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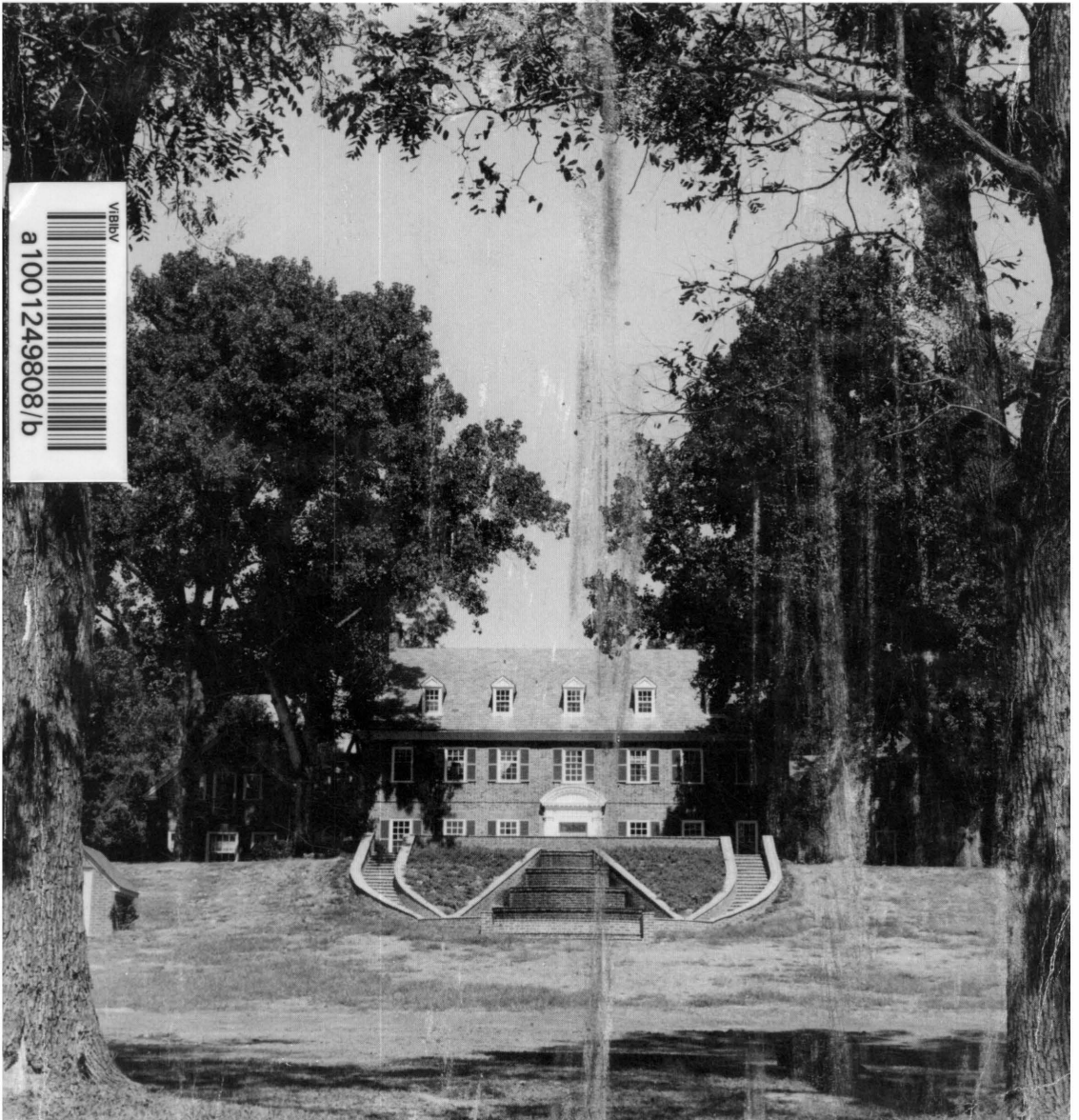
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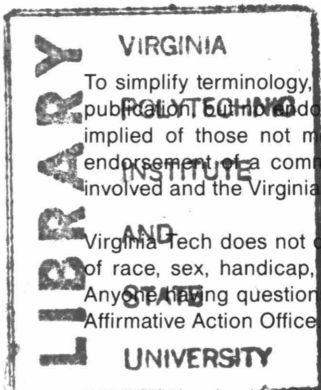
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SUPPLEMENTAL DATA FOR SOIL SURVEY OF CHARLES CITY COUNTY, VIRGINIA

VAES Bulletin 90-3

August 28, 1990

R. L. Hodges, P. J. Thomas, and W. J. Edmonds

Virginia Agricultural Experiment Station
Department of Crop and Soil Environmental Sciences
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061

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COVER PHOTOGRAPH: The manor house on Evelynton Plantation, as seen from Herring Creek, is on Pamunkey soils.

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Introduction

In 1988 the Department of Crop and Soil Environmental Sciences, Virginia Polytechnic Institute and State University, completed the soil survey of Charles City County. Cooperating agencies were the Soil Conservation Service of the United States Department of Agriculture, the Colonial Soil and Water Conservation District, and the Charles City County Board of Supervisors.

The soil survey enables users to determine the kinds of soils and their potential for land use within the county. Soil scientists observed steepness, length, and shape of slopes; size of streams and general pattern of drainage; kinds of native plants or crops; and kinds of sediments and rocks. They dug many pits to describe and sample soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material or unconsolidated sediments which have been changed little by plant roots.

Soil scientists produce soil maps when they draw boundaries of the kinds of soils observed in the survey area on aerial photographs. These photographs show trees, buildings, fields, roads, and other natural and cultural features that were used to locate soil boundaries. Soil map units are delineations of natural landscape units identified by the same symbol on soil maps. Most map units represent natural landscape units composed of one kind of soil or of soils with similar properties and responses to use and management. Other map units represent natural landscape units composed of two or more kinds of dissimilar soils.

Because the published soil survey does not include the laboratory data used to characterize, classify, and interpret the soils within the map units, this supplemental report presents these data. The published soil survey cannot present all possible interpretations for uses of the soils within the survey area because there may be uses of the soils possible that are not currently known to the authors. Therefore, data included in this publication can be used by professional agricultural workers and engineers to make interpretations for these soils not included in the published soil survey reports.

Materials and Methods

Data for typical and supplemental soil profiles in the map units are presented in the following order:

Morphological Descriptions

Morphology of each soil profile is described according to National Cooperative Soil Survey standards specified by Soil Survey Staff (1951, 1975) and USDA-SCS (1983).

Laboratory Procedures

Data for each soil profile are presented in the following tables:

Table A - Particle-size Distribution

Table A gives the distribution of:

1. Very coarse sand (2.0 - 1.0 mm)
2. Coarse sand (1.0 - 0.5 mm)
3. Medium sand (0.5 - 0.25 mm)
4. Fine sand (0.25 - 0.1 mm)
5. Very fine sand (0.1 - 0.05 mm)
6. Total sand (2.0 - 0.05 mm)
7. Silt (0.05 - 0.002 mm)
8. Clay (< 0.002 mm)

in g kg⁻¹ of soil determined by the hydrometer (Bouyoucos, 1962; Day, 1965) or the pipette (Day, 1965) methods.

