dark grayish brown loam about 18 centimeters thick. The subsoil extends to a depth of 113 centimeters. It is mainly gray and light brownish gray loam and sandy clay loam with yellowish brown mottles. The substratum is mottled gray loamy sand to a depth of at least 165 centimeters.

Urban land consists of areas where the soils are covered by asphalt, buildings, concrete, or other impervious materials.

Included with this complex in mapping are areas of poorly drained Acredale and Nimmo soils, somewhat poorly drained Augusta and Dragston soils, and Udorthents. The Acredale soils have more silt in the subsoil and the Nimmo soils have less clay in the subsoil. The Augusta and Dragston soils are on areas at slightly higher elevations. Udorthents are areas where the natural soils have been disturbed by grading, excavating, or filling. Included soils make up about 25 percent of the unit.

The Permeability of the Tomotley soils is moderate in the subsoil and moderately rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is moderate in organic matter content and low in natural fertility. It commonly ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is between the surface and a depth of 30 centimeters during winter and spring.

The Tomotley soils in this complex are mostly used for open space, lawns, gardens, and parks.

The seasonal high water table is the main limitation of the Tomotley soil for community development. The seasonal high water table limits use of the soil as a site for septic tank absorption fields; however, this limitation may be overcome with adequate artifical drainage and with proper design and installation of drainfields. The seasonal high water table also limits use of the soil as a building site and for many types of recreation, but with proper landscaping and artifical drainage this limitation may also be overcome for these uses.

A capability subclass is not assigned to this unit.

12 - UDORTHENTS, LOAMY

This unit consists of deep, well and moderately well drained loamy and sandy soil material in areas where the soils have been altered during excavation or covered by earthy fill material. Udorthents are mostly around urban areas, major highways, canals, and mining operations. Areas of this unit are irregular and range from about 2 to over 200 acres. Slope ranges from 0 to 25 percent.

Included with this unit in mapping are small areas of undisturbed soils. Also included are small bodies of water and areas of more poorly drained disturbed soils. Many areas have inclusions of non-soil material such as asphalt, concrete, wood, and glass. Inclusions make up about 25 percent of the unit.

The permeability and available water capacity of these Udorthents is quite variable. Surface runoff is rapid and the erosion hazard is severe on unvegetated steep slopes.

These Udorthents are generally not suited to most agricultural uses. Udorthents have limitations for most types of community development and recreation, but some areas are used for community development where the soil material is suitable. An on-site investigation is needed to determine the suitability and limitations of the unit for any given use.

A capability subclass is not assigned to this unit.

21 - TARBORO LOAMY SAND

This soil is deep, gently sloping, and somewhat excessively drained. It is on low coastal plain surfaces. Areas of this soil are irregularly shaped and range from about 10 to 100 acres.

Typically, the surface layer of this soil is dark loamy sand about 20 centimeters thick. The substratum, extends to a depth of at least 200 centimeters. It is yellow and brown loamy sand and sand.

Included with this soil in mapping are small areas of moderately well drained Seabrook soils in slight depressions. They make up about 10 percent of the unit.

The permeability of this Tarboro soil is rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is moderate. The surface layer is friable and easily tilled. The substratum has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid through medium acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth greater than 13 centimeters during winter and early spring.

Most areas of this soil are in woodland. A few areas are farmed, and a few are in pasture.

This soil is moderately well suited to cultivated crops and to pasture and hay. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. The soil is well suited to some truck crops, especially if irrigated. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, hold moisture in the soil, and reduce erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stand of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, sycamore, sweetgum, and yellow poplar. Drought during the growing season hinders the survival of seeds and seedlings.

The rapid permeability of the substratum and the sandy texture of the soil are the main limitations for community development. The rapid permeability causes a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. The sandy texture causes the soil to cave in during excavation and makes the surface of the soil dusty when dry. The soil has a low moisture holding capacity, which limits the growth of grasses and shrubs.

The capability subclass is IIIs.

24 - BOJAC FINE SANDY LOAM

This soil is deep, nearly level, and well drained. It is on low inland ridges and subtle side slopes. Areas of this soil commonly are irregularly shaped and range from 2 to 130 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is dark brown fine sandy loam about 20 centimeters thick. The subsoil extends to a depth of 119 centimeters. It is yellowish brown and strong brown fine sandy loam. The substratum is mostly yellowish brown and yellow loamy fine sand and sand to a depth of at least 216 centimeters.

Included with this soil in mapping are small areas of well drained State soils and moderately well drained Munden and Tetotum soils. The State soils are on similar areas but have more clay in the subsoil. Munden and Tetotum soils are in slight depressions. Also included in mapping are small areas adjacent to lakes, bays, and large drainageways that have short steep slopes of 3 to 10 percent and range from 20 to 100 feet long. These areas are usually undulating and are dissected by many short drains, and the soils in these areas tend to contain less silt and clay than is typical for the unit. Included soils make up about 20 percent of the unit.

The permeability of this Bojac soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is very friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid through moderately acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 4 to 6 feet during winter and spring.

Most areas of this soil are used for cultivated crops. The remaining areas are in community development or in woodland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, stubble mulching, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce erosion and crop damage, and improve moisture relations in the soil. Tilling within the proper range of moisture content reduces soil compaction and clodding.

The potential productivity for trees on this soil is moderately high especially for oaks, loblolly pine, and sweetgum. Seeds and seedlings survive and grow well.

The seasonal high water table and the rapid permeability of the substratum are the main limitations of this soil for community development. Both the seasonal high water table and the rapid permeability may cause a contamination hazard to ground water and nearby waters in areas used for septic tanks. Proper design and installation of drainfields can help to overcome these limitations.

The capability class is I.

31 - SEABROOK LOAMY FINE SAND

This soil is deep, nearly level, and moderately well drained. It is on low terraces along drainageways. Areas of this soil commonly are elongated and irregularly oblong. They range from about 3 to 20 acres. Slopes range from 0 to 2 percent.

Typically, the surface layers of this soil are very dark grayish brown and dark brown loamy fine sand about 22 centimeters thick. The substratum is mostly yellowish brown and olive brown loamy fine sand to a depth of at least 180 centimeters. It is mottled below a depth of 62 centimeters.

Included with this soil in mapping are small areas of well drained Bojac soils, moderately well drained Munden soils, somewhat poorly drained Dragston soils, and poorly drained Nimmo and Tomotley soils. The Bojac soils are on slightly higher areas throughout the map unit. The Munden soils are on similar areas throughout the unit. The Dragston soils are in slight depressions and along drainageways. Also included in mapping are sandy soils that have thin sandy loam lamallae in the substratum. Included soils make up about 20 percent of this unit.

The permeability of this Seabrook soil is rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight. The surface layer is very friable and easily tilled through a wide range of moisture conditions. The substratum has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in organic matter content and natural fertility. The A horizon commonly is very strongly acid or very strongly acid, but reaction of the surface layer varies because of local liming practices. The substratum ranges from very strongly acid through medium acid. A seasonal high water table is at a depth of 60 to 120 centimeters during winter and early spring.

Most areas of this soil are in woodland. Some areas are farmed.

This soil is moderately well suited to cultivated crops and to pasture and hay. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and hold moisture in the soil.

Establishing and maintaining a mixture of grasses and legumes, using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, sweetgum, and oaks. The survival of seeds and seedlings is hindered by drought during the growing season. The soil is soft when wet, thus limiting use of heavy timber equipment.

Rapid permeability in the substratum, the seasonal high water table, and the sandy texture of the soil are the main limitations for community development. The rapid permeability and the water table cause a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. The sandy texture limits excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IIIs.

34 - MUNDEN FINE SANDY LOAM

This soil is deep, nearly level, and moderately well drained. It is on low inland ridges and subtle side slopes. Areas of this soil commonly are long and irregular and range from 2 to 200 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this Munden soil is dark grayish brown fine sandy loam about 20 centimeters thick. The subsoil extends to a depth of 81 centimeters. It is yellowish brown sandy loam in the upper 18 centimeters and mottled yellowish brown and brown loam and sandy loam below this. The substratum is mottled brown, gray, and red sand to a depth of at least 158 centimeters.

Included with this soil in mapping are small areas of well drained Bojac and State soils, moderately well drained Tetotum soils, and somewhat poorly drained Augusta and Dragston soils. The Bojac and State soils are on areas at slightly higher elevations and the State soils have more clay in the subsoil. The Augusta and Dragston soils are in slight depressions and the Augusta soils have more clay in the subsoil. Tetotum soils have more clay in the subsoil. Also included are areas adjacent to drainageways which have slopes of 3 to 10 percent and range from 20 to 100 feet long. Also included are soils which contain less silt and clay than is typical for the unit. Included soils make up about 20 percent of the unit.

The permeability of this Munden soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in organic matter content and natural fertility. It is very strongly acid through moderately acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1½ to 2½ feet during winter and early spring.

Most areas of this soil are used for cultivated crops. The remaining areas are in woodland or community development.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration. Tilling within the proper range of moisture content helps to reduce soil compaction and clodding.

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

36 - TETOTUM FINE SANDY LOAM

This soil is deep, nearly level, and moderately well drained. It is on low ridges and subtle side slopes on inland areas of the lower Coastal Plain. Areas of this soil commonly are long and irregular and range from 2 to 300 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 23 centimeters thick. The subsoil extends to a depth of 122 centimeters. It is mostly yellowish brown sandy clay loam and clay loam with gray and brown mottles in the lower part. The substratum is mottled brown, yellow, and gray stratified loamy fine sand and fine sandy loam to a depth of at least 183 centimeters.

Included with this soil in mapping are small areas of well drained Bojac and State soils, moderately well drained Munden soils, and somewhat poorly drained Augusta and Dragston soils. The Bojac and State soils are on areas at slightly higher elevations. The Augusta and Dragston soils are in slight depressions. The Munden soils have less clay in the subsoil. Also included are areas adjacent to large drainageways which have short, steep slopes of 2 to 10 percent and range from 20 to 100 feet long. The soils on the steeper slopes usually have more sand and less clay in the subsoil than is typical for Tetotum soils. Included soils make up about 15 percent of the unit.

The permeability of this Tetotum soil is moderate in the subsoil and moderately rapid to rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of greater than 150 centimeters. The soil is low in organic matter content and natural fertility. It commonly ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1½ to 2½ feet during winter and early spring.

Most areas of this soil are used for cultivated crops or are in community development. The remaining areas are in woodland.

This soil is well suited to cultivated crops. Crops respond well to lime and fertilizer. The soil is wet and cold in the early spring, and planting and tillage may be delayed because of wetness. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

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

The seasonal high water table of this soil is the main limitation for community development. The seasonal high water table limits use of the soil as a site for septic tank absorption fields but with proper design and installation of drainfields this limitation can be overcome.

The capability subclass is IIw.

42 - DRAGSTON FINE SANDY LOAM

This soil is deep, nearly level, and somewhat poorly drained. It is on low ridges and subtle side slopes. Areas of this soil commonly are long and irregular and range from 2 to 200 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 23 centimeters thick. The subsoil extends to a depth of 71 centimeters. It is mostly light olive brown and grayish brown fine sandy loam with mottles in shades of gray and brown. The substratum is mottled yellow fine sand to a depth of at least 168 centimeters.

Included with this soil in mapping are small areas of moderately well drained Munden and Tetotum soils, somewhat poorly drained Augusta soils, and poorly drained Nimmo and Tomotley soils. The Munden and Tetotum soils are on areas at slightly higher elevations. The Nimmo and Tomotley soils are in slight depressions. The Augusta soils have more clay in the subsoil. Included soils make up about 20 percent of the unit.

The permeability of this Dragston soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1 foot to 1½ feet during winter and spring.

Most areas of this soil are used for cultivated crops. The remaining areas are in community development or in woodland.

This soil is well suited to cultivated crops if drained. Drainage systems are difficult to install, however, because of the wet, sandy substratum. The soil may be droughty during the growing season and crop response to lime and fertilizer may be limited by the available water capacity. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, hold moisture in the soil, and reduce crusting.

The potential productivity for trees on the soil is high, especially for loblolly pine, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of heavy timber equipment.

The seasonal high water table and the rapid permeability of the substratum are the main limitations of this soil for community development. The seasonal high water table limits use of the soil as a site for septic tank absorption fields, but this limitation may be overcome with adequate artifical drainage

and with proper design and installation of drainfields. The rapid permeability of the substratum may cause a contamination hazard to ground water and nearby open waters in areas used for septic tanks. The seasonal high water table also limits use of the soil as a building site and for many types of recreation, but proper landscaping and artifical drainage can help to overcome this limitation.

The capability subclass is IIw if drained and IIIw if undrained.

45 - AUGUSTA FINE SANDY LOAM

This soil is deep, nearly level, and somewhat poorly drained. It is on low inland ridges and very subtle side slopes. Areas of this soil commonly are long and irregular and range from 2 to 200 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is brown fine sandy loam about 22 centimeters thick. The subsoil extends to a depth of 150 centimeters. The upper 25 centimeters is pale brown sandy clay loam with mottles in shades of gray and brown. The lower 103 centimeters is mostly gray clay loam with brown mottles. The substratum is mottled brown and gray sandy loam to a depth of at least 175 centimeters.

Included with this soil in mapping are small areas of moderately well drained Tetotum soils, somewhat poorly drained Dragston soils, and poorly drained Acredale and Tomotley soils. The Tetotum soils are on areas at slightly higher elevations. The Acredale and Tomotley soils are in slight depressions. Dragston soils have less clay in the subsoil. Included soils make up about 20 percent of the unit.

The permeability of this Augusta soil is moderate in the subsoil and moderately rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight except for included areas of short, steep slopes. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in organic matter content and natural fertility. It ranges from very strongly acid through moderately acid but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1 foot to 1½ feet during winter and spring.

Most areas of this soil are used for cultivated crops or are in community development. The remaining areas are in woodland.

This soil is well suited to cultivated crops if drained. Crops respond well to lime and fertilizer but are sometimes damaged in undrained areas after heavy or prolonged rains. The soil is wet and cold in spring, and wetness often interferes with tillage. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

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

The seasonal high water table is the main limitation of the soil for community development. The seasonal high water table limits the use of the soil as a site for septic tank absorption fields, but this limitation may be overcome by adequate artifical drainage and by proper design and installation of drainfields. Also, the seasonal high water table limits the use of the soil as a building site, for roads and streets, and for most types of recreation. The wetness limitation may be overcome wtih proper landscaping and artifical drainage.

The capability subclass is IIIw.

52 - NIMMO FINE SANDY LOAM

This soil is deep, nearly level, and poorly drained. It is on broad inland flats. Areas of this soil commonly are oval to irregular and range from 2 to 500 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is dark gray fine sandy loam about 18 centimeters thick. The subsoil extends to a depth of 84 centimeters. It is mostly light gray and gray fine sandy loam and loam with yellowish brown mottles. The substratum is light gray fine sand to a depth of at least 150 centimeters.

Included with this soil in mapping are small areas of somewhat poorly drained Augusta and Dragston soils, poorly drained Acredale and Tomotley soils and very poorly drained Portsmouth soils. The Dragston and Augusta soils are on areas at slightly higher elevations and the Augusta soils have more clay in the subsoil. Portsmouth soils have thicker, dark-colored surface layers that are rich in organic matter. The Acredale and Tomotley soils have more clay in the subsoil. Also included are soils that have water on the surface after heavy rains or during prolonged wet periods. Included soils make up about 20 percent of the unit.

The permeability of this Nimmo soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in organic matter content and natural fertility. It ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is between the surface and a depth of 1 foot during winter and spring.

Most areas of this soil have been drained by ditching and are used for cultivated crops. The remaining areas are in woodland or community development.

This soil is well suited to cultivated crops if drained. Drainage systems may be difficult to install because of the wet sandy substratum. Crops respond well to lime and fertilizer but are sometimes damaged in undrained areas after heavy or prolonged rains. The soil is wet and cold in spring, and wetness often interferes with tillage. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

The potential productivity for trees on this soil is high, especially for loblolly pine, sycamore, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. Productivity and seedling survival are enhanced by drainage. The soil is soft when wet thus, limiting the use of heavy timber equipment.

The seasonal high water table and the sandy texture of the substratum are the main limitations of the soil for community development. The seasonal high water table limits use of the soil as a site for septic tank absorption fields; however, this limitation may be overcome with adequate artifical drainage and proper design and installation of drainfields. The seasonal high water table also limits use of the soil as a building site and for many types of recreation, but this limitation can also be overcome for these uses with proper landscaping and artifical drainage.

The capability subclass is IIIw if drained and IVw if undrained.

55 - TOMOTLEY LOAM

This soil is deep, nearly level, and poorly drained. It is on broad inland flats or in poorly defined drainageways. Areas of this soil commonly are irregularly or oval and range from 2 to 500 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is dark gray loam about 20 centimeters thick. The subsoil extends to a depth of 147 centimeters. It is mainly gray and light gray sandy clay loam, sandy clay, and fine sandy loam with mottles in shades of brown and red. The substratum is mottled gray loamy sand to a depth of at least 200 centimeters.

Included with this soil in mapping are small areas of somewhat poorly drained Augusta and Dragston soils, poorly drained Acredale and Nimmo soils, and very poorly drained Portsmouth and Hyde soils. The Augusta and Dragston soils are on areas at slightly higher elevations. The Nimmo soils have less clay in the subsoil. The Acredale soils have more silt in the subsoil. The Portsmouth and Hyde soils have thicker, dark-colored surface layers that are rich in organic matter. Also included are areas that have water on the surface after heavy rains or during prolonged wet periods. Included soils make up about 30 percent of the unit.

The permeability of this Tomotley soil is moderate in the subsoil and moderately rapid in the substratum. Available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is moderate in organic matter content and low in natural fertility. It commonly ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is between the surface and a depth of 1 foot during winter and spring.

Most areas of this soil have been drained by ditching and are used for cultivated crops. The remaining areas are in community development or woodland.

This soil is well suited to cultivated crops if drained. Crops respond well to lime and fertilizer but are sometimes damaged in undrained areas after heavy or prolonged rains. The soil is wet and cold in spring, and wetness often interferes with tillage. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. Productivity and seedling survival are enhanced by drainage. The soil is soft when wet, thus limiting use of heavy timber equipment.

The seasonal high water table is the main limitation of the soil for community development. The seasonal high water table limits use of the soil as a site for septic tank absorption fields; however, this limitation may be overcome with adequate artifical drainage and with proper design and installation of drainfields. The seasonal high water table also limits use of the soil as a building site and for many types of recreation, but with proper landscaping and artifical drainage this limitation may also be overcome for these uses.

The capability subclass is IVw if undrained and IIIw if drained.

57 - ACREDALE LOAM

This soil is deep, nearly level and poorly drained. It is on broad inland flats. Areas of this soil commonly are oval to irregular and range from 2 to 500 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is grayish brown silt loam about 17 centimeters thick. The subsoil extends to a depth of 125 centimeters. It is mainly gray silt loam and silty clay loam with yellowish brown mottles. The substratum is mottled gray and yellowish brown sandy loam to a depth of at least 165 centimeters.

Included with this soil in mapping, are small areas of somewhat poorly drained Augusta soils, poorly drained Nimmo and Tomotley soils, and very poorly drained Hyde, Nawney, and Portsmouth soils. The Augusta soils are on slightly higher elevations and in undulating areas adjacent to creeks and drainageways. The Hyde and Portsmouth soils have thicker, dark-colored surface layers that are rich in organic matter. The Nimmo and Tomotley soils have less silt in the subsoil. The Nawney soils are frequently flooded. Also included are areas that have water ponded on the surface after heavy rains or during prolonged wet periods. Included soils make up about 20 percent of the unit.