Table B - Chemical Properties

Table B gives:

1. Exchangeable Ca²⁺, Mg²⁺, and K⁺ in cmol (+) kg⁻¹ of soil
2. Exchange acidity, H⁺, in cmol (+) kg⁻¹
3. Cation exchange capacity, CEC, estimated by:
CEC = Ca²⁺ + Mg²⁺ + K⁺ + H⁺ in cmol (+) kg⁻¹ of soil
4. Base saturation, BS, is estimated by: $BS = \frac{Ca^{2+} + Mg^{2+} + K^+}{CEC} \times 100$

with exchangeable Ca²⁺, Mg²⁺ and K⁺ determined by *N* NH₄OAc, pH 7.0, extraction with quantification by atomic absorption spectroscopy (USDA-SCA, 1972) and with exchange acidity (H⁺) determined by the BaCl₂-TEA, pH 8.2, method (USDA-SCS, 1972; Peech, 1965; Yuan, 1959).

Table C - Chemical Properties

Table C gives:

1. Organic matter content in g kg⁻¹ of soil
2. pH in -log[H⁺]
3. *N* KCl extractable Al³⁺ in cmol (+) kg⁻¹ of soil
4. Effective cation exchange capacity, ECEC, estimated by:
ECEC = Ca²⁺ + Mg²⁺ + K⁺ + Al³⁺ in cmol (+) kg⁻¹ of soil
5. Effective base saturation, EBS, is estimated by:
 $EBS = \frac{Ca^{2+} + Mg^{2+} + K^+}{ECEC} \times 100$

with organic matter content determined by the acid-dichromate digestion method (Allison, 1965), with soil reaction determined for 1-to-1 soil-to-water suspension using a glass electrode, and with exchangeable Al³⁺ determined by the KCl extraction method (McLean, 1965).

Soil Mineralogy

Samples pretreatment with H₂O₂ and NaOAc adjusted to pH 5.0 followed by citrate-dithionite-bicarbonate to remove organic matter and oxide coatings (Mehera and Jackson, 1958), respectively. Each sample was separated into sand, silt, and clay. Clay was separated from silt by centrifugation and decantation using dilute NaHCO₃ adjusted to pH 9.5, as a dispersant (Tanner and Jackson, 1947;

Jackson et al., 1950; Day, 1965; Jackson, 1979). About 250 mg of clay were deposited on a ceramic tile for X-ray diffraction analysis (Rich, 1969, Rich and Barnhisel, 1977). Gibbsite and kaolinite were estimated by integrating areas under respective differential scanning calorimeter endothermic peaks at approximately 280 °C and 520 °C and comparing with endothermic peaks of Reynolds synthetic gibbsite RH-31F and poorly crystalline Georgia kaolinite. Amounts of other clay minerals were made by proportioning integrated peak areas of appropriate x-ray diffractograms, using kaolinite as an internal standard, and assuming minerals detected were equal to 100. Sand was separated by wet sieving. Sand grains that passed the 40-mesh sieve were mounted in Canada balsam on glass slides. Minerals in the sand fraction were determined by the line-count method (Galehouse, 1971) using a Zeiss Universal M polarizing microscope.

Table D - Clay Mineralogy

Table D gives estimated amounts of minerals in the clay fraction in g kg^{-1} of clay.

Table E - Sand Mineralogy

Table E gives estimated amounts of minerals in the sand fraction in g kg^{-1} of sand.

Table F - Soil Test Data

Table F gives:

1. pH in $-\log[\text{H}^+]$
2. Ca^{2+} , Mg^{2+} , P, K^+ , Zn, and Mn in ppm

These properties were determined by procedures used by the Soil Testing Laboratory, Department of Crop and Soil Environmental Sciences, Virginia Tech, Blacksburg, Virginia 24061-0404 (Donohue and McCoy, 1972).

Table G - Electrical Conductivity

Table G gives:

1. Electrical conductivity (EC) in dS m^{-1}
2. Water, mineral matter, organic matter, and total S in g kg^{-1} of dry soil

Electrical conductivities were determined by the method 8A3a, moisture at saturation by method 8A, and mineral matter content by method 8F (USDA-SCS, 1972); organic matter contents by the acid-dichromate digestion method Allison (1965); and total sulfur by the simple turbidimetric method (Tabatabai and Bremner, 1970).

Table H - Moist Incubation pH

Table H gives changes in pH that result from the moist incubation method proposed for defining sulfidic soil materials (Van Breemen, 1982).

Table I - Water Soluble Cations, CEC, SAR

Table I gives:

1. Ca^{2+} , Mg^{2+} , K^+ , and Na^+ in $\text{cmol}(+) \text{ liter}^{-1}$ of extract
2. Cation exchange capacity (CEC) in $\text{cmol}(+) \text{ kg}^{-1}$
3. Sodium adsorption ratio (SAR) calculated by:

$$\text{SAR} = \frac{(\text{Na}^+)}{\frac{\sqrt{\text{Ca}^{2+} + \text{Mg}^{2+}}}{2}}$$

Water soluble Ca^{2+} , Mg^{2+} , K^+ , and Na^+ were determined by methods 6N1, 6O1, 6P1, and 6Q1, respectively, (USDA-SCS, 1972); and CEC determined by ammonium saturation, displacement, and distillation method (Chapman, 1965).

Table J - Cationic composition of the saturation extract

Table J gives the cationic composition of the saturation extract as a percent of the total observed cation.

Classification of the Soils

"When the fixed limits of soil taxa are superimposed on the fixed pattern of soils in nature, limits of taxonomic classes rarely, if ever, coincide precisely with mappable areas" (USDA, 1983, p. 602-603). Therefore, only the typical profiles are required to be members of the soil series used to name map units. Supplemental profiles may be members of other similar or dissimilar series.

This supplemental report is to be used in conjunction with the Soil Survey of Charles City County. Therefore, no interpretations for the map units or data are presented.

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Profile Descriptions and Data

Altavista Series

The Altavista series consists of very deep, moderately well drained soils on stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 3 percent.

Altavista fine sandy loam, cultivated, 0 to 2 percent slopes; 1.7 miles northeast of the junction of Highways VA-623 and VA-627, 1.1 miles northwest of the mouth of Parsons Creek, 1.0 mile southwest of the tip of Old Neck marsh; elevation 10 feet.