The permeability of this Acredale soil is slow in the subsoil and moderately rapid to rapid in the substratum. Available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. Tilth is fair and the soil tends to dry out slowly. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The surface layer ranges from extremely acid through strongly acid but the reaction may vary because of local liming practices. The subsoil and substratum range from very strongly acid through neutral. The soil is moderate in organic matter content and medium in natural fertility. A seasonal high water table is between the surface and a depth of one foot during winter and spring.

Most areas of this soil have been drained by ditching and are used for cultivated crops. The remaining areas are in community development or in woodland.

This soil is well suited to cultivated crops if drained. Crops respond well to lime and fertilizer but are sometimes damaged in undrained areas after heavy or prolonged rains. The soil is wet and cold in spring, and wetness often interferes with tillage. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

The potential productivity for trees on this soil is very high, especially for loblolly pine, oaks, and sweetgum. Seeds and seedlings survive and grow well if competing vegetation is controlled. Productivity and seedling survival are enhanced by drainage. The soil is soft when wet, thus limiting use of heavy timber equipment.

The seasonal high water table, slow permeability, and low strength are the main limitations of this soil for community development. The seasonal high water table and slow permeability limit use of the soil as a site for septic tank absorption fields, but these limitations may be overcome with adequate artifical drainage and proper design and installation of drainfields. The seasonal high water table limits use of the soil as a building site and for many types of recreation, but this limitation may be overcome with proper landscaping and artifical drainage. The seasonal high water table and low strength limit use of the soil material for roads and streets. Strengthening or replacing the base material and installation of adequate artifical drainage improve the usefulness of this soil for road and streets.

The capability subclass is IIIw if drained and IVw if undrained.

65 - PORTSMOUTH LOAM

This soil is deep, nearly level, and very poorly drained. It is mostly on broad inland flats and slight depressions. Areas of this soil commonly are irregularly shaped and range from 2 to 400 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is black loam about 30 centimeters thick, underlain by gray loam to a depth of 47 centimeters. The subsoil extends to a depth of 95 centimeters. It is mostly gray fine sandy loam and sandy clay loam in the upper part and mottled gray, brown and yellow sandy loam in the lower part. The substratum is gray stratified sand, fine sandy loam, and sandy clay loam to a depth of at least 180 centimeters.

Included with this soil in mapping are small areas of poorly drained Acredale, Nimmo, and Tomotley soils, somewhat poorly drained Dragston soils, and very poorly drained Hyde soils. The Acredale, Nimmo, and Tomotley soils are on areas at slightly higher elevations. The Dragston soils are on low-lying ridges. The Hyde soils have more silt in the subsoil than Portsmouth soils. Also included are areas that have water on the surface after heavy rains or during prolonged wet periods. Included soils make up about 20 percent of the unit.

Permeability of this Portsmouth soil is moderate in the subsoil and moderately rapid to rapid in the substratum. Available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. Tilth is good. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is low in natural fertility and the surface layer is high in organic matter content. The soil commonly ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is between the surface and a depth of ½ foot, mostly during winter and spring.

Most areas of this soil have been drained by ditching and are used for cultivated crops. Most remaining areas are in woodland.

This soil is well suited to cultivated crops if drained. Drainage systems may be difficult to install because of the wet, sandy substratum. Draining areas of this soil in Carolina Bays may be hindered by the lack of suitable outlets. Crops respond well to lime and fertilizer but are sometimes damaged in undrained areas after heavy or prolonged rains. The soil is wet and cold in spring and wetness often interferes with tillage. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

The potential productivity for trees on this soil is very high, especially for loblolly pine, sweetgum, and oaks. Productivity and seedling survival are enhanced by drainage. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of heavy timber equipment.

The seasonal high water table and the sandy substratum are the main limitations of the soil for community development. The seasonal high water table limits use of the soil as a site for septic tank absorption fields; however, this limitation may be overcome with adequate artifical drainage and with proper design and installation of drainfields. The seasonal high water table and the instability of the sandy substratum limit excavation. The seasonal high water table also limits use of the soil as a building site and for many types of recreation. This wetness limitation may be overcome for these uses with proper landscaping and artifical drainage.

The capability subclass is IIIw if drained and VIw if undrained.

67 - HYDE SILT LOAM

This soil is deep, nearly level, and very poorly drained. It is on broad flats and slight depressions. Areas of this soil commonly are irregularly shaped and range from 2 to 200 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is black silt loam about 42 centimeters thick. The subsoil is mostly mottled grayish brown and dark gray silty clay loam and clay loam to a depth of 135 centimeters. The substratum is gray stratified sand, sandy loam and sandy clay loam to a depth of at least 180 centimeters.

Included with this soil in mapping are small areas of poorly drained Acredale, Nimmo, and Tomotley soils, and very poorly drained Portsmouth soils. The Acredale, Nimmo, and Tomotley soils are on areas at slightly higher elevations. The Portsmouth soils have more sand in the subsoil. Also included are areas that have water on the surface after heavy rains or during prolonged wet periods. Included soils make up about 20 percent of the unit.

The permeability of this Hyde soil is slow in the subsoil and moderately rapid to rapid in the substratum. Available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. Tilth is fair. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 150 centimeters or more. The soil is medium in natural fertility and the surface layer is high in organic matter content. The soil ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is between the surface and a depth of 1 foot during wet seasons of the year.

Most areas of this soil have been drained by ditching and are used for cultivated crops. Most remaining areas are in woodland.

This soil is well suited to cultivated crops if drained. Crops respond well to lime and fertilizer but are sometimes damaged in undrained areas after heavy or prolonged rainfall. The soil is wet and cold in spring, and wetness often interferes with tillage. Tilling within the proper range of moisture content reduces soil compaction and clodding. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

The potential productivity for trees on this soil is very high, especially for sycamore, yellow-poplar, sweetgum, oaks, and loblolly pine. Productivity and seeding survival are enhanced by drainage. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, and the use of heavy timber equipment is limited during periods of heavy rainfall and during wet seasons.

The seasonal high water table, slow permeability, and low strength are the main limitations of the soil for community development. The seasonal high water table and slow permeability limit use of the soil as a site for

septic tank absorption fields; however, these limitations may be overcome with adequate artifical drainage and proper design and installation of drainfields. The seasonal high water table also limits use of the soil as a building site and for many types of recreation. Proper landscaping and artifical drainage can also help to overcome this limitation for building sites and recreation. The seasonal high water table and low strength limit use of the soil for roads and streets. Strengthening or replacing the base material and installation of adequate artifical drainage help to overcome these limitations.

The capability subclass is IIIw if drained and VIw if undrained.

76 - DOROVAN MUCKY PEAT

This soil is deep, nearly level, and very poorly drained. It is in swamps adjacent to major rivers and their tributaries. Areas of this soil commonly are irregular shaped and range from 3 to over 500 acres. Slope is less than 1 percent.

Typically, the surface layer of this soil is dark brown partially decomposed organic material about 8 centimeters thick. Below this, the subsurface layers are mostly black highly decomposed organic material to a depth of 185 centimeters. The substratum is dark grayish brown fine sand to a depth of at least 250 centimeters.

Included with this soil in mapping are small areas of very poorly drained Nawney. Nawney soils are mineral soils which are on areas at slightly higher elevations. Also included in mapping are small areas between Dorovan soils and upland mineral soils that have a thinner organic surface layer. Included soils make up about 15 percent of the unit.

The permeability of this Dorovan soil is moderate. The available water capacity is very high. Surface runoff is very slow. The shrink-swell potential is low. The soils range from extremely acid through slightly acid. They are flooded frequently by wind tides and are continuously saturated.

Most areas of this soil are in woodland. Dorovan soils are limited for most agricultural and urban uses because of wetness, low strength, flooding, and high organic matter content.

The potential productivity for trees on this soil is moderate, especially for water tolerant species such as baldcypress, blackgum, and water tupelo. Scattered loblolly pine is in some areas. Wetness and low strength of the organic soil material severely limit timber management and harvesting operations.

This soil is best utilized when left in its natural state and maintained as a wetland wildlife habitat. Areas delineated as Dorovan in the City of Chesapeake are protected from disturbance by federal and state laws.

The capability subclass is VIIw.

81 - NAWNEY SILT LOAM

This soil is deep, nearly level, and very poorly drained. It is on flood plains and in drainageways. Areas of this soil commonly are long and narrow or irregular and range from 2 to 500 acres. Slope is less than 1 percent.

Typically, the surface mineral layer of this soil is dark gray silt loam about 12 centimeters thick. The substratum is gray loam to a depth of 107 centimeters and below this is gray loamy sand to a depth of at least 150 centimeters.

Included with this soil in mapping are small areas of poorly drained Acredale, Nimmo, and Tomotley soils and very poorly drained Dorovan and Portsmouth soils. The Acredale, Nimmo, Portsmouth, and Tomotley soils are on areas at slightly higher elevations and are not usually flooded as are the Nawney soils. The Dorovan soils have thick organic layers to a depth of more than 127 centimeters. Some included areas near Dorovan soils have an organic surface layer thicker than 20 centimeters. Included soils make up about 25 percent of the unit.

The permeability of this Nawney soil is moderate. Available water capacity is moderate. Surface runoff is very slow. The substratum has a moderate shrink-swell potential. The root zone extends to a depth of 150 centimeters or more but is restricted for some plants by the seasonal high water table. The soil is low in natural fertility and the surface layer has moderate organic matter content. The soil ranges from extremely acid through strongly acid above about 100 centimeters and from extremely acid through slightly acid below about 100 centimeters. A seasonal high water table is at the surface to a depth of 15 centimeters throughout the winter and early spring and the soil is frequently flooded, especially from late fall through late spring.

This soil is not suited for uses other than woodland and wildlife habitat because of wetness and flooding. Most areas are in woodland and are protected by federal and state laws.

The potential productivity for trees on this soil is moderate. Common trees are mostly water tolerant baldcypress, water tupelo, sweetgum, and red maple. Except for water tolerant species, seed and seedling mortality is high. The seasonal high water table causes roots to grow close to the surface, thus increasing the wind throw hazard. Wetness and flooding limit the use of heavy equipment.

The capability subclass is VIIw.

SOIL SERIES DESCRIPTIONS

TARBORO SERIES

The Tarboro series consists of deep, somewhat excessively drained, rapidly permeable soils that formed in sandy fluvial and marine sediments. These soils are on stream terraces along major streams in the Coastal Plain that drain from the Piedmont and Mountains and on low coastal plain surfaces. Slope is dominantly 1 to 4 percent but ranges from 0 to 8 percent.

Taxonomic Class: Mixed, thermic Typic Udipsamments.

Typical Pedon: Tarboro loamy sand-cultivated (Colors are for moist soil unless otherwise stated).

Ap--0 to 20 cm.; brown (10 YR 4/3) loamy sand; weak medium granular structure; very friable; many fine and medium roots; medium acid; abrupt smooth boundary. (12 to 25 cm. thick)

C1--20 to 65 cm.; yellowish brown (10 YR 5/6) loamy sand; weak medium granular structure; very friable; few fine roots; common fine flakes of mica and medium opaque grains; strongly acid; gradual wavy boundary. (37 to 75 cm. thick)

C2--65 to 100 cm.; brownish yellow (10 YR 6/6) loamy sand; weak medium granular structure; very friable; few fine roots; few fine flakes of mica and medium opaque grains; medium acid; gradual wavy boundary. (25 to 50 cm. thick)

C3--100 to 142 cm.; yellow (10 YR 7/6) sand; single grained; loose; few fine flakes of mica and common medium opaque grains; slightly acid; gradual wavy boundary. (30 to 50 cm. thick)

C4--142 to 205 cm.; very pale brown (10 YR 7/4) sand; single grained; loose; few fine flakes of mica and common medium opaque grains; slightly acid; clear wavy boundary. (30 to 75 cm. thick)

C5--205 to 250 cm.; very pale brown (10 YR 7/4) coarse sand; single grained, loose; few fine flakes of mica and common medium opaque grains; slightly acid.

Thickness of sandy material exceeds 200 centimeters. The silt plus clay content in the 10 to 40 inch control section ranges from 8 to 20 percent with less than 8 percent clay. The soil is strongly acid through slightly acid, unless limed.

The A horizon has hue of 10 YR or 7.5 YR, value of 3 through 5 and chroma of 2 through 6. It is loamy sand or sand.

The C horizon has hue of 10 YR through 5 YR, value of 4 through 8 and chroma of 3 through 8. Colors become paler with increasing depth in many pedons. The C horizon is loamy sand or sand. Coarse sand and gravelly layers are in the substrata of many pedons.

BOJAC SERIES

Soils of the Bojac series are deep and well drained. They formed in loamy and sandy fluvial sediments. They are nearly level to gently sloping soils on terraces and floodplains in the Piedmont and Coastal Plain. Slopes range from 0 to 7 percent.

Taxonomic Class: Coarse-loamy, mixed, thermic Typic Hapludults.

Typical Pedon: Bojac fine sandy loam-cultivated (Colors are for moist soil).

Ap--0 to 20 cm.; brown (10 YR 4/3) fine sandy loam; single grain; loose; many fine roots; slightly acid; abrupt smooth boundary. (0 to 30 cm. thick)

B21t--20 to 33 cm.; yellowish brown (10 YR 5/6) fine sandy loam; many medium faint dark yellowish brown (10 YR 4/4) mottles; weak fine subangular blocky structure; very friable; common fine roots; 12 percent of sand grains bridged and coated with clay; slightly acid; diffuse smooth boundary.

B22t--33 to 63 cm.; yellowish brown (10 YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 15 percent of sand grains bridged and coated with clay; medium acid; diffuse smooth boundary.

B23t--63 to 94 cm.; strong brown (7.5 YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 35 percent of sand grains bridged and coated with clay; strongly acid; diffuse smooth boundary.

B24t--94 to 119 cm.; yellowish brown (10 YR 5/8) fine sandy loam; many medium distinct very pale brown (10 YR 7/4) mottles; weak medium subangular blocky structure; very friable; 15 percent of sand grains bridged and coated with clay; strongly acid; diffuse smooth boundary. (Combined thickness of the Bt horizon ranges from 60 to 180 cm. thick)

C1--119 to 178 cm.; very pale brown (10 YR 7/3) loamy fine sand; single grain; loose; strongly acid; diffuse smooth boundary. (0 to 100 cm. thick)

C2--178 to 216 cm.; yellow (10 YR 7/6) coarse sand; common medium faint yellowish brown (10 YR 5/6) mottles; single grain; loose; 2 percent pebbles; strongly acid.

Solum thickness ranges from 75 to 165 centimeters. In unlimed areas, the A and B horizon range from slightly acid through extremely acid, and the C horizon ranges from very strongly acid through medium acid. Quartz pebbles make up 0 to 5 percent of the A and B horizons and 0 to 15 percent of the C horizon.

The A horizon has hue of 7.5 YR through 2.5 Y, value of 3 through 6 and chroma of 1 through 4. It is loamy fine sand, sandy loam, or fine sandy loam.

The B horizons have hue of 5 YR through 10 YR, value of 4 through 6, and chroma of 4 through 8. They are sandy loam, fine sandy loam, or loam. Some pedons have a thin subhorizon that is sandy clay loam or clay loam. Mottles with chroma 2 or less are in some pedons below a depth of 100 centimeters.

The C horizon has hue of 7.5 YR through 2.5 Y, value of 4 through 7, and chroma of 3 through 8. High chroma and low chroma mottles are in many pedons. The C horizon is usually stratified and ranges from coarse sand to loamy fine sand.

SEABROOK SERIES

Soils of the Seabrook series are deep and moderately well drained. They formed in sandy fluvial and marine sediments. Seabrook soils are on low-lying terraces in the Coastal Plain. Slopes range from 0 to 2 percent.

Taxonomic Class: Mixed, thermic Aquic Udipsamments.

Typical Pedon: Seabrook loamy fine sand.

A11--0 to 7 cm.; very dark grayish brown (10 YR 3/2) loamy fine sand; weak fine granular structure; very friable; many fine medium and coarse roots; many fine and common medium pores; strongly acid; clear smooth boundary.

A12--7 to 22 cm.; dark brown (10 YR 4/3) loamy fine sand; weak fine granular structure; very friable; common fine medium and coarse roots; many fine and medium pores; strongly acid; gradual smooth boundary.

C1--22 to 45 cm.; yellowish brown (10 YR 5/4) loamy fine sand; massive; very friable; few fine and medium roots; few fine pores; very strongly acid; gradual smooth boundary.

C2--45 to 62 cm.; light yellowish brown (2.5 Y 6/4) loamy fine sand; massive; very friable; few fine and medium roots; few fine pores; very strongly acid; gradual smooth boundary.

C3--62 to 100 cm.; light yellowish brown (2.5 Y 6/4) loamy fine sand; common fine prominent strong brown (7.5 YR 5/8) mottles and common medium distinct light gray (2.5 Y 7/2) mottles; massive; very friable; few fine and medium roots; few fine pores; common strong brown (7.5 YR 5/8) fine sandy loam bodies up to 5 mm in diameter; strongly acid; clear wavy boundary.

C4--100 to 142 cm.; light olive brown (2.5 Y 5/6) loamy fine sand; common medium distinct yellowish brown (10 YR 5/6) and pale brown (10 YR 6/3) mottles; massive; very friable; common strong brown (7.5 YR 5/8) fine sandy loam bodies up to 5 mm; many fine flakes of mica; strongly acid; gradual wavy boundary.

C5--142 to 180 cm.; mottled light yellowish brown (2.5 Y 6/4), yellowish brown (10 YR 5/6), dark greenish gray (5 GY 6/1), and yellowish red (5 YR 4/6) loamy fine sand; massive; very friable; common fine flakes of mica; strongly acid.

The thickness of the sandy horizons is more than 180 centimeters. Most pedons have concretions and loamy bodies up to 5 centimeters in diameter throughout the soil. The soil is very strongly acid or strongly acid in the A horizon and ranges from very strongly acid through medium acid in the C horizon.

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

The upper part of the C horizon has hue of 10 YR or 2.5 Y, value of 4 through 7, and chroma of 3 through 8. The lower part of the C horizon has hue of 2.5 Y or 5 Y, value of 6 or 7, and chroma of 1 or 2, or it is mottled with high and low chromas and does not have a dominant matrix color. The C horizon is sand, loamy sand, or loamy fine sand.

MUNDEN SERIES

The Munden series consists of deep, moderately well drained soils. They formed in loamy and sandy marine or fluvial sediments on the Pamlico surface of the lower Coastal Plain and on stream terraces throughout the Coastal Plain. Permeability is moderate in the solum and moderately rapid in the underlying material. Slopes range from 0 to 6 percent.

Taxonomic Class: Coarse-loamy, mixed, thermic Aquic Hapludults.

Typical Pedon: Munden fine sandy loam (Colors are for moist soil).

Ap--0 to 20 cm.; dark grayish brown (10 YR 4/2) sandy loam; weak fine granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary. (13 to 30 cm. thick)

B21t--20 to 38 cm.; yellowish brown (10 YR 5/6) sandy loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; few fine roots; few thin discontinuous clay films on faces of peds; many sand grains coated and bridged with clay; strongly acid; clear smooth boundary. (15 to 36 cm. thick)

B22t--38 to 63 cm.; yellowish brown (10 YR 5/6) loam; common medium faint light brown (7.5 YR 6/4) mottles; moderate medium subangular blocky structure; friable slightly sticky, slightly plastic; few fine roots; common thin discontinuous clay films on faces of peds; many sand grains coated and bridged with clay; very strongly acid; clear smooth boundary. (15 to 40 cm. thick)

B23t--63 to 81 cm.; brown (10 YR 5/3) and yellowish brown (10 YR 5/8) sandy loam; common fine distinct light brownish gray (10 YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few thin discontinuous clay films on faces of peds; many sand grains coated and bridged with clay; few small pockets of sand up to 4 cm. in diameter; very strongly acid; clear smooth boundary. (10 to 25 cm. thick)

C--81 to 158 cm.; mottled yellowish brown (10 YR 5/8), light brownish gray (10 YR 6/2) and yellowish red (5 YR 5/6) sand; single grain; loose; many sand grains stained; strongly acid.

Solum thickness ranges from 60 to 120 centimeters. Reaction ranges from very strongly acid through medium acid unless limed.

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

The B horizons have hue of 7.5 YR through 2.5 Y, value of 4 through 6, and chroma of 4 through 8. In some pedons the lower B horizons have high and low chroma mottles. The B horizons are sandy loam, fine sandy loam, or loam. Subhorizons of some pedons range to sandy clay loam.

The C horizon has hue of 7.5 YR through 2.5 Y, value of 5 through 7, and chroma of 2 through 8, or it is mottled with high and low chroma mottles. It is sand, loamy fine sand, sandy loam, or fine sandy loam.

TETOTUM SERIES

The Tetotum series consists of deep, moderately well drained soils that have moderate permeability in the B horizon and moderate to rapid permeability in the C horizon. They formed in moderately fine textured fluvial stream terrace or lower Coastal Plain sediments. Slopes range from 0 to 50 percent.

Taxonomic Class: Fine-loamy, mixed, thermic Aquic Hapludults.

Typical Pedon: Tetotum fine sandy loam (Colors are for moist soil)

Ap--0 to 23 cm.; dark grayish brown (10 YR 4/2) fine sandy loam; moderate fine granular structure; very friable; many fine roots; few fine pebbles; medium acid, clear smooth boundary. (20 to 30 cm. thick)

B21t--23 to 36 cm.; dark yellowish brown (10 YR 4/4) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; common fine pores; few thin patchy clay films; few fine pebbles; strongly acid; clear smooth boundary.

B22t--36 to 58 cm.; yellowish brown (10 YR 5/4) clay loam; moderate medium subangular blocky structure; firm, sticky, slightly plastic; common fine roots; common fine pores; thin patchy clay films; few fine pebbles; strongly acid; clear smooth boundary.

B23t--58 to 76 cm.; yellowish brown (10 YR 5/8) clay loam, few fine distinct gray (10 YR 6/1) and strong brown (7.5 YR 5/8) mottles; moderate fine subangular blocky structure; firm, sticky, slightly plastic; common fine roots; common fine pores; thin patchy clay films; few fine pebbles; strongly acid; clear smooth boundary.

B24t--76 to 96 cm.; mottled yellowish brown (10 YR 5/8), gray (10 YR 6/1), and red (2.5 YR 4/8) clay loam; moderate fine angular blocky structure; firm, sticky, plastic; few fine roots; few fine pores; thin continuous clay films; common fine pebbles; very strongly acid; clear smooth boundary. (Combined thickness of the B2t horizon is 45 to 130 cm.)

B3tg--96 to 122 cm.; gray (10 YR 6/1) sandy clay loam; many fine distinct strong brown (7.5 YR 5/6) and yellowish brown (10 YR 5/6) mottles; weak medium subangular blocky structure; firm slightly sticky, slightly plastic; few fine roots; few fine pores; thin patchy clay films; common fine pebbles; very strongly acid; gradual smooth boundary. (0 to 35 cm. thick)

II Cg--122 to 183 cm.; gray (10 YR 6/1) stratified fine sandy loam and loamy fine sand; common distinct yellowish brown (10 YR 5/4) and strong brown (7.5 YR 5/6) mottles; massive; friable; few fine pebbles; very strongly acid.

Solum thickness ranges from 100 to 150 centimeters or more. Coarse fragments make up 0 to 10 percent of the soil. Reaction ranges from strongly acid through extremely acid, unless limed.

The upper 50 centimeters of the Bt horizon has more than 30 percent silt or more than 40 percent silt plus very fine sand.

The A horizon has hue of 10 YR or 2.5 Y, value of 3 through 5, and chroma of 2 through 4. It is sandy loam, fine sandy loam, loam or silt loam.

The B horizons have hue of 7.5 YR through 2.5 Y, value of 4 through 7, and chroma of 1 through 8. The lower B horizons have high and low chroma mottles. The B horizons are loam or clay loam, but some pedons have sub-horizons of sandy clay loam, silt loam, or silty clay loam.

The C horizon is gray with high chroma mottles or it is mottled with no dominant matrix color. It is stratified and ranges from sand to sandy clay loam.

DRAGSTON SERIES

The Dragston series consists of deep, somewhat poorly drained soils that formed in loamy fluvial or marine sediments on stream terraces and on the Pamlico surface of the lower Coastal Plain. Permeability is moderately rapid. Slopes range from 0 to 2 percent.

Taxonomic Class: Coarse-loamy, mixed, thermic Aeric Ochraquults.

Typical Pedon: Dragston fine sandy loam-cultivated (Colors are for moist soil).

Ap--0 to 23 cm.; dark grayish brown (10 YR 4/2) fine sandy loam; weak medium granular structure; very friable; many fine roots; many fine pores; strongly acid; abrupt smooth boundary. (15 to 30 cm. thick)

B21t--23 to 43 cm.; light olive brown (2.5 Y 5/4) fine sandy loam; common medium distinct yellowish brown (10 YR 5/8) mottles and few fine faint grayish brown (2.5 Y 5/2) mottles; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; few fine pores; thin very patchy clay films on faces of peds and clay bridging between sand grains; very strongly acid; clear wavy boundary. (15 to 35 cm. thick)

B22tg--43 to 71 cm.; grayish brown (2.5 Y 5/2) fine sandy loam; common medium distinct yellowish brown (10 YR 5/8) mottles; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; thin very patchy clay films on faces of peds and clay bridging between sand grains; very strongly acid; gradual wavy boundary. (15 to 50 cm. thick)

B3g--71 to 94 cm.; grayish brown (10 YR 5/2) fine sandy loam; common medium distinct yellowish brown (10 YR 5/6) mottles; weak very coarse subangular blocky structure; very friable, non-sticky, non-plastic; very strongly acid; gradual wavy boundary. (0 to 20 cm. thick)

C--94 to 168 cm.; brownish yellow (10 YR 6/8) fine sand; few coarse distinct light brownish gray (10 YR 6/2) mottles; single grain; loose; very strongly acid.

Solum thickness ranges from 65 to 125 centimeters. Quartz pebbles make up 0 to 2 percent of the solum and 0 to 10 percent of the C horizon. The soil is strongly acid or very strongly acid unless limed.

The A horizon has hue of 10 YR through 5 Y, value of 2 through 5, and chroma of 1 through 4. High and low chroma mottles are few to common. The A horizon is loamy fine sand, sandy loam, fine sandy loam, or loam.

The B horizons have hue of 10 YR through 5 Y or they are neutral, value of 4 through 6, and chroma of 0 through 8, and they are mottled with high and low chromas. The B horizons are sandy loam, fine sandy loam, or loam, but some pedons have subhorizons of sandy clay loam.

The C horizon is mottled or has hue of 10 YR through 5 Y or it is neutral, value of 4 through 7, and chroma of 0 through 8. It is stratified sand, fine sand, loamy fine sand, sandy loam, or fine sandy loam.

AUGUSTA SERIES

The Augusta series consists of deep, somewhat poorly drained, moderately permeable soils that formed in loamy sediments. These soils are on low terraces in the Southern Coastal Plain. The water table commonly is at a depth of about 1 to 2 feet in winter and spring. Slopes range from 0 to 2 percent.

Taxonomic Class: Fine-loamy, mixed, thermic Aeric Ochraquults.

Typical Pedon: Augusta fine sandy loam--in pasture (Colors are for moist soil unless otherwise stated).

Ap--0 to 22 cm.; brown (10 YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; few fine pebbles; common fine flakes of mica; strongly acid; abrupt wavy boundary. (12 to 25 cm. thick)

B21t--22 to 47 cm.; pale brown (10 YR 6/3) sandy clay loam; many medium distinct yellowish brown (10 YR 5/6) and common medium faint light brownish gray (10 YR 6/2) mottles; weak medium subangular blocky structure; friable few fine roots; few fine pebbles; few fine flakes of mica; strongly acid; gradual smooth boundary. (15 to 30 cm. thick)

B22t--47 to 60 cm.; mottled light brownish gray (10 YR 6/2) and yellowish brown (10 YR 5/6) clay loam; moderate medium subangular blocky structure; firm; thin continuous clay film on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary. (0 to 20 cm. thick)

B23tg--60 to 130 cm.; light brownish gray (10 YR 6/2) clay loam; many medium distinct yellowish brown (10 YR 5/6) mottles; moderate medium subangular blocky structure; firm; thin continuous clay film on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary. (30 to 50 cm. thick)

B3g--130 to 150 cm.; gray (5 Y 6/1) sandy clay loam; common medium distinct yellowish brown (10 YR 5/6) mottles; weak coarse subangular blocky structure; friable; common fine flakes of mica; strongly acid; gradual irregular boundary. (0 to 25 cm. thick)

Cg--150 to 175 cm.; gray (5 Y 6/1) coarse sandy loam; many medium distinct yellowish brown (10 YR 4/4) mottles; massive; friable; about 5 percent by volume of fine pebbles; few fine flakes of mica; strongly acid.

Solum thickness ranges from 100 to 200 centimeters. The soil ranges from very strongly acid through medium acid, unless limed.

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

The B horizons have hue of 10 YR through 5 Y, value of 4 through 7, and chroma of 1 through 6, or they are neutral. The B horizons have mottles with high and low chroma. They are sandy loam, loam, sandy clay loam, or clay loam. Some pedons have a subhorizon of clay.

The C horizon has hue of 10 YR through 5 Y, value of 5 through 7, and chroma of 1 or 2, or it is neutral. It is stratified and ranges from sand to clay loam.

NIMMO SERIES

The Nimmo series consists of deep, poorly drained soils. They formed in loamy and sandy marine or fluvial sediments on the lower Coastal Plain and on stream terraces. Permeability is moderate in the solum and moderately rapid in the underlying material. Slopes range from 0 to 2 percent.

Taxonomic Class: Coarse-loamy, mixed, thermic Typic Ochraquults.

Typical Pedon: Nimmo fine sandy loam (Colors are for moist soil).

Ap--0 to 18 cm.; dark gray (10 YR 4/1) fine sandy loam; weak fine granular structure; friable, non-sticky, slightly plastic; many fine roots; common clean sand grains; strongly acid; abrupt smooth boundary. (10 to 38 cm. thick)

B21tg--18 to 36 cm.; light gray (10 YR 6/1) fine sandy loam; common medium prominent yellowish brown (10 YR 5/6) mottles; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; common fine medium and coarse roots; many sand grains coated and bridged with clay; few thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary. (15 to 51 cm. thick)

B22tg--36 to 63 cm.; (10 YR 5/1) loam; many medium prominent yellowish brown (10 YR 5/6) mottles; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; common fine medium and coarse roots; many sand grains coated and bridged with clay; few thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary. (15 to 51 cm. thick)

B23tg--63 to 84 cm.; gray (10 YR 5/1) fine sandy loam; many medium prominent yellowish brown (10 YR 5/6) mottles; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; common fine and medium roots; many sand grains coated and bridged with clay; few thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary. (13 to 25 cm. thick)

II Cg--84 to 152 cm.; light gray (10 YR 7/1) fine sand; single grain; loose; common very fine black mineral grains; few medium yellowish brown (10 YR 5/4) sand grains; few coarse sand grains; strongly acid.

Solum thickness ranges from 60 to 120 centimeters. Coarse fragments make up 0 to 3 percent of the soil. The soil ranges from extremely acid through strongly acid unless limed.

The A horizon has hue of 10 YR through 5 Y, value of 2 through 5, and chroma of 1 or 2. It is loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam.

The Btg horizons have hue of 10 YR through 5 Y, value of 4 through 7, and chroma of 1 or 2. They have mottles of high chroma. They commonly are loam or fine sandy loam but range to sandy loam, and some pedons have thin strata of silt loam or sandy clay loam.

The C horizon has hue of 7.5 YR through 5 Y or is neutral, value of 3 through 8, and chroma of 0 through 8. It is sand, fine sand, loamy sand, or loamy fine sand with strata of finer textures.

TOMOTLEY SERIES

The Tomotley series consists of deep, poorly drained, moderately slowly permeable soils formed in loamy marine or fluvial sediment. These soils are on nearly level flats and slight depressions on terraces of the Coastal Plain. The water table is within one foot of the soil surface for 60 to 120 days each year. Slopes range from 0 to 2 percent.

Taxonomic Class: Fine, loamy mixed, thermic Typic Ochraquults.

Typical Pedon: Tomotley loam (Colors are for moist soil).

Ap--0 to 20 cm.; very dark gray (10 YR 3/1) loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary. (12 to 25 cm. thick)

A2--20 to 32 cm.; light gray (10 YR 6/1) loam; common medium distinct dark gray (10 YR 4/1) streaks and splotches; weak medium subangular blocky structure; very friable; common fine roots; common fine uncoated sand grains; very strongly acid; clear smooth boundary. (7 to 28 cm. thick)

B21tg--32 to 60 cm.; gray (10 YR 5/1) sandy clay, loam, common fine distinct yellowish brown and strong brown and a few fine prominent red mottles; weak medium subangular blocky structure; friable; thin patchy clay films in old root channels and on faces of some peds; common fine roots; few fine lenses of light gray loamy fine sand; very strongly acid; gradual wavy boundary. (15 to 52 cm. thick)

B22tg--60 to 110 cm.; gray (10 YR 6/1) sandy clay loam; common medium prominent red (10 YR 4/8); common medium distinct yellowish brown (10 YR 5/6), and common fine distinct strong brown mottles; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine lenses of light gray loamy fine sand; very strongly acid; gradual wavy boundary. (20 to 90 cm. thick)

B23tg--110 to 130 cm.; light gray (5 Y 7/1) sandy clay; common medium prominent red (2.5 YR 4/6), common fine distinct strong brown and yellowish brown mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of some peds; few fine lenses of light gray; loamy fine sand; few fine flakes of mica; very strongly acid; gradual wavy boundary. (17 to 40 cm. thick)

B3g--130 to 147 cm.; light gray (5 Y 7/1) fine sandy loam with coarse pockets of sandy clay loam; common medium distinct strong brown (7.5 YR 5/8), common medium faint pale olive (5 Y 6/3), and few fine prominent yellowish red mottles; massive; friable; few fine flakes of mica; very strongly acid; gradual wavy boundary. (15 to 75 cm. thick)

Cg--147 to 200 cm.; light gray (2.5 Y 7/2) loamy fine sand; common medium distinct strong brown (7.5 YR 5/8), and common medium faint light yellowish brown (2.5 Y 6/4) mottles, massive friable; few fine flakes of mica; very strongly acid.

Solum thickness ranges from 100 to more than 150 centimeters. The soil ranges from extremely acid to strongly acid unless limed.

The Ap horizon has hue of 10 YR to 5 Y, or it is neutral, value of 2 to 4, and chroma of 0 to 2. Some pedons have an A2 horizon with hue of 10 YR or 2.5 Y, value of 4 to 7, and chroma of 1 or 2. The A2 horizon commonly has high chroma mottles. The A horizons are loamy fine sand, fine sandy loam, sandy loam, or loam.

The B horizons have hue of 10 YR to 5 Y, or they are neutral, value of 5 to 7, and chroma of 0 to 2. Mottles in shades of gray, olive, yellow, brown, or red range from few to many. The B horizons are sandy clay loam, clay loam, loam, or fine sandy loam, but some pedons contain thin subhorizons of silt loam.

The C horizon has hue of 10 YR to 5 Y, or it is neutral, value of 6 or 7, and chroma of 1 to 2. Most pedons contain mottles of contrasting shades. The C horizon is commonly stratified and ranges from sand to clay.

ACREDALE SERIES

Soils of the Acredale series are deep and poorly drained. They formed in silty and loamy marine and fluvial sediments on the lower Coastal Plain. Permeability is slow and runoff is slow or ponded. Slopes range from 0 to 2 percent.

Taxonomic Class: Fine-silty, mixed, thermic Typic Ochraquults.

Typical Pedon: Acredale loam in a nearly level cultivated field. (The soil was moist throughout when described)

Ap--0 to 17 cm.; grayish brown (10 YR 5/2) loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; common fine and very fine roots; common fine and medium pores, strongly acid; clear smooth boundary. (15 to 30 cm. thick)

B1tg--17 to 37 cm.; light brownish gray (10 YR 6/2) silt loam; few fine prominent yellowish brown (10 YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and very fine roots; common very fine vesicular and few fine tubular pores; many very fine sand grains coated and bridged with clay; very strongly acid; abrupt smooth boundary. (0 to 25 cm. thick)

B21tg--37 to 87 cm.; gray (5 Y 5/1) silty clay loam; common medium prominent yellowish brown (10 YR 5/8) imped mottles; weak coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable, sticky, plastic; common very fine roots; few fine vesicular and few fine tubular pores; many thin continuous clay films on faces of macro peds; many very fine sand grains coated and bridged with clay; pockets of silt from 1 to 7 cm. diameter that are white when dry; very strongly acid; clear smooth boundary.

B22tg--87 to 107 cm.; mottled light greenish gray (5 GY 7/1), dark gray (N4/0), and yellowish brown (10 YR 5/8) silt loam; moderate fine and medium subangular and angular blocky structure; friable, sticky, plastic; few thin discontinuous clay films on faces of peds; few very fine sand grains coated and bridged with clay; few fine prominent yellowish red colors along very fine root channels; very strongly acid; clear smooth boundary. (Combined thickness of B2t horizon is 35 to 107 cm.)

IIB3tg--107 to 125 cm.; mottled light gray (10 YR 6/1), light greenish gray (56 Y 7/1), and yellowish brown (10 YR 5/8) sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine roots; few fine vesicular pores; few thin discontinuous clay films on faces of peds; few sand grains coated and bridged with clay; many clean sand grains; common pockets of clean white sand up to 3 inches in diameter; strongly acid; clear wavy boundary. (0 to 25 cm. thick)

IICg--125 to 165 cm.; mottled gray (5 Y 6/1), light olive gray (5 Y 6/2), and yellowish brown (10 YR 5/8) sandy loam; massive, very friable, non-sticky, non-plastic; few very fine vesicular pores; many fine flakes of mica; medium acid.

Solum thickness ranges from 100 to 150 centimeters. The A horizon ranges from extremely acid to strongly acid unless limed. The B and C horizons range from very strongly acid to neutral.

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

The B1 horizon, where present, has hue of 10 YR through 5 Y, or it is neutral, value of 4 through 7, and chroma of 0 through 2. Few to many high chroma mottles are in most pedons. It is loam or silt loam.