- Ap--0 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; few fine roots; common fine tubular pores; moderately acid; abrupt smooth boundary.
- BE--11 to 16 inches; light yellowish brown (10YR 6/4) loam; weak fine granular structure; friable, slightly sticky, nonplastic; few fine roots; common fine tubular and few fine vesicular pores; few fine flakes of mica; strongly acid; clear smooth boundary.
- Bt1--16 to 28 inches; light olive brown (2.5Y 5/4) loam; moderate medium and fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine and medium tubular pores; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.
- Bt2--28 to 37 inches; light olive brown (2.5Y 5/4) clay loam; common fine prominent light gray (10YR 6/1) mottles; weak medium and fine subangular blocky structure; friable, sticky, plastic; few fine roots; common fine tubular pores; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.
- Bt3--37 to 49 inches; mottled yellowish brown (10YR 5/8), light gray (10YR 6/1), and strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common faint clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.
- Btg--49 to 62 inches; light gray (10YR 6/1) sandy clay loam; common medium prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; common thick discontinuous clay films along vertical faces of some peds; few fine flakes of mica; extremely acid; clear smooth boundary.
- C--62 to 74 inches; streaked and mottled yellowish brown (10YR 5/6) and light gray (10YR 6/1) stratified fine sandy loam, loamy fine sand, and fine sand; single grain; compact in place; friable, slightly sticky, nonplastic; few fine flakes of mica; extremely acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-11	4	11	42	246	211	514	375	111
11-16	2	10	32	192	220	456	408	136
16-28	1	3	13	159	201	377	414	209
28-37	0	1	5	144	268	418	323	259
37-49	0	1	3	192	268	464	315	221
49-62	0	1	4	206	308	519	282	199
62-74	0	2	19	600	195	816	83	101

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-11	3.60	0.86	0.37	8.00	12.83	37.65
11-16	1.50	0.37	0.22	8.60	10.69	19.55
16-28	1.26	0.55	0.18	9.20	11.19	17.78
28-37	1.19	0.72	0.16	11.20	13.27	15.60
37-49	1.03	0.55	0.10	10.60	12.28	13.68
49-62	0.80	0.53	0.09	8.60	10.02	14.17
62-74	0.43	0.31	0.06	7.00	7.80	10.26
66	0.54	0.40	0.07	7.20	8.21	12.30

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
0-11	--	5.84	0.05	4.88	98.98
11-16	--	5.53	0.75	2.84	73.59
16-28	--	4.95	3.05	5.04	39.48
28-37	--	4.66	4.85	6.92	29.91
37-49	--	4.56	5.05	6.73	24.96
49-62	--	4.40	6.15	7.57	18.76
62-74	--	4.43	3.25	4.04	19.80
66	--	4.45	4.05	5.06	19.60

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
16-37	870	95	10	15	0	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-11	5.9	612	81	31	50	--	--
11-16	5.6	276	41	37	28	--	--
16-28	4.9	192	39	34	25	--	--
28-37	4.5	204	69	17	31	--	--
37-49	4.4	168	54	1	14	--	--
49-62	4.4	144	53	1	11	--	--
62-74	4.3	72	27	5	6	--	--

Augusta Series

The Augusta series consists of very deep, somewhat poorly drained soils on stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 2 percent.

Augusta sandy loam, cultivated, 0 to 2 percent slopes; 0.4 mile east of the junction of Highways VA-614 and VA-155, 30 yards north of Highway VA-614; elevation 35 feet.

Ap--0 to 8 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine and few coarse and medium roots; common fine and medium tubular pores; 2 percent quartz gravel up to 3/4 inch in diameter; moderately acid; abrupt smooth boundary.

E--8 to 13 inches; pale brown (10YR 6/3) sandy loam; common medium distinct light gray (10YR 6/1) mottles; weak medium granular structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; moderately acid; clear smooth boundary.

Bt--13 to 27 inches; light olive brown (2.5Y 5/4) sandy clay loam; few fine prominent light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and me-

dium tubular pores; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC--27 to 40 inches; mottled olive brown (2.5Y 4/4) and light gray (10YR 7/1) sandy loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Cg1--40 to 44 inches; grayish brown (2.5Y 5/2) gravelly loamy sand; common medium distinct light gray (10YR 7/1) mottles; single grain; loose; few fine and medium tubular pores; 23 percent quartz and weathered granite gneiss gravel up to 3/4 inch in diameter; few fine flakes of mica; very strongly acid; abrupt smooth boundary.

C--44 to 51 inches; reddish brown (5YR 4/4) gravelly coarse loamy sand; single grain; loose; few fine flakes of mica; 23 percent quartz and weathered granite gneiss gravel up to 3/4 inch in diameter; very strongly acid; gradual smooth boundary.

Cg2--51 to 72 inches; light brownish gray (10YR 6/2) stratified sand and gravelly sand; many coarse prominent strong brown (7.5YR 4/6) mottles; single grain; loose; 18 percent quartz gravel; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-8	45	135	253	268	253	19	720	219
8-13	56	103	235	280	22	696	220	84
13-27	54	112	206	238	14	624	176	200
27-40	69	133	280	270	12	764	79	157
40-44	170	259	306	133	4	872	45	83
44-51	291	302	238	59	3	893	5	102
51-72	268	377	280	43	2	970	2	28

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-8	1.93	0.79	0.10	4.20	7.02	40.17
8-13	0.51	0.33	0.05	3.60	4.49	19.82
13-27	1.15	0.50	0.10	5.40	7.15	24.48
27-40	0.68	0.23	0.06	4.60	5.57	17.41
40-44	0.27	0.09	0.04	3.20	3.60	11.11
44-51	0.27	0.10	0.04	0.20	0.61	67.21
51-72	0.10	0.04	0.01	2.20	2.35	6.38
63	0.05	0.04	0.01	0.20	0.30	33.33

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-8	--	5.66	0.05	2.87	98.26
8-13	--	5.78	0.45	0.89	66.42
13-27	--	5.00	2.75	4.50	38.89
27-40	--	4.96	3.15	4.12	23.54
40-44	--	4.83	1.75	2.15	18.60
44-51	--	4.86	1.65	2.06	19.90
51-72	--	5.07	0.35	0.50	30.00
63	--	5.24	0.15	0.25	40.00

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
13-27	925	30	0	5	20	20

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
inches		ppm					
0-8	5.8	396	103	27	48	0.8	10.4
8-13	5.7	156	57	11	29	0.3	4.4
13-27	4.8	240	55	6	29	0.2	2.4
27-40	4.7	108	21	9	17	0.1	1.1
40-44	4.6	60	11	10	11	0.1	0.6
44-51	4.5	60	11	10	12	0.1	0.7
51-72	4.8	48	7	8	8	0.2	0.9

Bethera Series

The Bethera series consists of very deep, poorly drained soils on upland flats and depressions. They formed in clayey fluvial and marine sediments. Slopes range from 0 to 2 percent.

Bethera silt loam, woodlands, 0 to 2 percent slopes; 0.6 mile north-northeast of the junction of Highways VA-618 and VA-602, 200 yards west of Highway VA-618; elevation 115 feet.