The B2t horizon has colors similar to the B1 horizon and ranges to include 5 GY and 5 G, value of 4 through 6, and chroma of 1. Some pedons are mottled with high and low chroma mottles. Texture of the upper part of the B2t horizon is silty clay loam or silt loam. In the lower part, textures range to loam, clay loam, or silty clay.

The B3 horizon, where present, has colors and textures similar to the lower part of the B2t horizon, but texture of the B3 horizon also ranges to sandy loam or sandy clay loam in some pedons.

The C horizon has colors similar to the B horizon. It is dominantly sand, loamy sand, or sandy loam, but commonly contains thin strata of finer textures.

PORTSMOUTH SERIES

The Portsmouth series consists of very poorly drained, moderately permeable soils formed in loamy textured marine and fluvial sediments. These soils are moderately thick over contrasting sandy textural material. Slopes range from 0 to 2 percent.

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, thermic Typic Umbraquults.

Typical Pedon: Portsmouth loam-cultivated. (Colors are for moist soil unless otherwise stated)

Ap--0 to 30 cm.; black (10 YR 2/1) loam; weak medium granular structure; very friable; many fine roots; medium acid; gradual wavy boundary. (20 to 32 cm. thick)

A2--30 to 47 cm.; gray (10 YR 5/1) loam; weak medium granular structure; very friable; few fine and medium roots; medium acid; gradual wavy boundary. (0 to 20 cm. thick)

B1g--47 to 57 cm.; gray (10 YR 5/1) and dark gray (10 YR 4/1) fine sandy loam; common medium distinct brownish yellow (10 YR 6/8) and yellow (10 YR 7/8) mottles; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; common fine pores and old root channels; common medium flakes of mica; strongly acid; gradual wavy boundary. (0 to 15 cm. thick)

B2tg--57 to 87 cm.; gray (10 YR 5/1) and dark gray (10 YR 4/1) sandy clay loam with pockets and lenses of sandy clay and sandy loam; common prominent yellowish brown (10 YR 5/8) mottles; weak medium subangular blocky structure; friable; sticky; plastic; common fine pores and old root channels; common thin patchy clay films on faces of peds; common medium flakes of mica; few medium grains of feldspar minerals; very strongly acid; clay; wavy boundary. (25 to 50 cm. thick)

B3g--87 to 95 cm.; mottled gray (10 YR 5/1), yellowish brown (10 YR 6/8) and reddish yellow (5 YR 6/8) sandy loam; weak medium subangular blocky structure; very friable; common medium flakes of mica; few medium grains of feldspar minerals; very strongly acid; clear smooth boundary. (0 to 7 cm. thick)

IIC1g--95 to 120 cm.; gray (10 YR 6/1) sand with few small bodies of sandy clay loam; single grained; loose; common medium flakes of mica; few medium grains of feldspar minerals; very strongly acid; abrupt smooth boundary. (7 to 37 cm. thick)

IIC2g--120 to 180 cm.; gray (10 YR 6/1) and light gray (10 YR 7/1) coarse sand; single grained; loose; common medium flakes of mica; few small to large pebbles; strongly acid.

The loamy textural horizons are 60 to 100 centimeters thick over contrasting sandy textural horizons. Reaction of the A and B horizons ranges from extremely acid to medium acid.

The A1 or Ap horizon typically has hue of 10 YR, value of 2 or 3, and chroma of 0 to 3. Colors range to black (N2/0), very dark gray (N3/0), and very dark grayish brown (2.5 Y 3/2). The A2 horizon, where present, has hue of 10 YR or 5 Y, value of 5 to 7, and chroma of 1 or 2. Texture is sandy loam, fine sandy loam, or loam, or their mucky analogues.

The B1 horizon, where present, has hue of 10 YR or 5 Y or it is neutral, value of 4 to 6, and chroma of 1 or 2. It has mottles in shades of yellow and brown. It is sandy loam, fine sandy loam, or loam.

The B2t horizon has hue of 10 YR, 5 Y, or it is neutral, value of 4 to 7, and chroma of 1 or 2. Mottles are in shades of brown, yellow, and red. It is sandy clay loam, loam, or clay loam. Some pedons have strata or pockets of sandy clay and sandy loam.

The B3 horizon, where present, has colors similar to the B2t horizon. It is loamy sand or sandy loam and is less than 5 inches thick.

The IIC horizon has hue of 10 YR, 5 Y, or it is neutral, value of 5 to 7, and chroma of 1 or 2. Mottles are in shades of brown and yellow. It is sand or loamy sand. Some pedons contain strata or pockets of sandy loam, clay loam, or sandy clay loam.

HYDE SERIES

The Hyde series consists of very poorly drained soils on the lower Coastal Plain. These soils are on broad nearly level flats.

Taxonomic Class: Fine-silty, mixed, thermic Typic Umbraquults.

Typical Pedon: Hyde silt loam--cultivated. (Colors are for moist soil unless otherwise stated. When described, the soil was saturated below 127 cm.)

Ap--0 to 20 cm.; black (N 2/) silt loam; moderate medium granular structure; friable; few fine and medium roots; strongly acid; clear smooth boundary. (17 to 25 cm. thick)

A12--20 to 42 cm.; black (N 2/) silt loam; moderate medium granular structure; friable; few fine and medium roots; few fine pieces of charcoal; very strongly acid; clear wavy boundary. (7 to 25 cm. thick)

B21tg--42 to 82 cm.; coarsely mottled dark gray (10 YR 4/1) and dark grayish brown (10 YR 4/2) silty clay loam; few fine distinct strong brown (7.5 YR 5/6) mottles that follow old root channels increasing to common at 24 inches; weak fine subangular blocky structure; firm, sticky, plastic; few fine roots; common very fine and fine pores; few old root channels filled with A1 material; extremely acid; gradual wavy boundary. (37 to 65 cm. thick)

B22tg--82 to 135 cm.; grayish brown (2.5 Y 5/2) clay loam grading to gray (5 Y 5/1) at 42 inches; common fine distinct strong brown (7.5 YR 5/6) and reddish yellow (7.5 YR 6/6) mottles; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; extremely acid; clear smooth boundary. (37 to 75 cm. thick)

IICg--135 to 180 cm.; gray (5 Y 5/1) and greenish gray (5 G 5/1) stratified sand, loamy sand, and sandy clay loam, massive very friable; very strongly acid.

Thickness of the solum is 100 to more than 150 centimeters. Reaction of the A and B horizons is extremely acid to strongly acid, unless limed. The C horizon ranges from extremely acid to neutral.

The A horizon is black (10 YR 2/1; N 2/0; 5 Y 2/1), very dark gray (10 YR 3/1; N 3/0; 5 Y 3/1), or very dark grayish brown (10 YR 3/2; 2.5 Y 3/2) loam, very fine sandy loam, silt loam, or mucky loam.

The B2tg horizon is dark gray (10 YR 4/1; N 4/0; 5 Y 4/1) dark grayish brown (10 YR 4/2; 2.5 Y 4/2) brown (10 YR 5/2; 2.5 Y 5/2) light brownish gray (10 YR 6/2; 2.5 Y 6/2, or gray (10 YR 5/1; 10 YR 6/1; 5 Y 5/1; 5 Y 6/1). Mottles in shades of brown and red are few to common. Texture is clay loam, silty clay loam, or loam.

The C horizon is gray, light gray, light olive gray, grayish brown, light brownish gray, olive gray, greenish gray, or dark greenish gray stratified sand, loamy sand, sandy loam, sandy clay loam, or clay loam.

DOROVAN SERIES

The Dorovan series consists of very poorly drained, very slowly permeable soils that formed in black highly decomposed acid-organic materials more than 51 inches thick. These soils are on densely forested flood plains of tributaries of major streams. The tributaries lack well defined channels, and the soil remains saturated most of the time. Water is ponded on the surface.

Taxonomic Class: Dysic, thermic Typic Medisaprists.

Typical Pedon: Dorovan, undrained--forested. (Colors are for moist soils unless otherwise stated)

Oe--0 to 8 cm.; very dark brown (10 YR 2/2) muck peat consisting of partially decomposed moss, leaves, roots, and twigs; 50 percent fiber after rubbing; slightly sticky; very strongly acid; gradual wavy boundary. (0 to 10 cm. thick)

Oa1--8 to 28 cm.; black (10 YR 2/1) muck that remains black (10 YR 2/1) when rubbed and pressed; about 30 percent fiber unrubbed and less than 5 percent rubbed; fibers remaining after rubbing and partially decomposed wood 1 to 2 mm in size; massive; non-sticky; common roots and partially decomposed limbs; very strongly acid; diffuse wavy boundary. (0 to 35 cm. thick)

Oa2--28 to 185 cm.; black (10 YR 2/1) muck that remains black (10 YR 2/1) when rubbed and pressed; about 30 percent fiber unrubbed and less than 5 percent rubbed; fibers remaining after rubbing are partially decomposed wood 1 to 2 mm in size; massive; non-sticky; few roots; decomposed limbs and twigs; few logs; very strongly acid; gradual wavy boundary. (128 to 178 cm. thick)

IICg1--185 to 230 cm.; very dark grayish brown (10 YR 3/2) sand; single grained; non-sticky; few partially decayed small fragments of wood; very strongly acid; gradual wavy boundary. (35 to 50 cm. thick)

IICg2--230 to 270 cm.; dark grayish brown (10 YR 4/2) sand; single grained; non-sticky; few partially decayed small fragments of wood; very strongly acid.

The organic material ranges from 128 to more than 200 cm. thick. It is strongly acid or very strongly acid.

The Oe layer has a hue of 10 YR; values of 2, 3 or 4, and chroma of 1, 2, or 3. It contains 40 to 90 percent fiber unrubbed, 20 to 60 percent rubbed. Some pedons lack this layer.

The remaining organic layers have hues of 10 YR, 7.5 YR, 5 YR, or 2.5 Y, values of 2 or 3, and chroma of 2, 1, or N/ . They contain 10 to 40 percent fiber unrubbed, less than 1/6 of the volume when rubbed. Fibers remaining after rubbing are dominantly woody. A few logs and large fragments of wood are in the lower part of the organic layers.

The IIC horizon has hues of 10 YR and 2.5 Y, values of 3, 4, or 5, and chroma of 2, 1, or N/ . Texture of the IIC horizon is sand, loamy sand, sandy loam, or loam.

NAWNEY SERIES

The Nawney series consists of very poorly drained soils that formed in loamy fluvial and marine sediments. The soils are on nearly level flood basins and flood plains in the Coastal Plain. Slope ranges from 0 to 2 percent.

Taxonomic Class: Fine-loamy, mixed, acid, thermic Typic Fluvaquents.

Typical Pedon: Nawney silt loam-forested. (Colors are for moist soil)

0--10 to 0 cm.; partially decomposed roots, leaves, and twigs and highly decomposed very dark grayish brown (10 YR 3/2) organic material; many very fine and medium roots; very strongly acid; abrupt wavy boundary. (0 to 20 cm. thick)

A--0 to 13 cm.; dark gray (10 YR 4/1) silt loam; few fine prominent yellowish brown (10 YR 5/8) mottles; weak fine granular structure; very friable; slightly sticky, slightly plastic; many fine and medium roots; strongly acid; clear wavy boundary. (10 to 25 cm. thick)

Cg1--13 to 108 cm.; gray (10 YR 6/1) loam; massive; friable; slightly sticky, slightly plastic; common fine and medium roots; strongly acid; gradual wavy boundary. (90 to 180 cm. thick)

Cg2--108 to 150 cm.; gray (10 YR 6/1) stratified sand, loamy sand, and sandy loam; massive; slightly sticky, slightly plastic; strongly acid.

The loamy horizons extend to a depth of 100 to 150 cm. below the surface. The soil ranges from extremely acid through strongly acid about 100 cm. and from extremely acid through slightly acid below about 100 cm. Coarse fragments commonly are 0 to 2 percent, but range to 15 percent below a depth of 100 cm. Some pedons have one or more buried A horizons.

The A horizon has hue of 7.5 YR through 5 Y or is neutral, value of 2 through 5, and chroma of 0 through 2. Value of 3 or less is limited to horizons less than 15 cm. thick. Some pedons have high chroma mottles. The A horizon commonly is fine sandy loam, sandy loam, loam, or silt loam but ranges to loamy sand, sandy clay loam, clay loam, and silty clay loam.

The C horizon has hue of 10 YR through 5 GY or is neutral, value of 4 through 7, and chroma of 0 through 2. Some pedons have high chroma mottles and some pedons are highly variegated with both high and low chroma mottles. The C horizon above about 100 cm. commonly is sandy loam, fine sandy loam, loam, sandy clay loam, clay loam, or silty clay loam. Pockets or strata of coarser or finer texture are in some pedons. Below about 100 cm. textures commonly are highly stratified and range from sand to clay.

EXPLANATION OF INTERPRETATIVE TABLES

With the knowledge of soil features, it is possible to rate the limitations of a soil for specific uses for broad land-use planning. Soil Survey maps show the location of different soils, each having distinct individual properties that determine the behavior of these soils. The limitations of these soils for each use are rated in terms of degree-slight, moderate, or severe --

SLIGHT ratings mean little or no limitation or limitations easily corrected by the use of normal equipment.

MODERATE ratings mean presence of some limitation which normally can be overcome by careful design and management at somewhat greater costs.

SEVERE limitations are those which normally cannot be overcome without exceptional, complex, or costly measures.

It is not intended that a severe rating makes that use unsuitable except for marsh soils.

Soil features and their behavior should not be used as the sole basis for judgment nor can it replace detailed, on-site investigations and testing for design purposes. Other things to consider include location, accessibility, availability of utilities, current use of adjacent areas, and many others. Soil mapping and interpretations apply to the upper 5 to 6 feet.

Interpretations for NALF Soils

A. What they are

Soil interpretations are expressions of anticipated behavior of soils under various uses. They are based on detailed soil surveys, and related field and laboratory studies and tests. Because interpretations are valuable tools for broad planning, planners will want to read "Soil Surveys and Land-use Planning"(2).

B. How prepared

Soils in the United States are classified by properties which can be measured or inferred either in the field or the laboratory. Following a rather complex system, soils are named by the National Cooperative Soil Survey. Each named soil is described in detail and then mapped by soil scientists walking over the fields and through woodlands while making countless auger borings. Representative profiles of major soils are selected, pits are excavated and all major horizons are sampled to determine the texture, acidity, available water capacity, cation exchange capacity, organic matter content, estimated permeability, liquid

limit, plasticity index, and any other properties which are of importance locally. In addition, forest site index studies and wildlife observations are made to assist with the interpretations for those uses.

C. Assumptions and Rationale for Interpretations

Many soil properties affect the use of a soil for a sepcific purpose. Usually they are inter-related and may be overlapping. A total of 11 principal soil properties have been chosen as most important. Their importance varies with the specific use. In many cases one property may be enough to affect the rating for a given use.

D. Dominant soil properties or features used in interpretations ---

1. Flood hazard (stream overflow).
2. Wetness (natural drainage classes or water table height and duration).
3. Slope.
4. Coarse fragments (gravel, cobbles, ironstone, shell fossils).
5. Texture (sand, silt, clay proportions).
6. Permeability, percolation.
7. Shrink-swell potential.
8. Natural fertility.
9. Available water capacity.
10. Erosion hazard.
11. Prior erosion.

Note: Depth to bedrock, rockiness and stoniness are not considered in this report (depth to bedrock is estimated at approximately 1,000 feet). Frost action potential is also not considered for the winters are relatively mild and freezing below 6 inches is rare in cultivated areas, almost nil in wooded areas.

E. Explanation of Properties or Factors

1. Flood hazard (stream overflow) - This refers to the overflow intended to include shallow ponding associated with normal rainfall runoff. Damage normally diminishes upstream.

Flood hazard is a critical soil factor for such land uses as sites for residential buildings, schools, hospitals, nursing homes, and camp sites where loss of life is likely if rapid evacuation is not possible. For health reasons, it is also critical for use of flooded areas as sites for septic disposal fields and sanitary landfills. Extremely high potential for property damage normally prohibits the use of flood plains for sites of industrial or commercial structures unless the flood hazard can be reduced.

Flood hazards at sites can change from time to time. Construction of flood control structures upstream may reduce the flood hazard considerably. On the other hand stream encroachments and upstream urban development may increase the flood hazard.

2. Wetness (natural drainage classes or water table height and duration) - This is an indication of the portion of the year that a soil is saturated or contains excess water. In some cases the soil is saturated by a water table that rises and falls seasonally; in others, water is perched over slowly permeable layers (clay or fragipans). Six natural drainage classes (before man's improvement efforts) are normally used: excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Natural drainage classes are: excessive - no excess water in soil in any season; well drained - excess water for only short periods after abnormally heavy rainfall; moderately well drained - seasonally high water at 1½ to 4 feet from surface from January to April; somewhat poorly drained - seasonally high water at 1/2 to 1½ feet from surface from December to May; poorly drained - seasonally high water at 0 to 1 foot from surface from November to June; very poorly drained - seasonally high water at surface from October to June. Each class successively is wet for longer periods. There is not an absolute relation of wetness for permeability because wetness is an expression of whether the water remains for definite periods of time. Records of water table fluctuations are used for seasonal water table predictions.

   Some important uses which are affected by soil wetness are building foundations, septic effluent disposal, roads, parking lots, playgrounds, farming, and sanitary landfills.

3. Slope - Slope is shown on the maps in letters following the soil symbol as follows (if there is enough slope to justify it):

Slope Letter, Description		Percent Slope
A	nearly level	0 to 2 percent
B	gently sloping	2 to 6 percent
C	sloping	6 to 10 percent
D	moderately steep	10 to 15 percent
E	steep	15 to 25 percent
F	very steep	25 to 70 percent or greater

   Percent slope means the number of feet vertical rise or fall per 100 feet horizontal distance. Slope as a soil factor affects such uses as military maneuvering, septic tank effluent disposal, playgrounds, farming, wildlife food plots, parking

lots, roads, campsites, and forest management.

4. Coarse fragments - This refers to fragments of quartz, ironstone, or fossiliferous shells ranging in sizes larger than coarse sands (2mm). If the fragments are of quartz they are called pebbles or gravel up to 3 inches. If the fragments are greater than 3 inches but less than 10 inches they are called cobbles. The ironstone (ferricrete) and shells (fossiliferous shells) are not designated to size adjectives. Coarse fragments affect uses of soils as athletic fields, source of topsoil, and campsites. A high coarse fragment on the surface content reduces the erosion hazard in a soil.

5. Texture (sand, silt, clay proportions) - This refers to the proportion of each of the named size particles in a soil. Soil texture is an important soil property affecting available water capacity, natural fertility, permeability, erosiveness, frost action hazard, filtering ability, and many others. Sandy textures are generally rapidly permeable, low in available water capacity, low in natural fertility. Clayey soils are slowly permeable and are subject to shrink-swell volume changes. Silty soils have high available water capacity but are subject to high erosion action.

6. Permeability, percolation - Permeability refers to the rate of vertical movement of water through a wet soil; it is generally expressed in inches per hour. Percolation refers to the rate of water movement (vertically and horizontally) in a soil thoroughly wetted; it is reported in minutes per inch.

   Permeability (or percolation) is important as one of the controlling properties of soil that governs its use as a septic effluent disposal field. Suitable permeability (or percolation) must be coupled with well drained conditions; high water table can prevent permeable soils from functioning.

   Permeability also affects the drainage, irrigation, and function of sanitary landfills.

7. Shrink-swell potential - Refers to the volume change that normally occurs with the alternating drying and wetting that occurs in soils. Soils containing large amounts of montmorillonite clay have high shrink-swell potential.

8. Natural fertility - Natural fertility is a general expression of the ability of soil to grow plants and produce crops. Natural fertility is affected by acidity which can be corrected by liming. The application of fertilizers over many years tremendously increases the crop production facility of a soil.

Natural fertility affects the use of soils for farming, lawns, golf fairways and as a source of topsoil.

9. Available water capacity - Available water capacity is the ability of soils to hold water available to plants. It is controlled mostly by silt size soil particles. In some soils there are root-restricting horizons. Water in and below these layers is mostly unavailable to plants. Where the water table enters the soil it can provide additional water if the texture is not too coarse.

10. Erosion hazard - Generally this is a function of slope. It becomes critical when the natural cover of trees, shrubs or grasses are removed.

11. Prior Erosion - Prior erosion on land carelessly managed affects crop yields severely. It may affect other soil properties such as depth to bedrock, organic matter content, available water capacity, and others. It affects such uses as farming, lawns and landscaping, and golf fairways.

F. Limitations of Interpretations ---

Map units of soil surveys contain inclusions of other soils. Soils with similar properties and behavior are intentionally included; distinctly contrasting soils are intentionally included only if they are small. Included in places, are contrasting soils that are not seen by the mapper. Interpretations are made for the dominant soil as mapped and may not fit the contrasting inclusions. Interpretations are most reliable for large areas, and least reliable for very small areas. These need on-site investigations.

G. References and Suggested Reading

1. Interpretations

"Guide for Interpreting Engineering Uses of Soils", USDA - Soil Conservation Service, Superintendent of Documents, Washington, D. C. $2.00

2. Planning Material

"Soil Surveys and Land Use Planning", Soil Science Society of America, 677 South Segoe Road, Madison, Wisconsin

3. Engineering and Soil Terminology

PCA Primer, Portland Cement Association, 33 West Grand Avenue Chicago, Illinois.

H. Explanation of Headings on Soil Interpretive Tables

Soil description is a non-technical description of the soil series. If more detailed information is needed, refer to the official description for the series.

Stream overflow hazard is given in terms of normal occurrence-none, seldom (less than 1 year in 5), occasional (1 overflow in 3 or 4 years), frequent (annually), and very frequent (several times a year).

Depth to seasonal high water is the normal range of minimum depth, in feet, to the water table (real or perched). Duration and height in summer are also given if known. If water is perched, this information is given here.

Horizons shows the layers of a representative profile that are significant.

Typical depth from surface shown in inches.

Classification, USDA texture class, Unified, and AASHTO gives the normal range of textures for each horizon by abbreviations. Key to these are listed in Reference 2. For definitions and comparison with unified and AASHTO, see PCA Soil Primer listed in references.

Coarse fragments refer to material greater than 2 mm in diameter. This material is normally removed from the sample and is therefore over and above the 100% assigned to the material below 2 mm in diameter.

Fractions passing sieve numbers is given in normal ranges for the soil but does not cover inclusions of other soils.

Liquid limit and Plastic index given are ranges. For definition, see a recent soil survey report or PCA Soil Primer.

Permeability is the range of rates for water passing through a wet soil.

Available water capacity given ranges of available water; where groundwater is seasonally close to the surface, this information is given.

Soil reaction, natural shown is the range in pH for the soil before lime treatment. Most farmed soils have higher pH because of treatment. Some treatment has changed the pH to 5 feet or more.

Resistivity is an indication of potential corrosivity of uncoated steel especially where soil and moisture changes occur. Low resistivity indicates high corrosivity.

Organic matter is given in percent ranges.

Shrink-swell potential ratings are relative expressions for results of normal wetting and drying that takes place in soils. High ratings are reserved for soils high in montmorillonite clays.

Consistence, in place, is normally rated for moist soils in this area. Consistences are different for wet and dry soils.

SOURCE OF MATERIALS ---

Topsoil refers to material used for top-dressing an area where vegetation is to be established and maintained.

Sand and gravel indicates probable sources of the material. Normally thickness of material is 3 or more feet thick in the upper part being within 5 feet of depth. No quality is indicated in these ratings.

Roadfill refers to suitability of soils as a source of roadfill. Ratings intended for holding back water. Permeability here refers to compacted permeability and normally is slower than soil materials in place.

AGRICULTURAL INTERPRETATIONS —

Land capability classes show, in a general way, the suitability of soils for most kinds of field crops. Soil groupings are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive land forming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to horticultural crops, or other crops requiring special management. Capability classes are designated by Arabic numerals 1 through 8. The higher numerals indicate progressively greater limitations and narrower choices for practical use. The letters e, s, and w following the numeral indicates the dominant limitation to be erosion, soil droughtiness or wetness. Numbers following these letters indicate soil management groups.

Wildlife Suitability are ratings showing the limitations of soils to produce the habitat considered important for openland, woodland, and wetland wildlife.

Woodland Suitability groups indicate relative woodland production ratings. A rating of 1 is most productive and 5 least productive. Letters d, o, r, s, w, and x indicate dominant limiting factors. Letter d indicates shallow rooting depth, o indicates no limiting factor, r is relief or slope, s is a soil factor such as deep droughty sand, w is wetness, and x is extremely stony or rocky.

Erodibility (K) factors are relative erosion factors indicating sheet erosion that might be expected from bare soil. Ratings are .17, .20, .24, .28, .32, .37, .43, .49. Lowest erosion hazard is .17, the highest is .49. Some soils that are only nearly level are not rated.

Hydrologic Soil Group are ratings of soils to indicate amount of runoff following prolonged wetting. A indicates the least runoff and D the most. Factors considered in rating were natural drainage or water table, permeability rate, depth to fragipan (dense slowly permeable layer) or bedrock. Soil rated A can absorb the greatest rainfall and generally at the most rapid rates. These soils generally have a low available water capacity for plants because the coarse soil particles cannot hold the water.

SOIL LIMITATIONS FOR SELECTED USES

Pond Reservoir area is that area covered by water when an impoundment is filled. Of primary concern are soil properties that affect seepage rates.

Excavated ponds are dugout ponds with groundwater as the source of water. Underlying clay layers may reduce recharge rates sufficiently to make them poorly suited for irrigation. Extreme acidity of underlying clays may make some ponds so acid that fish will not live or will not reproduce.

Land drainage refers to the response of soils to the installation and performance of surface and subsurface drainage systems.

Sprinkler irrigation refers to the application of water to soils for crop production.

Terraces, diversions are berms of soil constructed on a designed grade to carry runoff water to protected outlets.

Land smoothing includes removal of knolls and filling of low areas to facilitate farming operations.

Winter grading refers to grading, generally around new construction planned to be done in winter.

Pipeline construction and maintenance includes the installation and maintenance of the lines to a depth of 5 or 6 feet.

Shallow excavations to a depth of 5 to 6 feet for cables, cemeteries, foundations.

COMMUNITY DEVELOPMENT USES (BUILDING SITE DEVELOPMENT)

Septic filter fields assumes lines at a depth of about 2 1/2 feet. Groundwater pollution hazard is stated where significant but was not used as a criteria in the rating.

Foundations for houses with basements assumes excavations to 5 or 6 feet. Bedrock soft enough to be dug out with light power equipment, such as backhoes, is rated as moderate limitation when depth is less than 40 inches. Soils are assumed to be undisturbed. Use of soils for septic disposal is not considered in this rating.

Foundations for houses without basements assumes excavation deep enough for footings. Use of soils for septic disposal is not considered in this rating.

Local roads refers to the use of the soils for construction and maintenance of improved local roads and streets that have all-weather surfacing. Excluded from rating are highways designed for fastmoving, heavy trucks.

Parking lots assumes that they will be paved. Criteria are similar to roads but slopes are more restricted.

Campsites, trailers and tents assumes that little site preparation will be done other than shaping and leveling for tent and parking areas. Soil suitability for growing and maintaining vegetation is not a part of this rating.

Play areas, Athletic fields assumes the soils are to be used intensively for such organized games as baseball, football, soccer, volley ball, etc. Soil suitability for growing and maintaining vegetation is not a part of this rating. Playing season is full year.

Picnic areas assumes park-type use with most vehicular traffic confined to access roads. Soil suitability for growing vegetation is not a part of this rating.

Paths and trails assumes that the areas will be used as they occur naturally with little excavation or fill. Soil features affecting trafficability, dust, design and maintenance are considered in this rating.

Lawns, landscaping, golf fairways assumes moderate foot and light vehicular traffic and soil materials at the site will be used for any smoothing operations.

Sanitary landfill, trench method rating is based on information to a depth of 5 feet. On-site investigation is needed to determine conditions below 5 feet. Groundwater pollution hazard is used as a criteria for this rating.

GLOSSARY

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse grained (light textured) soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

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

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose. Noncoherent when dry or moist; does not hold together in a mass.

Friable. When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic. When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky. When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard. When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft. When dry, breaks into powder or individual grains under very slight pressure.

Cemented. Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 to 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. The walls of excavations tend to cave in or slough.

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 of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines. Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess salts. Excess water-soluble salts in the soil that restrict the growth of most plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake. The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine grained (heavy textured) soil. Sandy clay, silty clay, and clay.

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

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

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

Hardpan. A hardened or cemented soil horizon, or layer.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon. An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon. The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

A2 horizon. A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon. The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	-	Very low
0.2 to 0.4	-	Low
0.4 to 0.75	-	Moderately low
0.75 to 1.25	-	Moderate
1.25 to 1.75	-	Moderately high
1.75 to 2.5	-	High
More than 2.5	-	Very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

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

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

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

Medium textured soil. Very fine sandy loam, loam, silt loam or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage.

Muck. Dark colored, finely divided, well decomposed organic soil material.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

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

Parent material. The unconsolidated organic and mineral material in which soil forms.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	Less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	More than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping. Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

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

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity of alkalinity is expressed as:

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

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

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.

Salty water. Water that is too salty for consumption by livestock.

Seepage. The movement of water through the soil. Seepage adversely affects the specified use.

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

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

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

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

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

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

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

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

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crops, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently, designated as the "plow layer", or the "Ap horizon".

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill. Risk of caving or sloughing on banks or fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the low lands along streams.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

SCS SOILS 37A
3-75

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Soil Survey Area: _____
State: _____

Date: _____

CULTURAL FEATURES

DESCRIPTION	SYMBOL
BOUNDARIES	
National, state, or province	
County or parish	
Minor civil division	
Reservation (national forest or park, state forest or park, and large airport)	
Land grant	
Limit of soil survey (label)	
Field sheet matchline & neatline	
AD HOC BOUNDARY (label)	
Small airport, airfield, park, oilfield, cemetery, or flood pool	
STATE COORDINATE TICK	1 890 000 FEET
LAND DIVISION CORNERS (sections and land grants)	
ROADS	
Divided (median shown if scale permits)	
County, farm or ranch	
Trail	
ROAD EMBLEMS & DESIGNATIONS	
Interstate	66
Federal	287
State	52
Other	396
RAILROAD	
POWER TRANSMISSION LINE (normally not shown)	
PIPE LINE (normally not shown)	
FENCE (normally not shown)	
LEVEES	
Without road	
With road	
With railroad	
DAMS	
Large (to scale)	
Medium or small	
PITS	
Gravel pit	
Mine or quarry	

CULTURAL FEATURES (cont.)

DESCRIPTION	SYMBOL
MISCELLANEOUS CULTURAL FEATURES	
Farmstead, house (omit in urban areas)	
Church	
School	
Indian mound (label)	
Located object (label)	
Tank (label)	
Wells, oil or gas	
Windmill	
Kitchen midden	

WATER FEATURES

DESCRIPTION	SYMBOL
DRAINAGE	
Perennial, double line	
Perennial, single line	
Intermittent	
Drainage end	
Canals or ditches	
Double - line (label)	CANAL
Drainage and/or irrigation	
LAKES, PONDS AND RESERVOIRS	
Perennial	water, wp
Intermittent	intermittent, int
MISCELLANEOUS WATER FEATURES	
Marsh or swamp	
Spring	
Well, artesian	
Well, irrigation	
Wet spot	

SPECIAL SYMBOLS FOR SOIL SURVEY

DESCRIPTION	SYMBOL
SOIL DELINEATIONS AND SOIL SYMBOLS	
ESCARPMENTS	CeA, FoB2
Bedrock (points down slope)	
Other than bedrock (points down slope)	
SHORT STEEP SLOPE	
GULLY	
DEPRESSION OR SINK	
SOIL SAMPLE SITE (normally not shown)	S
MISCELLANEOUS	
Blowout	
Clay spot	
Gravelly spot	
Gumbo, slick or scabby spot (sodic)	
Dumps and other similar non soil areas	
Prominent hill or peak	
Rock outcrop (includes sandstone and shale)	
Saline spot	
Sandy spot	
Severely eroded spot	
Slide or slip (tips point upslope)	
Stony spot, very stony spot	
RECOMMENDED AD HOC SOIL SYMBOLS	

Rules of Application for Use of Conventional and Special Map Symbols for Soil Surveys

1. All symbols are black. Symbols other than boundaries, roads, streams, drainage ends, and soil delineations (pen sizes listed below) will be placed on type overlays of project surveys with clear stripping film with adhesive backing (stickup). Pen size 00 is to be used for symbols on field sheets and for map compilation of other surveys with the following exceptions:

Pen size	Symbols
0	-- Trail and soil delineation.
1	-- Minor civil division, reservation, land grant and limit of soil survey
2	-- National, state or province, county or parish boundaries, and center line of dams.
2.5	-- All roads except trails.

2. All the symbols shown on the legend will not be used in a single soil survey. Symbols actually used will be underlined in red during the initial field review. Changes in symbols selected must be approved by the state soil scientist.

3. Ad hoc symbols will be defined in the legend in terms of the specific kind and size of area represented.

4. All mapping unit boundaries are unbroken lines. Enclosed areas of water, double line streams and double line canals are mapping unit boundaries.

5. Single and double line roads, railroads, minor civil division lines, field sheet match lines or neatlines, soil survey area boundaries, single line canals, and levees are not mapping unit boundaries.

6. Areas represented by conventional and special symbols will not be included in the table "Approximate Acreage and Proportionate Extent of the Soils" in soil surveys. Acreage for enclosed areas of water more than 40 acres in size; and streams, sloughs, estuaries and canals more than one-eighth of a statute mile in width is given at the end of the table under "water".

7. The following rules apply to symbols for pits, marsh or swamp, and dumps and other similar nonsoil areas:

   a. Areas less than the minimum size delineation being used in the survey area are indicated only by symbols.

   b. Areas greater than the minimum size delineation being used in the survey area are delineated, classified, and correlated as mapping units.

8. Where a map scale change occurs in a soil survey area a neatline is used as a boundary. The map scale change is made a part of the joins note parallel to the neatline, e.g. Joins sheet 89 - 1:31680.

9. Proposed roads are not shown. Where the photo image shows a road under construction, represent it on the map as if it were constructed. Interchanges and access and egress ramps to limited access roads are not shown. "Other" roads are shown as necessary for proper orientation of the map.

10. Symbols for schools and churches are centered on the photo image and are not inked to scale.

11. Departure from these conventional and special symbols must be approved by the Deputy Administrator for Soil Survey.

PRIME FARMLAND

Prime farmland is one of several kinds of important farmlands defined by the U. S. Department of Agriculture. It is of major importance in providing the Nation's short and long-range needs for food and fiber. The supply of high quality farmland is limited and the U. S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland as defined by the U. S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season, acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges mainly from 0 to 6 per cent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 770 acres or 30 percent of NALF meets the requirement for prime farmland. The prime farmland is located in the nine agricultural outleased units. As the drainage is improved to meet the requirements for prime farmland the acreage will increase. This will occur primarily on the agricultural outleased land.

A recent trend in land use has been the loss of some prime farmlands to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate, and usually less productive.

Soil map units that make up prime farmland at NALF are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in Table 1. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the mapping unit description.

Soils that have limitations--a high water table, flooding, or inadequate rainfall--may qualify for prime farmland if these limitations are overcome by such measures as drainage, flood control, or irrigation. In the following list, these limitations, if any, are shown in parenthesis after the map unit name. On site evaluation is necessary to see if these limitations have been overcome by corrective measures.

The map units that meet the soil requirement for prime farmland are:

21	Tarboro
24	Bojac
34	Munden
36	Tetotum
42	Dragston (if artifically drained)
45	Augusta (if artifically drained)
52	Nimmo (if artifically drained)
55	Tomotley (if artifically drained)
57	Acredale (if artifically drained)
65	Portsmouth (if artifically drained)
67	Hyde (if artifically drained)

TABLE 4

LAND CAPABILITY CLASSIFICATION

(Capability Classes are Defined in the Text)

Soil Name and Map Symbol	Class-Determining Phase	Capability Class
21---------- Tarboro	0-5% slope 5-8% slope	3s 4s
24---------- Bojac	0-2% slope, fsl 0-2% slope, lfs	1 2s
31---------- Seabrook	All	3s
34---------- Munden	0-2% slope 2-6% slope	2w 2e
36---------- Tetotum	0-2% slope 2-6% slope	2w 2e
42---------- Dragston	Drained Undrained	2w 3w
45---------- Augusta	All	3w
52---------- Nimmo	Drained Undrained	3w 4w
55---------- Tomotley	Drained Undrained	3w 4w
57---------- Acredale	Drained Undrained	3w 4w
65---------- Portsmouth	Drained Undrained	3w 6w
67---------- Hyde	Drained Undrained	3w 6w
76---------- Dorovan	All	7w
81---------- Nawney	Occasional Frequent	4w 6w

TABLE 5

YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Soil Name and Map Symbol	Corn Bu.	Soybeans Bu.	Wheat Bu.	Grass Hay Ton	Pasture AUM*
21---------- Tarboro	60	20	25	5.0	7.0
24---------- Bojac	105	30	50	8.0	6.0
31---------- Seabrook	65	25	—	3.5	6.0
34---------- Munden	130	40	50	5	9.5
36---------- Tetotum	115	45	35	3.0	7.0
42---------- Dragston	125	40	50	3.5	7.5
45---------- Augusta	110	35	45	6.5	6.0
52---------- Nimmo	130	40	50	4.0	9.5
55---------- Tomotley	130	40	50	6.0	9.5
57---------- Acredale	135	45	55	5.0	10.0
65---------- Portsmouth	135	45	55	6.0	10.0
67---------- Hyde	135	45	55	—	10.0
76---------- Dorovan	—	—	—	—	—
81---------- Nawney	50	25	—	—	8.0

*AUM - Animal-unit-month

TABLE 6

WOODLAND MANAGEMENT AND PRODUCTIVITY

Soil Name and Map Symbol	Ordination Symbol	Management Concerns				Potential Productivity		Trees to Plant
		Erosion Hazard	Equipment Limitation	Seedling Mortality	Windthrow Hazard	Common Trees	Site Index	
21---------- Tarboro	3s	Slight	Moderate	Moderate	Slight	Loblolly Pine	80	Loblolly Pine
24---------- Bojac	2w	Slight	Slight	Slight	Slight	Southern Red Oak Virginia Pine Loblolly Pine Sweetgum	70 75 80 80	Loblolly Pine Sweetgum
31---------- Seabrook	3w	Slight	Moderate	Moderate	Moderate	Loblolly Pine	84	Loblolly Pine
34---------- Munden	2w	Slight	Moderate	Slight	Slight	Loblolly Pine Sweetgum White Oak	90 90 75	Loblolly Pine
36---------- Tetotum	2w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Southern Red Oak	88 85 76	Loblolly Pine
42---------- Dragston	2w	Slight	Moderate	Slight	Slight	Southern Red Oak Loblolly Pine Sweetgum Yellow Poplar	80 85 90 90	Loblolly Pine Sweetgum Yellow Poplar
45---------- Augusta	2w	Slight	Moderate	Slight		Loblolly Pine Sweetgum American Sycamore White Oak Southern Red Oak	90 90 90 80 80	Loblolly Pine Sweetgum American Sycamore Yellow Poplar