E1--0 to 4 inches; light gray (5Y 6/1) silt loam; moderate medium and fine granular structure; friable, slightly sticky, slightly plastic; many fine and few coarse roots; extremely acid; abrupt smooth boundary.

E2--4 to 7 inches; light gray (5Y 6/1) silt loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine granular structure; friable, slightly sticky, slightly plastic; common fine and few coarse roots; many very fine tubular pores; extremely acid; clear smooth boundary.

BEg--7 to 12 inches; light gray (5Y 6/1) silt loam; many fine prominent strong brown (7.5YR 5/8) mottles; weak medium and fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and coarse roots; many very fine tubular pores; very strongly acid; clear smooth boundary.

Btg1--12 to 40 inches; light gray (5Y 7/1) clay loam; many fine prominent yellowish brown (10YR 5/8), strong brown (7.5YR 5/6), and yellowish red (5YR 5/6) mottles; strong medium subangular blocky structure; firm, sticky, plastic; few fine and coarse roots; many very fine tubular pores; common distinct clay films on faces of peds and in pores; very strongly acid; gradual smooth boundary.

Btg2--40 to 72 inches; light gray (5Y 7/1) clay loam; few coarse prominent dark yellowish brown (10YR 3/6) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; few very fine tubular pores; common distinct clay films on faces of peds and in pores; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	5	6	28	128	114	282	612	106
4-7	4	6	25	124	125	284	608	108
7-12	1	2	25	116	132	276	582	142
12-40	0	0	13	77	110	202	445	353
40-72	0	2	17	117	129	266	453	281

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.07	0.08	0.06	13.13	13.34	1.57
4-7	0.03	0.03	0.03	3.38	3.47	2.59
7-12	0.04	0.03	0.03	8.16	8.26	1.21
12-40	0.05	0.21	0.05	12.94	13.25	2.34
40-72	0.04	0.18	0.03	9.35	9.60	2.60
62	0.06	0.17	0.04	8.16	8.43	3.20

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.18	3.80	4.01	5.24
4-7	--	4.46	2.25	2.34	3.85
7-12	--	4.57	2.60	2.70	3.70
12-40	--	4.70	5.70	6.01	5.16
40-72	--	4.72	5.10	5.35	4.67
62	--	4.80	5.55	5.82	4.64

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
12-40	130	100	0	520	50	20	0	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-4	4.1	36	8	1	17	0.5	0.6
4-7	4.3	24	3	1	6	0.3	0.3
7-12	4.4	24	7	1	17	0.4	0.6
12-40	4.5	12	17	0	8	0.2	0.2
40-72	4.5	12	15	0	6	0.2	0.3

Bibb Series

The Bibb series consists of very deep, poorly drained soils on low floodplains. They formed in loamy fluvial sediments. Slopes range from 0 to 2 percent.

Bibb fine sandy loam, woodlands, 0 to 2 percent slopes; 30 yards southeast of Highway VA-607 and West Run; elevation 35 feet.

A--0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine and medium roots; extremely acid; abrupt smooth boundary.

Ag--4 to 9 inches; gray (10YR 5/1) fine sandy loam; moderate medium granular structure; friable, slightly sticky, nonplastic; common fine roots; extremely acid; abrupt smooth boundary.

Cg1--9 to 31 inches; light gray (5Y 6/1) fine sandy loam; common medium prominent light olive brown (2.5Y 5/6) mottles; massive; friable, slightly sticky, slightly plastic; few fine roots; extremely acid; gradual smooth boundary.

Cg2--31 to 41 inches; greenish gray (5GY 6/1) fine sandy loam; common medium prominent light olive brown (2.5Y 5/6), strong brown (7.5YR 4/6), and yellowish brown (10YR 5/6) mottles; massive; friable, slightly sticky, slightly plastic; common fine roots; very strongly acid; clear smooth boundary.

Cg3--41 to 55 inches; light greenish gray (5GY 7/1) gravelly coarse loamy sand; single grain; loose; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	27	43	223	393	41	727	190	83
4-9	5	9	129	408	90	641	240	119
9-31	14	19	83	405	121	642	226	132
31-41	20	41	156	351	94	662	174	164
41-55	85	132	252	325	55	850	84	66

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.17	0.10	0.14	10.95	11.36	3.61
4-9	0.10	0.06	0.07	7.76	7.99	2.88
9-31	1.19	0.05	0.03	6.37	7.64	16.62
31-41	3.31	0.24	0.04	3.98	7.57	47.42
41-55	1.11	0.27	0.05	3.98	5.41	26.43

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	42.1	4.35	2.38	2.79	14.70
4-9	19.8	4.34	2.18	2.41	9.54
9-31	3.3	4.37	2.18	3.45	36.81
31-41	3.6	4.52	1.70	5.29	67.86
41-55	1.4	4.88	0.34	1.77	80.79

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
inches	g kg ⁻¹ of sand					
9-41	895	60	0	0	20	25

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
inches	ppm						
0-4	4.4	72	19	2	51	--	--
4-9	4.4	60	12	1	15	--	--
9-31	4.4	312	11	1	8	--	--
31-41	4.4	540	23	1	8	--	--
41-55	5.4	288	47	2	18	--	--

Bibb Series - Supplemental profile 1

Bibb silty clay loam, woodlands, 0 to 2 percent slopes; 100 yards southeast of Highway VA-607 and West Run; elevation 35 feet.

A--0 to 4 inches; black (5Y 2/1) silty clay loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common fine and medium roots; extremely acid; abrupt smooth boundary.

Cg1--4 to 39 inches; gray (5Y 5/1) clay; common medium prominent yellowish brown (10YR 5/8) mottles; massive; firm, sticky, plastic; common fine and few medium roots; extremely acid; gradual smooth boundary.

Cg2--39 to 51 inches; light gray (5Y 6/1) sandy clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; firm, sticky, plastic; few fine roots; extremely acid; clear wavy boundary.

Cg3--51 to 56 inches; light gray (5Y 6/1) gravelly sandy clay loam; common fine and medium prominent dark yellowish brown (10YR 4/6) mottles; massive; friable, sticky, plastic; common fine roots; 20 percent rounded quartz gravels and cobbles; extremely acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	37	30	32	36	16	152	463	385
4-39	5	10	61	209	66	352	210	438
39-51	11	23	106	311	85	537	150	313
51-56	15	21	149	402	100	687	86	227

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	1.40	0.77	0.54	46.17	48.88	5.54
4-39	2.96	0.79	0.10	17.91	21.76	17.69
39-51	2.50	0.62	0.10	15.12	18.34	17.56
51-56	1.69	0.43	0.08	13.33	15.53	14.17

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
0-4	215	3.74	9.46	12.17	22.27
4-39	9	4.20	8.97	12.82	30.03
39-51	5	4.12	7.32	10.54	30.55
51-56	2	4.12	6.35	8.55	25.73

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
4-39	90	80	50	380	20	380	0	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.0	132	33	4	53	--	--
4-39	4.5	588	95	1	20	--	--
39-51	4.3	374	59	1	17	--	--
51-56	4.2	300	48	1	14	--	--

Bibb Series - Supplemental profile 2

Bibb sandy loam, woodlands, 0 to 2 percent slopes; 170 yards southeast of Highway VA-607 and West Run; elevation 35 feet.