TABLE 6

WOODLAND MANAGEMENT AND PRODUCTIVITY - Continued

Soil Name and Map Symbol	Ordination Symbol	Management Concerns				Potential Productivity		Trees to Plant
		Erosion Hazard	Equipment Limitation	Seedling Mortality	Windthrow Hazard	Common Trees	Site Index	
52---------- Nimmo	2w	Slight	Severe	Severe	Slight	Loblolly Pine Sweetgum White Oak	95 95 80	Loblolly Pine Sweetgum
55---------- Tomotley	2w	Slight	Severe	Severe	Slight	Loblolly Pine Sweetgum Water Tupelo	94 90	Loblolly Pine Sweetgum American Sycamore
57---------- Acredale	2w	Slight	Severe	Severe	Slight	Loblolly Pine Sweetgum White Oak Water Oak	96 100 86 86	Loblolly Pine
65---------- Portsmouth	1w	Slight	Severe	Severe		Loblolly Pine Sweetgum Red Maple Water Oak Willow Oak Sweet Bay Red Bay	96	Loblolly Pine Sweetgum
67---------- Hyde	1w	Slight	Severe	Severe		Loblolly Pine Swamp Tupelo Water Tupelo Sweetgum Water Oak Pond Pine Baldcypress	96 96 97 95 80 80	Loblolly Pine Water Tupelo Sweetgum

TABLE 6

WOODLAND MANAGEMENT AND PRODUCTIVITY - Continued

Soil Name and Map Symbol	Ordination Symbol	Management Concerns				Potential Productivity		Trees to Plant
		Erosion Hazard	Equipment Limitation	Seedling Mortality	Windthrow Hazard	Common Trees	Site Index	
76---------- Dorovan	4w	Slight	Severe	Severe		Blackgum	70	Baldcypress
81---------- Nawney	2w	Slight	Severe	Severe	Slight	Sweetgum Water Oak Eastern Cottonwood Green Ash Loblolly Pine	94 89 90 88 90	Loblolly Pine American Sycamore Sweetgum

TABLE 7

RECREATIONAL DEVELOPMENT

(See Text for Definitions of "Slight, "Moderate", and "Severe")

Soil Name and Map Symbol	Camp Areas	Picnic Areas	Playgrounds	Paths & Trails
21---------- Tarboro	Slight	Slight	Slight	Slight
24---------- Bojac	Slight	Slight	Slight	Slight
31---------- Seabrook	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness
34---------- Munden	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness
36---------- Tetotum	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness
42---------- Dragston	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness
45---------- Augusta	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness
52---------- Nimmo	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
55---------- Tomotley	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
57---------- Acredale	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding
65---------- Portsmouth	Severe: floods, wetness	Severe: wetness	Severe: wetness	Severe: wetness
67---------- Hyde	Severe: floods, wetness	Severe: wetness	Severe: wetness	Severe: wetness
76---------- Dorovan	Severe: floods	Severe: ponding excess humus	Severe: excess humus, ponding, flooding	Severe: ponding excess humus

TABLE 7

RECREATIONAL DEVELOPMENT - Continued

(See Text for Definitions of "Slight, "Moderate", and "Severe")

Soil Name and Map Symbol	Camp Areas	Picnic Areas	Playgrounds	Paths & Trails
81---------- Nawney	Severe: floods, wetness	Severe: wetness	Severe: wetness	Severe: wetness

TABLE 8

WILDLIFE HABITAT

Soil Name and Map Symbol	Potential for Habitat Elements							Potential as Habitat for-----		
	Grain and seed Crops	Grasses and Legumes	Wild Herba-ceous Plants	Hardwood Trees	Conif-erous Plants	Wetland Plants	shallow Water Areas	Openland Wildlife	Woodland Wildlife	Wetland Wildlife
21---------- Tarboro	Poor	Fair	Fair	Poor	Poor	Very Poor	Very Poor	Fair	Poor	Very Poor
24---------- Bojac	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
31---------- Seabrook	Fair	Fair	Good	Good	Good	Poor	Very Poor	Good	Good	Very Poor
34---------- Munden	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
36---------- Tetotum	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
42---------- Dragston	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Fair
45---------- Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
52---------- Nimmo	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
55---------- Tomotley	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good
57---------- Acredale	Good	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good

TABLE 8

WILDLIFE HABITAT-Continued

Soil Name and Map Symbol	Potential for Habitat Elements							Potential as Habitat for-----		
	Grain and seed Crops	Grasses and Legumes	Wild Herba-ceous Plants	Hardwood Trees	Conif-erous Plants	Wetland Plants	shallow Water Areas	Openland Wildlife	Woodland Wildlife	Wetland Wildlife
65---------- Portsmouth	Fair	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor
67---------- Hyde	Fair	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor
76---------- Dorovan	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Good	Good	Very Poor	Very Poor	Good
81---------- Nawney	Very Poor	Poor	Poor	Fair	Poor	Good	Good	Poor	Fair	Good

TABLE 9

BUILDING SITE DEVELOPMENT

(See Text for Definitions of "Slight, "Moderate", and "Severe")

Soil Name and Map Symbol	Shallow Excavations	Dwellings Without Basements	Dwellings With Basements	Small Commercial Buildings	Local Roads and Streets	Lawns and Landscaping
21---------- Tarboro	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
24---------- Bojac	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Slight	Moderate: droughty
31---------- Seabrook	Severe: cutbanks cave wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: droughty
34---------- Munden	Severe: cutbanks cave wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness
36---------- Tetotum	Severe: cutbanks cave wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness
42---------- Dragston	Severe: cutbanks cave wetness	Severe: wetness	Severe: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
45---------- Augusta	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness

TABLE 9

BUILDING SITE DEVELOPMENT - Continued

(See Text for Definitions of "Slight, "Moderate", and "Severe")

Soil Name and Map Symbol	Shallow Excavations	Dwellings Without Basements	Dwellings With Basements	Small Commercial Buildings	Local Roads and Streets	Lawns and Landscaping
52---------- Nimmo	Severe: cutbanks cave wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
55---------- Tomotley	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
57---------- Acredale	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: low strength ponding	Severe: ponding
65---------- Portsmouth	Severe: cutbanks cave wetness	Severe: floods wetness	Severe: floods wetness	Severe: floods wetness	Severe: wetness	Severe: wetness
67---------- Hyde	Severe: wetness	Severe: floods wetness	Severe: floods wetness	Severe: floods wetness	Severe: low strength wetness	Severe: wetness
76---------- Dorovan	Severe: excess humus ponding	Severe: floods ponding low strength	Severe: floods ponding	Severe: floods ponding low strength	Severe: ponding floods	Severe: ponding floods excess humus
81---------- Nawney	Severe: wetness	Severe: floods wetness	Severe: floods wetness	Severe: floods wetness	Severe: low strength wetness floods	Severe: wetness floods

TABLE 10

SANITARY FACILITIES

(See Text for Definitions of "Slight", "Moderate", "Good", "Fair", and Other Terms)

Soil Name and Map Symbol	Septic Tank Absorption Fields	Sewage Lagoon Areas	Trench Sanitary Landfill	Area Sanitary Landfill	Daily Cover For Landfill
21---------- Tarboro	Severe: poor filter	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage
24---------- Bojac	Moderate: wetness	Severe: seepage	Severe: wetness, seepage	Severe: seepage	Fair: thin layer
31---------- Seabrook	Severe: wetness, poor filter	Severe: seepage	Severe: seepage	Severe: seepage	Fair: too sandy
34---------- Munden	Severe: wetness	Severe: seepage, wetness	Severe: seepage, wetness	Severe: seepage, wetness	Fair: thin layer
36---------- Tetotum	Severe: wetness	Severe: seepage, wetness	Severe: seepage, wetness	Severe: wetness	Fair: too clayey
42---------- Dragston	Severe: wetness, poor filter	Severe: wetness, seepage	Severe: wetness, seepage	Severe: wetness, seepage	Poor: wetness, thin layer
45---------- Augusta	Severe: floods, wetness	Severe: floods, wetness	Severe: floods, wetness	Severe: floods, wetness	Fair: wetness

TABLE 10

SANITARY FACILITIES - Continued

(See Text for Definitions of "Slight", "Moderate", "Good", "Fair", and Other Terms)

Soil Name and Map Symbol	Septic Tank Absorption Fields	Sewage Lagoon Areas	Trench Sanitary Landfill	Area Sanitary Landfill	Daily Cover For Landfill
52---------- Nimmo	Severe: wetness	Severe: seepage, wetness	Severe: seepage, wetness	Severe: seepage, wetness	Poor: seepage, too sandy, wetness
55---------- Tomotley	Severe: wetness, percs slowly	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
57---------- Acredale	Severe: ponding, percs slowly	Severe: seepage, ponding	Severe: seepage, ponding	Severe: ponding	Severe: ponding
65---------- Portsmouth	Severe: wetness, poor filter	Severe: seepage, floods, wetness	Severe: seepage, wetness, too sandy	Severe: seepage, wetness	Poor: seepage, too sandy, wetness
67---------- Hyde	Severe: wetness, percs slowly	Severe: floods, wetness	Severe: wetness	Severe: wetness	Poor: wetness
76---------- Dorovan	Severe: floods, ponding, poor filter	Severe: floods, excess humus, ponding	Severe: floods, seepage, ponding	Severe: floods, ponding	Poor: ponding, excess humus

TABLE 10

SANITARY FACILITIES - Continued

(See Text for Definitions of "Slight", "Moderate", "Good", "Fair", and Other Terms)

Soil Name and Map Symbol	Septic Tank Absorption Fields	Sewage Lagoon Areas	Trench Sanitary Landfill	Area Sanitary Landfill	Daily Cover For Landfill
81---------- Nawney	Severe: floods, wetness, percs slowly	Severe: floods, wetness	Severe: floods, wetness	Severe: floods, wetness	Poor: wetness

TABLE 11

CONSTRUCTION MATERIALS

Soil Name and Map Symbol	Roadfill	Sand	Gravel	Topsoil
21---------- Tarboro	Good	Probable	Improbable: too sandy	Fair: too sandy
24---------- Bojac	Good	Probable	Improbable: too sandy	sl,fsl,l: Good lfs, ls: Fair, too sandy
31---------- Seabrook	Fair: wetness	Probable	Improbable: too sandy	Fair: too sandy
34---------- Munden	Fair: wetness	Probable	Improbable: too sandy	Fair: thin layer
36---------- Tetotum	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
42---------- Dragston	Fair: wetness	Probable	Improbable: too sandy	Fair: thin layer
45---------- Augusta	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Fair: small stones
52---------- Nimmo	Poor: wetness	Probable	Improbable: too sandy	Poor: wetness, thin layer
55---------- Tomotley	Poor: wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
57---------- Acredale	Poor: low strength wetness	Probable	Improbable: too sandy	Poor; wetness
65---------- Portsmouth	Poor: wetness	Probable	Improbable: too sandy	Poor: wetness
67---------- Hyde	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness

TABLE 11

CONSTRUCTION MATERIALS - Continued

Soil Name and Map Symbol	Roadfill	Sand	Gravel	Topsoil
76---------- Dorovan	Poor: wetness	Probable	Improbable: too sandy	Poor: excess humus, wetness
81---------- Nawney	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness, too clayey

TABLE 12

WATER MANAGEMENT

(See Text for Definitions of "Slight", "Moderate", and "Severe")

Soil Name and Map Symbol	Limitations for----			Features Affecting---		
	Pond Reservoir Areas	Embankments, Dikes, and Levees	Aquifer-fed Excavated Ponds	Drainage	Terraces and Diversions	Grassed Waterways
21---------- Tarboro	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Too sandy	Droughty
24---------- Bojac	Severe: seepage	Severe: piping	Severe: cutbanks cave	Deep to water	Soil blowing	Droughty
31---------- Seabrook	Severe: seepage	Severe: seepage, piping	Severe: cutbanks cave	Cutbanks cave	Wetness	Droughty
34---------- Munden	Severe: seepage	Severe: seepage, wetness	Severe: cutbanks cave	Cutbanks cave	Wetness, too sandy, slow blowing	Favorable
36---------- Tetotum	Moderate: seepage	Severe: wetness	Severe: cutbanks cave	Favorable	Wetness	Favorable
42---------- Dragston	Severe: Seepage	Severe: piping, wetness	Severe: cutbanks cave	Cutbanks cave	Wetness, soil blowing	Wetness, droughty
45---------- Augusta	Moderate: seepage	Severe: piping, wetness	Moderate: slow refill	Favorable	Wetness	Wetness

TABLE 12

WATER MANAGEMENT - Continued

(See Text for Definitions of "Slight", "Moderate", and "Severe")

Soil Name and Map Symbol	Limitations for----			Features Affecting---		
	Pond Reservoir Areas	Embankments, Dikes, and Levees	Aquifer-fed Excavated Ponds	Drainage	Terraces and Diversions	Grassed Waterways
52---------- Nimmo	Severe: seepage	Severe: seepage, wetness	Severe: cutbanks cave	Cutbanks cave	Wetness too sandy	Wetness droughty
55---------- Tomotley	Moderate: seepage	Severe: piping, wetness	Severe: slow refill	Favorable	Wetness, erodes easily	Wetness, wetness, erodes easily
57---------- Acredale	Moderate: seepage	Severe: ponding	Slight	Ponding	Ponding	Percs slowly
65---------- Portsmouth	Severe: seepage	Severe: seepage, wetness	Severe: cutbanks cave	Cutbanks cave	Wetness, too sandy	Wetness
67---------- Hyde	Slight	Severe: wetness	Slight	Favorable	Wetness, erodes easily	Wetness, erodes easily
76---------- Dorovan	Moderate: seepage	Severe: excess humus ponding	Severe: cutbanks cave	Ponding, floods subsides	Ponding	Wetness
81---------- Nawney	Slight	Severe: hard to pack, wetness	Severe: slow refill	Percs slowly, floods	Erodes easily, wetness, percs slowly	Erodes easily, wetness, percs slowly

TABLE 13

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion Factors--T" apply to the entire profile. Entries under "Organic Matter" apply only to the surface layer.)

Soil Name and Map Symbol	Depth	Clay< 2mm	Moist Bulk Density	Permeability	Available Water Capacity	Soil Reaction	Shrink-Swell Potential	Erosion Factors		Organic Matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
21----------	0-6	2-12		6.0	0.05-0.09	4.5-6.0	Low----------	0.28	5	0.5-1
Tarboro	6-80	2-12		6.0	0.05-0.09	4.5-6.0		0.17		
24----------	0-8	3-8	1.20-1.50	2.0-6.0	0.10-0.18	3.6-6.5	Low----------	0.28	3	.5-2
Bojac	0-8	3-8	1.20-1.50	6.0-20	0.05-0.08	3.6-6.5	Low----------	0.28	3	.5-1
	8-47	11-16	1.35-1.55	2.0-6.0	0.08-0.17	3.6-6.5	Low----------	0.28		
	47-85	1-8	1.30-1.50	>6.0	0.02-0.07	4.5-6.0	Low----------	0.28		
31----------	0-40	2-12	1.60-1.75	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.10		0.5-2
Seabrook	40-80	2-12	1.60-1.75	6.0-20	0.03-0.07	4.5-5.5	Low----------	0.10		
34----------	0-8	3-12	1.20-1.35	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20	4	.5-1
Munden	0-8	4-16	1.20-1.35	2.0-6.0	0.06-0.15	4.5-6.0	Low----------	0.20	4	1-2
	8-32	8-18	1.20-1.35	0.6-2.0	0.08-0.17	4.5-6.0	Low----------	0.17		
	32-62	2-12	1.35-1.55	>2.0	0.04-0.08	4.5-6.0	Low----------	0.17		
36----------	0-9	5-15	1.20-1.40	2.0-6.0	0.08-0.15	3.6-5.5	Low----------	0.28	4	.5-2
Tetotum	0-9	10-22	1.20-1.35	0.6-2.0	0.14-0.19	3.6-5.5	Low----------	0.37	4	.5-2
	9-48	18-35	1.25-1.45	0.6-2.0	0.14-0.19	3.6-5.5	Low----------	0.32		
	48-72	5-30	1.25-1.45	0.6-20	0.06-0.15	3.6-5.5	Low----------	0.32		
42----------	0-9	4-12	1.20-1.50	2.0-6.0	0.08-0.15	4.5-5.5	Low----------	0.24	4	.5-1
Dragston	0-9	2-10	1.20-1.45	>6.0	0.06-0.11	4.5-5.5	Low----------	0.17	4	.5-1
	9-37	10-18	1.25-1.45	2.0-6.0	0.08-0.16	4.5-5.5	Low----------	0.17		
	37-66	2-12	1.35-1.55	>6.0	0.04-0.10	4.5-6.5	Low----------	0.17		

TABLE 13

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS - Continued

(The symbol < means less than; > means more than. Entries under "Erosion Factors--T" apply to the entire profile. Entries under "Organic Matter" apply only to the surface layer.)

Soil Name and Map Symbol	Depth	Clay< 2mm	Moist Bulk Density	Permeability	Available Water Capacity	Soil Reaction	Shrink-Swell Potential	Erosion Factors		Organic Matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
45----------	0-9	5-20		2.0-6.0	0.10-0.15	4.5-6.0	Low--------	0.15	4	.5-1
Augusta	0-9	10-25		0.6-2.0	0.15-0.22	4.5-6.0	Low--------	0.15	4	.5-2
	9-60	20-35		0.6-2.0	0.12-0.18	4.5-6.0	Low--------	0.24		
	60-70	3-10		2.0-6.0	0.06-0.12	4.5-6.0	Low--------	0.24		
52----------	0-7	4-14	1.20-1.35	2.0-6.0	0.06-0.15	3.6-5.5	Low--------	0.17	4	1-3
Nimmo	0-7	3-12	1.20-1.35	2.0-6.0	0.06-0.10	3.6-5.5	Low--------	0.17	4	1-2
	7-13	8-15	1.20-1.35	0.6-2.0	0.08-0.17	3.6-5.5	Low--------	0.17		
	33-60	1-8	1.35-1.55	>2.0	0.04-0.08	3.6-5.5	Low--------	0.17		
55----------	0-13	2-10	1.40-1.70	6.0-20	0.06-0.11	3.6-5.5	Low--------	0.17	5	1-6
Tomotley	0-13	5-20	1.30-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low--------	0.20	5	1-6
	0-13	5-27	1.20-1.40	2.0-6.0	0.12-0.18	3.6-5.5	Low--------	0.20	5	1-6
	13-44	18-35	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low--------	0.20		
	44-59	15-45	1.30-1.60	0.2-2.0	0.12-0.18	3.6-6.0	Low--------	0.20		
57----------	0-15	8-18	1.20-1.35	0.6-2.0	0.17-0.20	3.6-5.5	Low--------	0.37	3	1-4
Acredale	15-43	18-34	1.25-1.40	0.06-0.2	0.13-0.20	4.5-7.3	Moderate---	0.37		
	43-66	5-18	1.30-1.50	2.0-20.0	0.04-0.12	2.5-7.3	Low--------	0.24		
65----------	0-19	5-25	1.30-1.40	0.6-6.0	0.12-0.18	3.6-5.5	Low--------	0.24	5	3-15
Portsmouth	19-35	20-35	1.45-1.55	0.6-2.0	0.14-0.20	3.6-5.5	Low--------	0.28		
	35-38	8-18	1.40-1.60	2.0-6.0	0.06-0.10	3.6-5.5	Low--------	0.17		
	38-72	2-10	1.40-1.65	6.0-2.0	0.02-0.05	3.6-6.0	Low--------	0.17		

TABLE 13

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS - Continued

(The symbol < means less than; > means more than. Entries under "Erosion Factors--T" apply to the entire profile. Entries under "Organic Matter" apply only to the surface layer.)