A--0 to 4 inches; dark gray (10YR 4/1) sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; common fine roots; extremely acid; abrupt smooth boundary.

E--4 to 8 inches; olive gray (5Y 5/2) fine sandy loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable, nonsticky, nonplastic; common fine roots; very strongly acid; abrupt smooth boundary.

CB--8 to 20 inches; yellowish brown (10YR 5/6) fine sandy loam; common medium prominent gray (10YR 5/1) mottles; moderate medium granular structure; friable, slightly sticky, nonplastic; few fine roots; extremely acid; clear smooth boundary.

Cg1--20 to 32 inches; mottled gray (10YR 5/1) and yellowish brown (10YR 5/8) sandy loam; massive; friable, nonsticky, nonplastic; few fine roots; very strongly acid; abrupt smooth boundary.

Cg2--32 to 50 inches; greenish gray (5GY 6/1) sandy clay loam; massive; firm, sticky, plastic; few fine roots; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	16	54	271	284	39	664	270	66
4-8	22	50	207	273	51	603	305	92
8-20	22	55	208	267	53	606	253	141
20-32	34	90	342	252	28	747	109	144
32-50	5	7	23	56	385	477	211	312

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.30	0.15	0.13	8.16	8.74	6.64
4-8	0.05	0.05	0.05	5.37	5.52	2.72
8-20	0.04	0.04	0.05	5.57	5.70	2.28
20-32	0.10	0.10	0.04	8.16	8.40	2.86
32-50	7.90	5.80	0.60	6.57	20.87	68.52

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	26	4.28	1.89	2.47	23.48
4-8	4	4.53	1.41	1.56	9.62
8-20	2	4.43	2.86	2.99	4.35
20-32	1	4.50	3.64	3.88	6.19
32-50	2	5.52	1.21	15.51	92.20

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.4	96	27	1	50	--	--
4-8	4.5	48	11	0	15	--	--
8-20	4.5	36	11	0	12	--	--
20-32	4.6	60	19	0	12	--	--
32-50	5.2	660	120	2	114	--	--

Bibb Series - Supplemental profile 3

Bibb silt loam, woodlands, 0 to 2 percent slopes; 1.3 miles north of the junction of Highways VA-106 and VA-603, 30 yards north of the junction of Highway VA-106 and Possum Run; elevation 80 feet.

A--0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam; massive; friable, sticky, plastic; many fine roots; very strongly acid; clear smooth boundary.

Bg1--4 to 8 inches; dark grayish brown (10YR 4/2) silt loam; massive; friable, sticky, plastic; common fine roots; very strongly acid; clear smooth boundary.

Bg2--8 to 24 inches; very dark grayish brown (2.5Y 3/2) loam; massive; friable, sticky, slightly plastic; very strongly acid; abrupt smooth boundary.

Cg--24 to 28 inches; light gray (5Y 6/1) coarse sand; single grain; friable, sticky, nonplastic; very strongly acid; abrupt smooth boundary.

Ab--28 to 32 inches; dark gray (5Y 4/1) loam; massive; friable, sticky, nonplastic; very strongly acid; abrupt smooth boundary.

Bgb--32 to 38 inches; black (5Y 2/2) loam; massive; friable, sticky, slightly plastic; very strongly acid; abrupt wavy boundary.

Cgb--38 to 60 inches; gray (5Y 5/1) coarse sand; single grain; loose; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg ⁻¹ of soil							
0-4	37	30	39	35	12	152	642	206
4-8	17	32	64	102	51	266	561	173
8-24	75	128	165	99	18	485	390	125
24-28	141	253	362	130	5	898	47	55
28-32	35	69	145	136	20	405	413	182
32-38	22	66	145	136	20	389	429	182
38-60	94	257	307	245	17	920	56	24

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
inches	cmol (+) kg ⁻¹					%
0-4	1.84	0.46	0.21	25.47	27.98	8.97
4-8	0.99	0.27	0.07	11.94	13.27	10.02
8-24	1.05	0.25	0.09	10.75	12.14	11.45
24-28	0.31	0.07	0.02	1.79	2.19	18.26
28-32	2.43	0.38	0.13	20.50	23.44	12.54
32-38	1.95	0.31	0.11	19.90	22.27	10.64
38-60	0.46	0.06	0.02	8.56	9.10	5.93
60	0.43	0.06	0.02	1.99	2.50	20.40

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.90	2.75	5.26	47.72
4-8	--	4.98	1.85	3.18	41.82
8-24	--	4.93	1.55	2.94	47.28
24-28	--	5.00	0.60	1.00	40.00
28-32	--	4.77	2.45	5.39	54.55
32-38	--	4.68	2.50	4.87	48.67
38-60	--	5.07	0.35	0.89	60.67
60	--	4.89	0.40	0.91	66.04

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
8-24	890	75	0	10	20	5

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	5.0	396	38	5	58	3.6	9.8
4-8	4.8	204	29	9	18	2.4	8.9
8-24	4.8	168	19	13	11	1.7	4.8
24-28	4.7	108	12	26	12	6.1	6.5
28-32	4.6	144	14	23	15	5.2	11.0
32-38	4.7	324	27	19	28	6.1	16.1
38-60	5.0	120	7	7	8	0.9	3.1

Bibb Series - Supplemental profile 4

Bibb loam, woodlands, 0 to 2 percent slopes; 1.5 miles south of the junction of Highway VA-618 and Chickahominy River, 1.3 miles west of the junction of Highways VA-155 and VA-610, 0.2 miles east of the end of Highway VA-610; (This soil was mapped as Johnston mucky sandy loam, but was included with soils of the Bibb series); elevation 50 feet.

A--0 to 9 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common fine and few medium roots; moderately acid; clear smooth boundary.

Bg--9 to 22 inches; dark gray (10YR 4/1) fine sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; few fine roots; moderately acid; abrupt smooth boundary.

C1--22 to 33 inches; olive (5Y 5/4) loamy fine sand; massive; friable, slightly sticky, nonplastic; slightly acid; abrupt smooth boundary.

Cg1--33 to 43 inches; greenish gray (5GY 6/1) fine sandy loam; massive; friable, slightly sticky, slightly plastic; neutral; abrupt smooth boundary.

Cg2--43 to 53 inches; gray (N 5) loamy fine sand; massive; friable, slightly sticky, slightly plastic; slightly acid; abrupt smooth boundary.

Oeb--53 to 59 inches; black (10YR 2/1) sand; massive; abrupt smooth boundary.