Soil Name and Map Symbol	Depth	Clay< 2mm	Moist Bulk Density	Permeability	Available Water Capacity	Soil Reaction	Shrink-Swell Potential	Erosion Factors		Organic Matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
67----------	0-17	3-18	1.30-1.50	0.6-2.0	0.13-0.20	3.6-5.5	Low--------	0.17	5	4-15
Hyde	17-54	18-35	1.30-1.50	0.2-0.6	0.13-0.20	3.6-5.5	Low--------	0.43		
	54-72									
76----------	0-3		0.25-0.40	0.6-2.0	0.25-0.50	4.5-5.5				
Dorovan	3-74		0.35-0.55	0.6-2.0	0.25-0.50	4.5-5.5				
	74-99	5-20	1.40-1.65	6.0-20	0.05-0.08	4.5-5.5	Low--------			
81----------	0-10	15-35	1.20-1.40	0.2-0.6	0.12-0.18	4.5-6.0	Moderate---	0.32	5	2-6
Nawney	0-10	27-50	1.20-1.40	0.06-0.2	0.12-0.16	4.5-6.0	Moderate---	0.32		
	10-51	35-60	1.30-1.50	0.06-0.2	0.12-0.16	4.5-6.0	Moderate---	0.37		
	51-72	30-60	1.30-1.50	0.06-0.2	0.12-0.16	4.5-6.0	Moderate---	0.37		

TABLE 14

ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than.)

Soil Name and Map Symbol	Depth	USDA Texture	Classification		Fragments >3 inches	Percentage Passing Sieve Number---				Liquid Limit	Plasticity Index
			Unified	AASHTO		4	10	40	200		
	In				Pct						
21---------- Tarboro	0-6	l,lfs,fs	SM,SW-SM,SP-SM	A-2,A-1-B	0	100	100	40-70	10-35		NP
	6-80	ls,lfs,fs	SM,SW-SM,SP-SM	A-2	0	100	100	50-80	10-35		NP
24---------- Bojac	0-8	sl,fsl,l	SM,SC,ML,CL-ML,SM	A-2,A-4	0	95-100	95-100	55-100	30-60	<25	NP-7
	0-8	lfs,ls	SM	A-2	0	95-100	95-100	50-100	15-30	<20	NP
	8-47	fsl,l,sl	ML,SM	A-2,A-4	0	95-100	95-100	55-100	20-60	<35	NP-10
	47-85	sr-lfs-cos	SM,SP,SW-SM	A-1,A-2,A-3	0	80-100	75-100	12-100	2-35	<20	NP
31---------- Seabrook	0-40	ls,lfs,s	SM	A-2	0	100	90-100	51-95	13-30		NP
	40-80	s,ls,lfs	SP-SM,SM	A-2,A-3	0	100	90-100	51-95	5-30		NP
34---------- Munden	0-8	ls,lfs	SM,SM-SC	A-2,A-4	0	100	98-100	55-85	15-45	<18	NP-7
	0-8	sl,fsl,l	SM,SC,SM-SC	A-4	0	100	98-100	60-95	35-75	<22	NP-10
	8-32	sl,l,scl	SM,SC,SM-SC	A-2,A-4,A-6	0	100	98-100	60-95	30-75	<30	NP-15
	32-62	ls,fs,s	SM,SP-SM,SM-SC	A-2,A-3	0	100	98-100	50-90	5-35	<18	NP-7
36---------- Tetotum	0-9	fsl,sl	SM,ML	A-2,A-4	0	85-100	80-100	45-85	25-55	<30	NP-7
	0-9	l,sil	SM,SC,ML,CL	A-4,A-6	0	85-100	80-100	65-95	45-85	<30	NP-15
	9-48	scl,cl,sil	SC,CL	A-6,A-7	0-2	85-100	80-100	60-95	35-85	30-45	10-20
	48-72	sr,scl,lfs	SM,SC,ML,CL	A-2,A-4,A-6	0-2	80-100	75-100	50-95	15-75	<30	NP-15

TABLE 14

ENGINEERING INDEX PROPERTIES - Continued

(The symbol < means less than; > means more than.)

Soil Name and Map Symbol	Depth	USDA Texture	Classification		Frag-ments >3 inches	Percentage Passing Sieve Number---				Liquid Limit	Plas-ticity Index
			Unified	AASHTO		4	10	40	200		
	In				Pct						
42----------	0-9	fsl,sl,l	SM,SC,SM,SC	A-2,A-4	0	100	95-100	60-85	30-60	<20	NP-8
Dragston	0-9	lfs,ls	SM,SM-SC	A-2	0	100	95-100	50-90	15-35	<18	NP-7
	9-37	fsl,sl,l	SM,SC,SM-SC	A-2,A-4	0	100	95-100	60-85	30-60	<25	NP-10
	37-66	s,ls,fsl	SM,SP-SM,SM-SC	A-1,A-2,A-3	0	95-100	85-100	35-70	5-30	<18	NP-7
45----------	0-9	sl,fsl	SM,SM-SC	A-2,A-4	0	90-100	75-100	50-80	30-50	<25	NP-7
Augusta	0-9	sil,l	SM,CL-ML	A-4	0	90-100	75-100	75-100	51-75	<35	NP-10
	9-60	scl,cl,l	CL,CL-ML	A-4,A-6,A-7	0	90-100	75-100	75-95	51-80	20-45	5-25
	60-70	cosl,l,gr-ls	SM,SP-SM,ML,SM-SC	A-2,A-4,A-1	0	75-100	55-100	30-90	10-70	<25	NP-5
52----------	0-7	l,fsl,sl	SM,SC,SM-SC,ML	A-4	0	100	95-100	60-85	36-60	<22	NP-10
Nimmo	0-7	ls,lfs	SM,SM-SC	A-2,A-4	0	100	95-100	55-85	15-45	<18	NP-7
	7-33	l,fsl,sl	SM,SC,ML,CL	A-2,A-4,A-6	0	100	95-100	60-95	30-75	<30	NP-15
	33-60	ls,fs,s	SM,SP-SM,SM-SC	A-2,A-3	0	100	95-100	50-80	5-35	<18	NP-7
55----------	0-13	ls,lfs	SM	A-2	0	98-100	95-100	75-98	15-35	<25	NP-4
Tomotley	0-13	sl,fsl	SM	A-2,A-4	0	98-100	95-100	75-98	25-50	<30	NP-7
	0-13	sil,l	ML	A-4	0	98-100	95-100	75-100	51-98	<40	NP-10
	13-44	fsl,scl,cl	SM-SC,SC,CL-ML,CL	A-2,A-4,A-6	0	98-100	95-100	75-98	30-70	20-40	6-18
	44-59	fsl,scl,sc	SM-SC,SC,CL-ML,CL	A-4,A-6,A-7	0	98-100	95-100	75-98	30-75	20-45	6-22
	59-80	var									

TABLE 14

ENGINEERING INDEX PROPERTIES - Continued

(The symbol < means less than; > means more than.)

Soil Name and Map Symbol	Depth	USDA Texture	Classification		Frag-ments >3 inches	Percentage Passing Sieve Number---				Liquid Limit	Plas-ticity Index
			Unified	AASHTO		4	10	40	200		
	In				Pct						
57----------	0-15	sil,l,vfsl	CL,ML,CL-ML	A-4,A-6	0	100	100	80-100	50-90	<30	NP-15
Acredale	15-43	sil,sicl	CL	A-4,A-5,A-6, A-7	0	100	100	90-100	70-95	20-45	7-25
	43-66	sl,ls,s	SW-SM,SM,SC, SM-SC	A-2,A-3,A-4	0	100	100	55-75	5-35	<30	NP-15
65----------	0-19	sl,fsl,l	SM,SM-SC-ML	A-2,A-4	0	98-100	98-100	65-95	30-65	<30	NP-7
Portsmouth	19-35	l,scl,cl	SC,CL-ML,CL	A-4,A-6	0	98-100	98-100	75-95	36-70	18-40	7-18
	35-38	ls,sl	SM	A-2	0	98-100	98-100	50-70	13-35	<18	NP-4
	38-72	sr-cos-ls	SP-SM,SP,SM	A-1,A-2,A-3	0	98-100	98-100	45-65	3-20		NP
67----------	0-17	l,sil,vfsl	CL-ML,ML	A-4	0	100	98-100	85-100	60-90	<25	NP-7
Hyde	17-54	cl,l,sicl	CL	A-6,A-4,A-7	0	100	98-100	90-100	75-95	22-42	7-20
	54-72	Var									
76----------	0-3	mpt	PT		0						
Dorovan	3-74	muck	PT		0						
	74-99	s,ls,s	SP-SM,SM-SC, SM	A-1,A-3,A-4, A-2-4	0	100	100	5-70	5-40	<20	NP-7
81----------	0-10	sicl,sil,l	ML,CL,CL-ML	A-4,A-6,A-7	0	100	100	90-100	70-95	23-45	3-18
Nawney	0-10	sic,cl,c	ML,CL,MH,CH	A-6,A-7	0	100	100	90-100	75-98	35-75	12-40
	10-51	sicl,sic,c	CL,CH,ML,MH	A-6,A-7	0	100	100	95-100	85-98	35-75	12-40
	51-72	sicl,sic, scl	CL,CH,ML,MH	A-6,A-7	0	100	100	90-100	51-90	30-78	11-42

TABLE 15

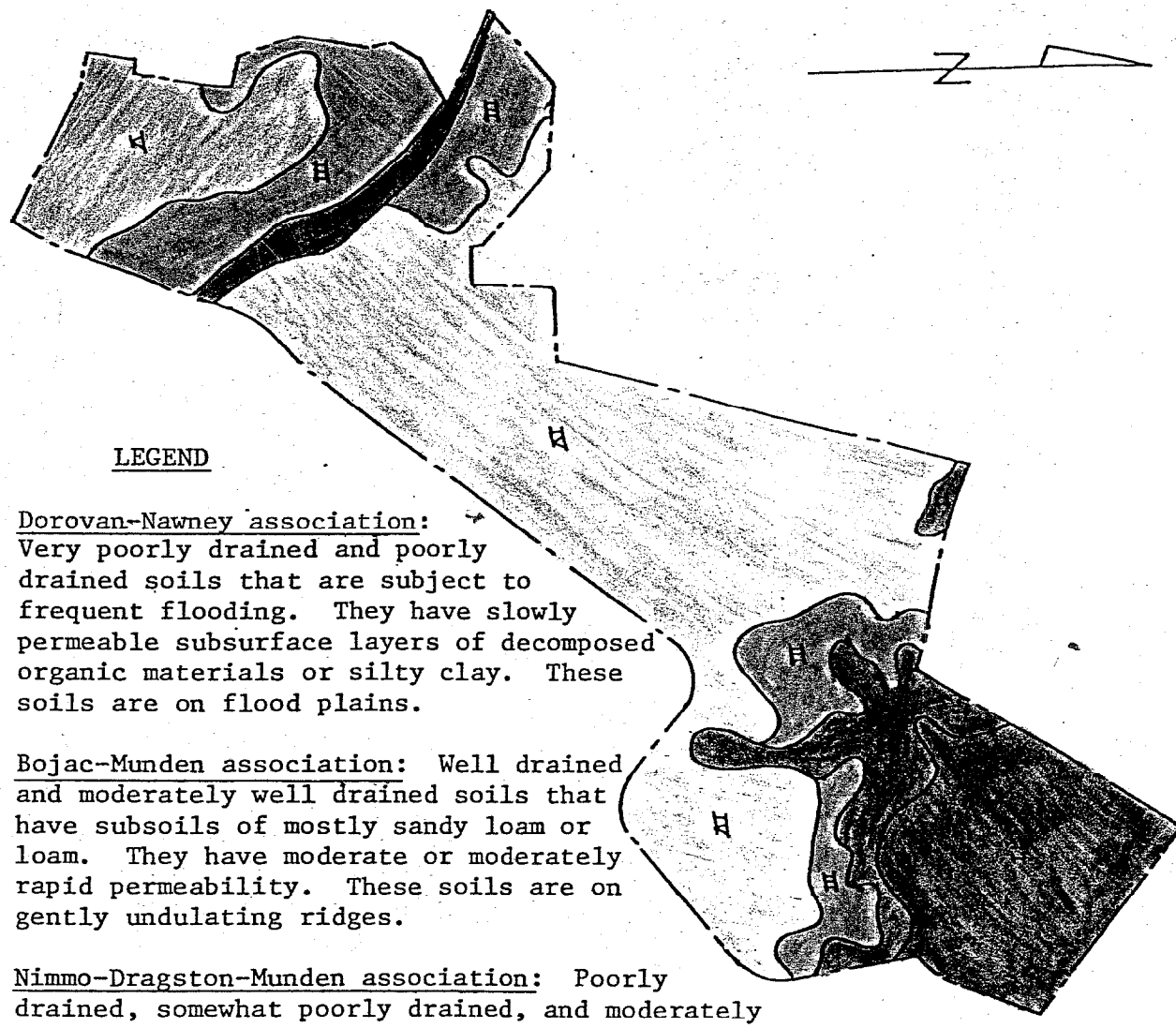
SOIL AND WATER FEATURES

Soil Name & Map Symbol	Hydrologic Group	Flooding			High Water Table			Bedrock		Risk of Corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated Steel	Concrete
21---------- Tarboro	A	None-Rare	---	---	6.0	---	---	60	---	Low	Moderate
24---------- Bojac	B	None	---	---	4.0	Apparent	Nov-Apr.	60	---	Low	High
31---------- Seabrook	C	None-Rare	---	---	1.5-3.0	Apparent	Dec-Apr.	60	---	Low	High
34---------- Munden	B	None	---	---	1.5-2.5	Apparent	Dec-Apr.	60	---	Low	High
36---------- Tetotum	C	None	---	---	1.5-2.5	Apparent	Dec-Apr.	60	---	High	High
42---------- Dragston	C	None	---	---	1.0-2.5	Apparent	Nov-Apr.	60	---	Low	High
45---------- Augusta	C	None-Common	Brief	Jan-May	1.0-2.0	Apparent	Jan-May	60	---	High	Moderate
52---------- Nimmo	D	None	---	---	0-0.5	Apparent	Dec-Apr.	60	---	Low	High
55---------- Tomotley	B/D	None-Rare	---	---	0-1.0	Apparent	Dec-Mar.	60	---	High	High
57---------- Acredale	C/D	None	---	Nov-May	+1-1.0	Apparent	Dec-Apr.	60	---	High	High

TABLE 15

SOIL AND WATER FEATURES - Continued

Soil Name & Map Symbol	Hydrologic Group	Flooding			High Water Table			Bedrock		Risk of Corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated Steel	Concrete
65--------- Portsmouth	D	Rare	---	---	0-1.0	Apparent	Dec-Apr.	60	---	High	High
67--------- Hyde	B/D	Rare	---	---	0-1.5	Apparent	Dec-Apr.	60	---	High	High
71--------- Ponzer	D	Rare	---	---	0-1.0	Apparent	Dec-May	60	---	High	High
76--------- Dorovan	D	Common	V.Long	Jan-Dec.	+1-0.5	Apparent	Jan-Dec.	60	---	High	High
81--------- Nawney	D	Common	V.Long	Dec-Apr.	0-1.0	Apparent	Nov-May	60	---	High	High



LEGEND

I Dorovan-Nawney association: Very poorly drained and poorly drained soils that are subject to frequent flooding. They have slowly permeable subsurface layers of decomposed organic materials or silty clay. These soils are on flood plains.

II Bojac-Munden association: Well drained and moderately well drained soils that have subsoils of mostly sandy loam or loam. They have moderate or moderately rapid permeability. These soils are on gently undulating ridges.

III Nimmo-Dragston-Munden association: Poorly drained, somewhat poorly drained, and moderately well drained soils that have subsoils of mostly sandy loam or loam. They have moderate or moderately rapid permeability. These soils are on toeslopes and broad flats.

IV Acredale-Tomotley association: Poorly drained soils that have subsoils of clay loam, silty clay loam, and silty clay. They have moderate to slow permeability. These soils are on broad flats and depressions.

V Portsmouth-Tomotley association: Very poorly drained and poorly drained soils that have moderately permeable subsoils of clay loam. In most places the topsoil is dark colored and enriched with organic matter. These soils are on broad flats and depressions.

GENERAL SOILS MAP
NALF FENTRESS
CHESAPEAKE, VA

Scale 1 : 38,400
1 inch = 3200 ft.