Cgb--59 to 72 inches; dark gray (5Y 4/1) very gravelly sand; single grain; loose; 50 percent rounded quartz and feldspar gravels; extremely acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg ⁻¹ of soil							
0-9	7	16	92	179	57	353	490	157
9-22	4	20	184	443	90	741	199	60
22-33	1	5	113	592	106	816	135	59
33-43	0	3	106	594	94	797	85	118
43-53	0	4	118	601	92	815	104	81
53-59	76	133	302	376	42	928	24	48
59-72	181	187	241	323	26	958	11	31

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-9	11.30	0.16	0.09	10.40	21.95	52.62
9-22	4.00	0.05	0.03	0.40	4.48	91.07
22-33	2.21	0.03	0.03	0.00	2.27	100.00
33-43	4.96	0.07	0.05	0.00	5.08	100.00
43-53	4.85	0.10	0.06	0.40	5.41	92.61
53-59	11.10	0.31	0.01	18.60	30.02	38.04
59-72	1.81	0.04	0.01	3.60	5.46	34.07

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-9	42	5.84	0.05	11.60	99.57
9-22	19	6.03	0.0	4.08	100.00
22-33	7	6.22	0.05	2.32	97.84
33-43	6	7.09	0.05	5.13	99.03
43-53	10	6.52	0.05	5.06	99.01
53-59	--	--	12.45	23.87	47.84
59-72	--	2.91	2.65	4.51	41.24

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
9-33	950	30	0	0	0	20

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>				<u>ppm</u>			
0-9	5.4	1200	11	4	18	1.5	3.7
9-22	5.7	636	6	4	8	0.3	1.4
22-33	7.1	528	7	2	12	0.2	1.7
33-43	7.8	768	12	2	18	0.3	3.4
43-53	3.4	984	12	2	18	0.3	3.4

Bibb Series - Supplemental profile 5

Bibb loam, woodlands, 0 to 2 percent slopes; 1.5 miles south of the junction of Highway VA-618 and Chickahominy River, 1.3 miles west of the junction of Highways VA-155 and VA-610, 0.2 miles east of the end of Highway VA-610; (This soil was mapped as Mantachie loam, but was included with soils of the Bibb series because of small acreage in Charles City County); elevation 50 feet

A--0 to 6 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine and few medium roots; moderately acid; abrupt smooth boundary.

Bg1--6 to 15 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; few fine roots; moderately acid; abrupt smooth boundary.

Bg2--15 to 28 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; few fine and medium roots; few fine flakes of mica; moderately acid; clear smooth boundary.

Cg1--28 to 42 inches; greenish gray (5GY 5/1) fine sandy loam; massive; friable, slightly sticky, slightly plastic; few fine roots; few fine flakes of mica; neutral; abrupt smooth boundary.

Cg2--42 to 64 inches; gray (N 5) loamy fine sand; massive; friable, slightly sticky, slightly plastic; slightly acid; abrupt smooth boundary.

Cg3--64 to 72 inches; fluid sands and highly weathered wood.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-6	32	52	135	147	118	484	412	104
6-15	15	55	154	248	86	559	367	74
15-28	5	17	158	430	87	697	226	77
28-42	3	12	91	507	120	733	159	108
42-64	7	20	173	511	87	798	111	91

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-6	8.90	0.26	0.12	10.60	19.88	46.68
6-15	6.50	0.70	0.03	6.60	13.20	50.00
15-28	6.14	0.06	0.03	5.20	11.43	54.51
28-42	5.89	0.06	0.06	3.80	9.81	61.26
42-64	6.69	0.10	0.06	2.60	9.45	72.49

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
0-6	46	5.94	0.05	9.33	99.46
6-15	33	5.88	0.05	6.65	99.25
15-28	22	5.76	0.05	6.28	99.20
28-42	7	6.55	0.00	6.01	100.00
42-64	11	6.47	0.05	6.90	99.26

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
15-42	890	85	0	5	20	0

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-6	5.9	1080	13	8	22	1.5	2.0
6-15	5.7	864	7	8	11	0.8	1.4
15-28	4.7	1056	8	4	11	0.6	0.9
28-42	6.7	1140	11	7	26	0.4	0.4
42-64	3.8	972	15	5	25	0.9	1.7

Bojac Series

The Bojac series consists of very deep, well drained soils on terraces adjacent to major streams. They formed in loamy fluvial sediments. Slopes range from 0 to 6 percent.

Bojac loamy fine sand, cultivated, 0 to 2 percent slopes; 0.7 mile southeast of the end of Highway VA-619, 1.5 miles southwest of the mouth of Kittewan Creek, 1.2 miles northeast of tip of Weyanoke Point; elevation 7 feet.

Ap--0 to 10 inches; dark brown (7.5YR 3/4) loamy fine sand; weak fine granular structure; very friable, nonsticky, nonplastic; common fine roots; common fine and medium tubular pores; few fine flakes of mica; very strongly acid; clear smooth boundary.

Bt--10 to 35 inches; dark brown (7.5YR 4/4) sandy loam; weak coarse subangular blocky structure; very friable, slightly sticky, slightly plastic; few fine roots; common fine and medium tubular pores; many clay coatings on sand grains and many clay bridges between sand grains; few fine flakes of mica; moderately acid; gradual smooth boundary.

C--35 to 70 inches; strong brown (7.5YR 4/6) loamy sand; single grain; loose; common fine and medium tubular pores; common fine flakes of mica; slightly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
10-30	5	76	204	277	84	645	213	142

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
10-30	2.28	0.61	0.17	0.99	4.05	75.56
60	0.96	0.14	0.05	0.40	1.55	74.19

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
10-30	1	5.90	0.10	3.16	96.84
60	0	6.14	0.10	1.25	92.00

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
10-30	865	60	0	10	0	65

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Caroline Series

The Caroline series consists of very deep, well drained soils on uplands. They formed in clayey fluvial and marine sediments. Slopes range from 2 to 10 percent.

Caroline silt loam, in an area of Caroline-Emporia complex, cultivated, 2 to 6 percent slopes; 0.3 mile north of the junction of Highways VA-603 and VA-622, 0.6 mile north of the junction of Highways VA-603 and VA-106, 0.5 mile southwest of crossing of two Virginia Power transmission lines, 50 yards east of Highway VA-106; elevation 152 feet.

Ap--0 to 5 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable, slightly sticky, nonplastic; many fine and medium and few coarse roots; common fine and medium tubular pores; neutral; abrupt smooth boundary.

Bt1--5 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable, sticky, plastic; common fine and medium and few coarse roots; common fine and medium tubular pores; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2--14 to 29 inches; strong brown (7.5YR 5/6) clay; few medium distinct yellowish red (5YR 5/6) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and medium and few coarse roots; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3--29 to 52 inches; strong brown (7.5YR 5/6) clay; common medium distinct yellowish red (5YR 5/6) and yellowish brown (10YR 5/6) and common medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and few medium roots; common fine tubular pores; many distinct clay films on faces of peds and bridges between sand grains; extremely acid; diffuse smooth boundary.

Bt4--52 to 70 inches; variegated red (2.5YR 4/6), light gray (10YR 6/1), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few medium roots; few fine tubular pores; many distinct clay films on faces of peds; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg^{-1} of soil							
0-5	2	9	34	157	140	342	521	137
5-14	0	3	5	8	17	33	697	270
14-29	2	5	18	93	79	198	389	413
29-52	0	5	12	84	75	176	337	487
52-70	1	6	11	96	89	204	351	445

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-5	2.68	1.42	0.32	0.20	4.62	95.67
5-14	1.66	1.09	0.15	5.40	8.30	34.94
14-29	1.35	1.00	0.09	9.80	12.24	19.93
29-52	0.30	0.52	0.04	10.80	11.66	7.38
52-70	0.04	0.34	0.03	10.40	10.81	3.79

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-5	--	7.05	0.05	4.47	98.88
5-14	--	4.92	1.55	4.45	65.17
14-29	--	4.55	3.95	6.39	38.18
29-52	--	4.36	6.65	7.51	11.45
52-70	--	4.68	7.15	7.56	5.42

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
5-29	990	0	0	0	0	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-5	6.9	684	120	36	80	0.8	6.8
5-14	4.9	336	120	5	37	0.4	1.0
14-29	4.5	240	95	1	17	0.2	0.5
29-52	4.3	84	51	1	9	0.2	0.3
52-70	4.5	48	36	1	8	0.2	0.2

Catpoint Series

The Catpoint series consists of very deep, somewhat excessively drained soils on stream terraces. They formed in sandy fluvial and marine sediments. Slopes range from 0 to 4 percent.

Catpoint loamy sand, woodlands, 0 to 4 percent slopes; 1.1 miles east-northeast of Highway VA-614 and Collins Run on Virginia Division of Forestry fire trail 1501, 0.8 mile northeast of junction Highway VA-614 and Virginia Division of Forestry fire trail 1501, 0.2 mile south of Chickahominy River; elevation 25 feet.

A--0 to 8 inches; dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; common fine, medium, and coarse tree roots; common medium discontinuous tubular pores; very strongly acid; clear wavy boundary.

E--8 to 24 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; few fine and medium tree roots; common medium discontinuous tubular pores; very strongly acid; gradual smooth boundary.

E and Bt1--24 to 41 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; loose; yellowish brown (10YR 5/6) loamy fine sand; weak fine granular structure; very friable lamellae; common fine and medium roots; common fine discontinuous pores; very strongly acid; clear smooth boundary.

E and Bt2--41 to 66 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; strong brown (7.5YR 5/6) loamy sand lamellae; weak fine granular structure; very friable; common fine and few coarse tree roots; common medium discontinuous tubular pores; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-8	7	38	240	497	62	844	102	54
8-24	4	20	173	608	87	892	64	44
24-41	1	10	173	587	88	859	61	80
41-66	1	15	244	647	38	946	18	36

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-8	0.40	0.12	0.08	9.20	9.80	6.12
8-24	0.17	0.06	0.03	2.60	2.86	9.09
24-41	0.40	0.12	0.05	3.80	4.37	13.04
41-66	0.64	0.12	0.04	0.80	1.60	50.00
60	0.90	0.23	0.04	1.00	2.17	53.92

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-8	--	4.26	1.55	2.15	27.91
8-24	--	4.77	0.75	1.01	25.74
24-41	--	4.72	1.65	2.22	25.68
41-66	--	5.26	0.25	1.05	76.19
60	--	5.54	0.05	1.22	95.90

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
24-41	920	45	10	0	0	25

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Chickahominy Series

The Chickahominy series consists of very deep, poorly drained soils on stream terraces and flats along the Chickahominy and James Rivers. They formed in clayey fluvial sediments. Slopes range from 0 to 2 percent.

Chickahominy loam, woodlands, 0 to 2 percent slopes; 1.2 miles northwest of Highway VA-5 bridge and Chickahominy River, 30 yards south of Highway VA-5, 1.3 miles north of mouth of Tomahund Creek, 0.9 mile southwest of mouth of Morris Creek; elevation 38 feet.

A--0 to 2 inches; dark grayish brown (2.5Y 4/2) loam; moderate medium and fine granular structure; friable, sticky, plastic; many fine, medium, and coarse roots; few fine tubular pores; extremely acid; abrupt smooth boundary.

E--2 to 5 inches; dark grayish brown (10YR 4/2) loam; common fine prominent light olive brown (2.5Y 5/4) mottles; moderate medium granular structure; friable, sticky, plastic; many fine, medium, and coarse roots; common very fine tubular pores; extremely acid; clear smooth boundary.

Btg1--5 to 35 inches; grayish brown (10YR 5/2) clay; common fine prominent yellowish brown (10YR 5/6) mottles; strong medium and fine subangular blocky structure; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; few fine flakes of mica; extremely acid; gradual smooth boundary.

Btg2--35 to 50 inches; gray (10YR 5/1) clay; many coarse prominent yellowish brown (10YR 5/6) mottles; strong medium and coarse angular blocky structure; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; extremely acid; gradual wavy boundary.

Btg3--50 to 64 inches; light gray (10YR 6/1) clay; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular and angular blocky structure; firm, sticky, plastic; many distinct clay films on faces of peds; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
5-35	0	2	4	84	107	197	395	408

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
inches	cmol (+) kg ⁻¹					%
5-35	0.35	0.58	0.16	14.85	15.94	6.84
55	0.31	1.01	0.16	10.89	12.37	11.96

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
5-35	3	4.34	11.05	12.14	8.98
55	1	4.56	9.75	11.23	13.18

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
5-35	230	120	40	350	20	16	0	0

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Chickahominy Series - Supplemental profile 1

Chickahominy loam, ponded, woodlands, 0 to 2 percent slopes; 1.3 miles south of the junction of Highways VA-623 and VA-627, 0.2 mile southwest of the junction of Highways VA-621 and VA-623, 170 yards west of Highway VA-623; elevation 32 feet

A--0 to 4 inches; black (5Y 2/1) loam; weak fine granular structure; friable, sticky, slightly plastic; common fine roots; few fine tubular pores; extremely acid; abrupt smooth boundary.

B_{Ag}--4 to 8 inches; dark gray (5Y 4/1) loam; few fine and coarse prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common very fine tubular pores; extremely acid; abrupt smooth boundary.