SOIL IDENTIFICATION ACCORDING TO DRAINAGE

NAVAL AUXILIARY LANDING FIELD - FENTRESS

CHESAPEAKE, VIRGINIA

I Soils that have been disturbed by construction activities

- 2 Urban land
- 12 Udorthents, loamy

II Well drained soils

- 21 Tarboro loamy sand, 0 to 8 percent slopes
- 24 Bojac fine sandy loam, 0 to 2 percent slopes

III Moderately well drained soils

- 31 Seabrook loamy fine sand, 0 to 2 percent slope
- 34 Munden fine sandy loam, 0 to 2 percent slope
- 36 Tetotum fine sandy loam, 0 to 2 percent slope

IV Somewhat poorly drained soils

- 42 Dragston fine sandy loam
- 45 Augusta fine sandy loam

V Poorly drained soils

- 52 Nimmo fine sandy loam
- 55 Tomotley loam
- 57 Acredale loam

VI Very poorly drained soils with thick dark colored surface layers

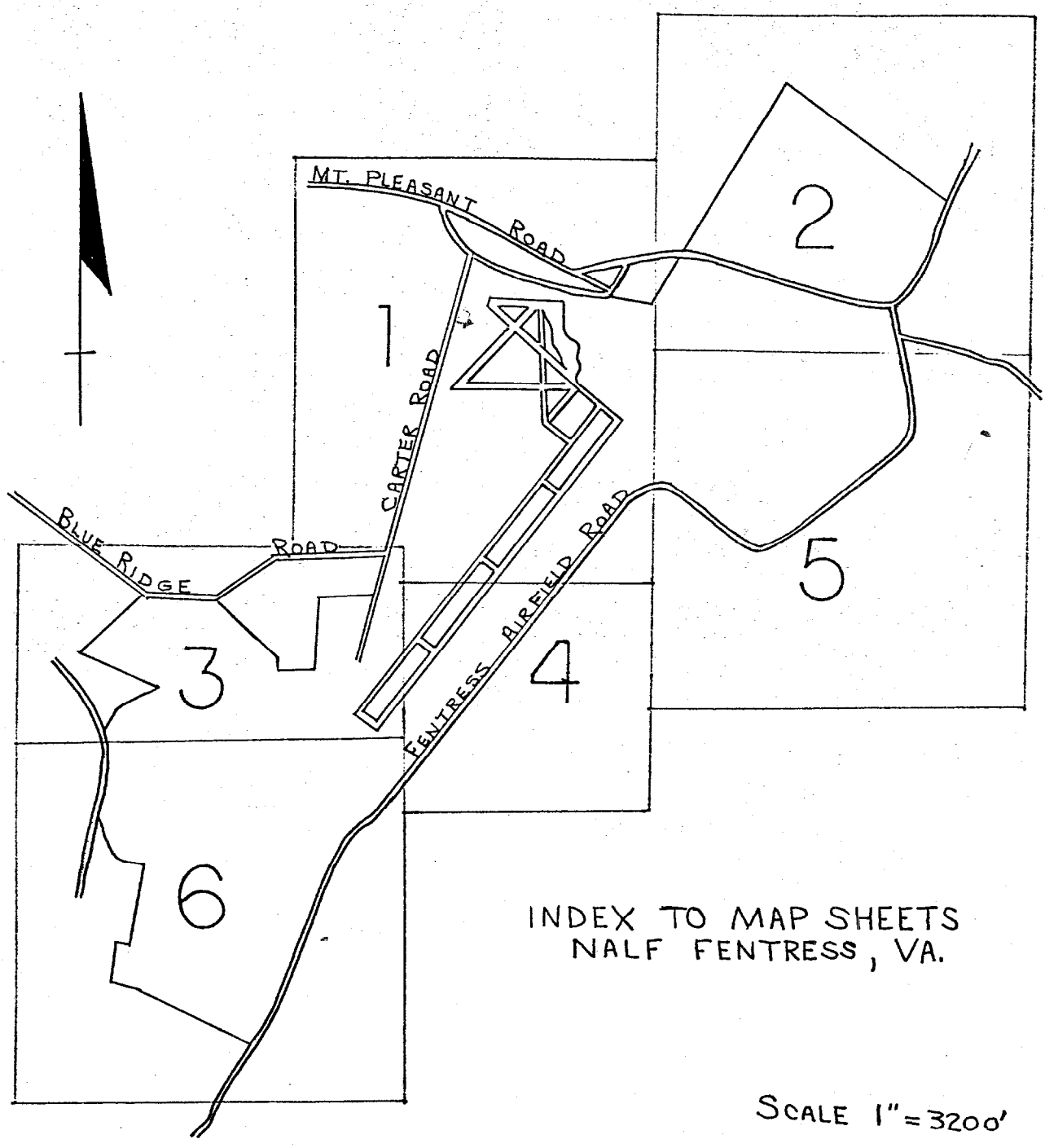
- 65 Portsmouth loam
- 67 Hyde silt loam

VII Very poorly drained organic soils

- 76 Dorovan muck

VIII Poorly drained soils of flood plains

- 81 Nawney silt loam



INDEX TO MAP SHEETS
NALF FENTRESS, VA.

SCALE 1" = 3200'

SOIL MAP MAP SHEET # 1

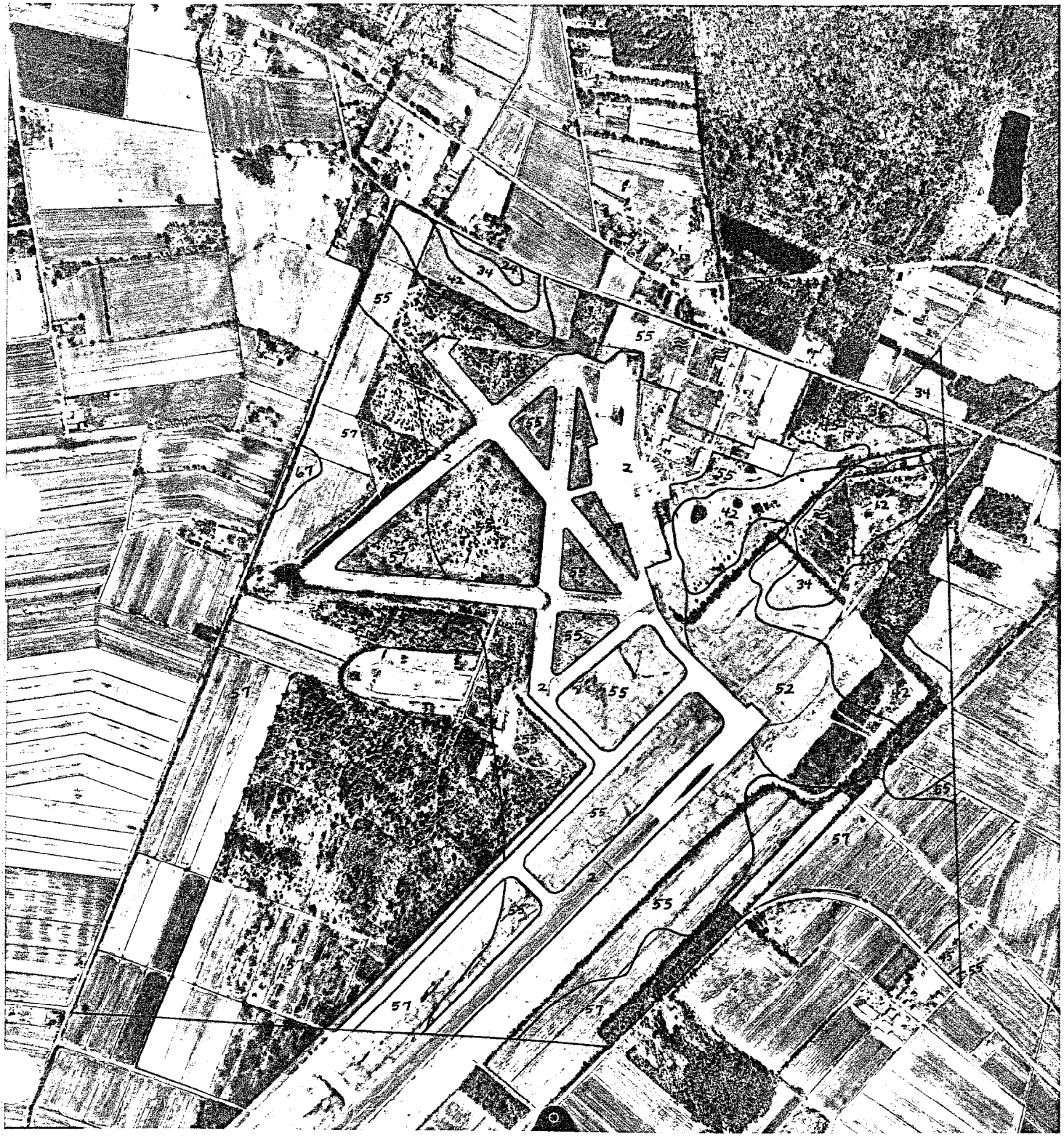
Owner NALF FENTRESS Operator

County CHESAPEAKE State VIRGINIA

Soil survey sheet(s) or code No.(s) Approx. scale 1:12000

N

PREPARED BY U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
COOPERATING WITH VIRGINIA DARE CONSERVATION DISTRICT.



SOIL MAP MAP SHEET # 2

Owner NALF FENTRESS Operator

County CHESAPEAKE State VIRGINIA

Soil survey sheet(s) or code No.(s) Approx. scale 1:12000

N

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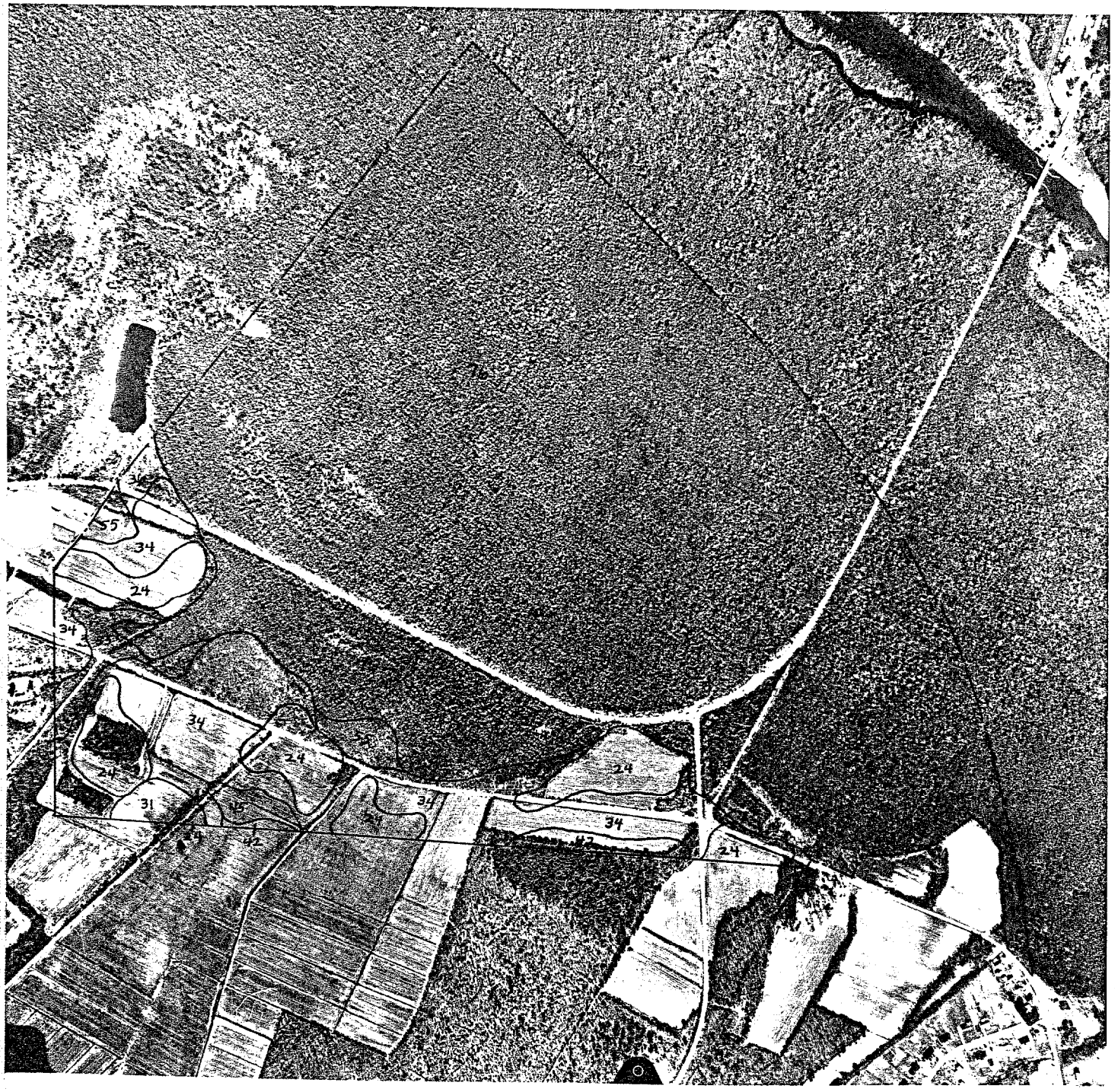

SOIL MAP

MAP SHEET #3

Owner NALF FENTRESS Operator

County CHESAPEAKE State VIRGINIA

Soil survey sheet(s) or code No.(s) Approx. scale 1:12000

N

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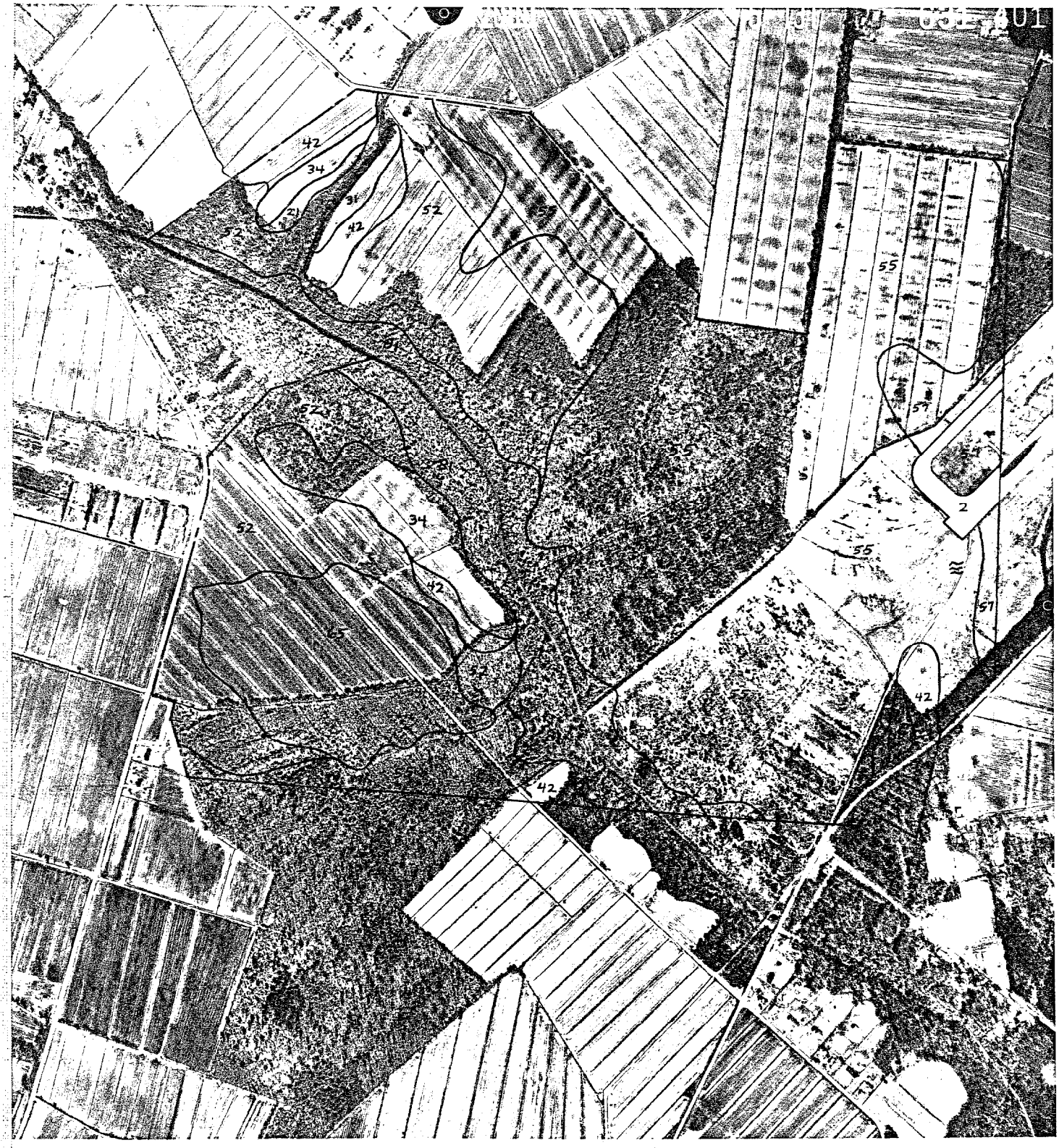

SOIL MAP

Map Sheet # 4

Owner Nale Fentress Operator

County Chesapeake State Virginia

Soil survey sheet(s) or code No.(s) Approx. scale 1:12000

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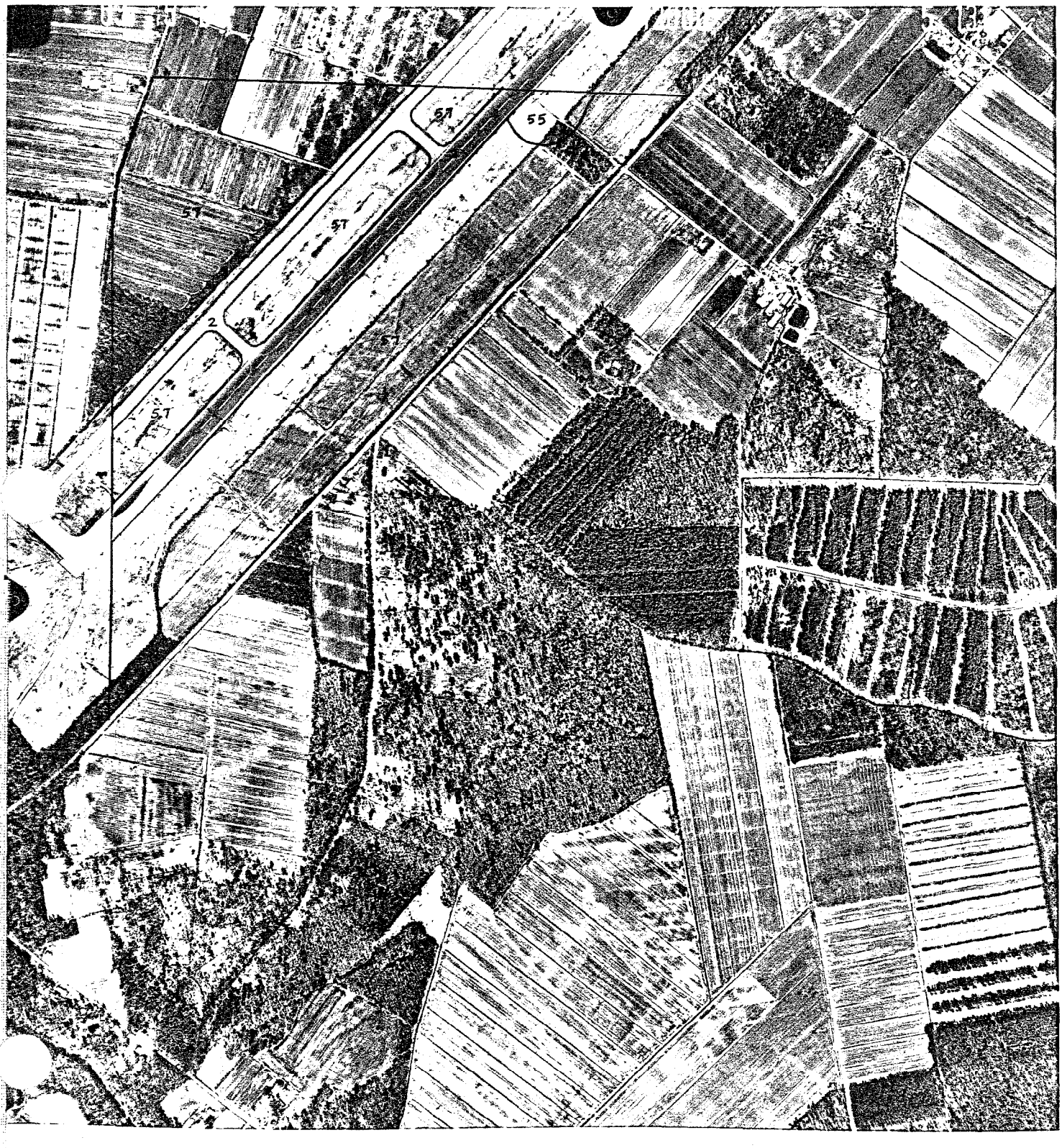

SOIL MAP

Map Sheet #5

Owner Nale Fentress Operator

County Chesapeake State Virginia

Soil survey sheet(s) or code No.(s) Approx. scale 1:12000

N

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COOPERATING WITH Virginia Dare CONSERVATION DISTRICT.