B_{tg1}--8 to 25 inches; dark gray (N 4) clay; common medium prominent olive yellow (2.5Y 6/8) mottles; strong fine angular blocky structure; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

B_{tg2}--25 to 47 inches; light gray (5Y 6/1) clay; common medium prominent yellowish brown (10YR 5/8) mottles; strong medium angular and subangular blocky structure; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

B_{Cg}--47 to 64 inches; light gray (5Y 7/1) clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, plastic; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Cg--64 to 72 inches; mottled light gray (5Y 7/1), yellowish brown (10YR 5/8), and strong brown (7.5YR 5/6) fine sandy loam; massive; friable, sticky, plastic; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	8	22	44	200	106	380	407	213
4-8	3	8	44	190	110	355	442	203
8-25	2	5	22	143	90	262	297	441
25-47	2	1	16	153	113	286	297	417
47-64	0	1	13	209	165	388	342	270
64-72	0	1	3	325	209	539	302	160

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.47	0.40	0.18	19.70	20.75	5.06
4-8	0.43	0.35	0.14	16.12	17.04	5.40
8-25	1.01	0.85	0.10	18.51	20.47	9.57
25-47	0.42	1.40	0.14	17.91	19.87	9.86
47-64	0.14	1.80	0.16	14.13	16.23	12.94
64-72	0.16	1.76	0.11	8.16	10.19	19.92
58	0.10	1.40	0.12	8.96	10.60	15.28

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.06	7.05	8.10	12.96
4-8	--	4.25	6.80	7.72	11.92
8-25	--	4.55	11.15	13.11	14.95
25-47	--	4.65	12.95	14.91	13.15
47-64	--	4.78	10.20	12.30	17.07
64-72	--	4.88	6.25	8.28	24.52
58	--	4.80	8.10	9.74	16.84

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
8-25	60	100	100	390	40	300	0	10

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-4	4.0	72	26	2	36	1.8	1.3
4-8	4.3	72	29	1	25	1.1	1.1
8-25	4.6	156	75	0	12	0.8	0.7
25-47	4.5	48	111	0	18	1.2	0.4
47-64	4.7	24	95	0	15	1.1	0.2
64-72	4.8	36	120	0	17	1.7	0.4

Conetoe Series

The Conetoe series consists of very deep, well drained soils on stream terraces. They formed in fluvial sediments. Slopes range from 0 to 4 percent.

Conetoe loamy sand, woodlands, 0 to 4 percent slopes; 2.2 miles west of Walkers Dam on Virginia Department of Forestry fire trail 1501, 0.8 mile west-southwest of Cypress Bank Landing, 0.5 mile southwest of center line of Chickahominy River; elevation 25 feet.

A--0 to 5 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; many medium and few fine tree roots; common medium discontinuous tubular pores; extremely acid; gradual smooth boundary.

E--5 to 22 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; very friable; common medium and fine tree roots; common medium discontinuous tubular pores; very strongly acid; gradual smooth boundary.

Bt1--22 to 42 inches; strong brown (7.5YR 5/6) sandy loam; weak fine granular structure; friable; few fine and medium tree roots; few medium discontinuous tubular pores; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt2--42 to 50 inches; yellowish brown (10YR 5/6) loamy fine sand; single grain and weak fine granular structure; loose and very friable; common fine and medium tree roots; common medium discontinuous tubular pores; few fine flakes of mica; strongly acid; gradual smooth boundary.

C--50 to 72 inches; very pale brown (10YR 7/3) sand; thin lamellae of yellowish brown (10YR 5/6) loamy sand; single grain; loose; few fine tree roots; common medium discontinuous tubular pores; few fine flakes of mica; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-5	10	75	341	373	63	862	74	64
5-22	9	57	331	373	68	839	94	67
22-42	5	42	282	357	85	776	108	116
42-50	22	60	326	425	59	892	42	66
50-72	16	97	508	330	18	969	2	29

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-5	0.17	0.07	0.05	5.20	5.49	5.28
5-22	0.21	0.08	0.03	1.40	1.72	18.60
22-42	1.18	0.04	0.05	3.00	4.63	35.21
42-50	0.50	0.25	0.04	1.20	1.99	39.70
50-72	0.21	0.15	0.02	4.60	4.98	7.63
72	0.19	0.10	0.02	1.40	1.71	18.13

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-5	--	3.98	1.35	1.64	17.68
5-22	--	4.83	0.85	1.17	27.35
22-42	--	5.31	0.75	2.02	62.87
42-50	--	5.25	0.85	1.64	48.17
50-72	--	5.35	0.35	0.73	52.05
72	--	5.46	0.25	0.56	55.36

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
22-42	885	65	15	15	0	20

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Craven Series

The Craven series consists of very deep, moderately well drained soils on uplands. They formed in clayey fluvial and marine sediments. Slopes range from 2 to 10 percent.

Craven loam, cultivated, 2 to 6 percent slopes; 70 yards south of Nance Shop Historic Marker on Highway VA-603, 0.6 mile west-southwest of the junction of Highways VA-603 and VA-609 at the communication tower, 1.0 mile east-northeast of the junction of Highways VA-603 and VA-605; elevation 130 feet.

Ap--0 to 10 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; common coarse, medium, and fine roots; common fine and medium tubular pores; strongly acid; abrupt smooth boundary.

Bt1--10 to 22 inches; strong brown (7.5YR 5/6) clay; common fine prominent red (2.5YR 5/8) and common fine distinct yellowish brown (10YR 5/6) mottles; strong fine angular blocky structure; firm, sticky, plastic; few medium and coarse roots; few fine tubular pores; many distinct clay films on faces of peds; common fine flakes of mica; strongly acid; clear smooth boundary.

Bt2--22 to 36 inches; mottled strong brown (7.5YR 5/8), light gray (10YR 7/1), red (2.5YR 5/8), yellowish red (5YR 5/8), and yellowish brown (10YR 5/6) clay; strong fine angular blocky structure; firm, sticky, plastic; common fine and few medium roots; many distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Bt3--36 to 45 inches; mottled strong brown (7.5YR 5/8), light gray (10YR 6/1), reddish brown (2.5YR 5/4), and yellowish red (5YR 5/8) clay; strong medium angular blocky structure; firm, sticky, plastic; few fine roots; few distinct clay films on faces of peds; few fine flakes of mica; extremely acid; gradual smooth boundary.

BCg--45 to 70 inches; mottled and streaked light gray (10YR 7/1), reddish brown (2.5YR 5/4), and strong brown (7.5YR 5/8) stratified clay and clay loam; moderate coarse angular blocky structure in Bt part and massive in C part; friable, sticky, plastic; few fine roots; few fine flakes of mica; extremely acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-10	8	11	41	178	174	411	470	119
10-22	1	3	8	75	70	157	358	485
22-36	5	4	4	47	85	145	280	575
36-45	4	8	8	56	91	168	320	512
45-70	12	16	11	100	137	276	370	354

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-10	5.45	0.71	0.56	4.40	11.12	60.43
10-22	6.19	1.59	0.40	6.60	14.78	55.35
22-36	3.02	1.22	0.41	14.40	19.05	24.41
36-45	1.50	0.85	0.31	15.40	18.06	14.73
45-70	0.26	0.34	0.15	12.00	12.75	5.88

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	5.58	0.05	6.77	99.26
10-22	--	5.31	0.95	9.13	89.59
22-36	--	4.60	8.15	12.80	36.33
36-45	--	4.45	10.45	12.71	17.78
45-70	--	4.30	8.55	9.30	8.06

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
10-36	90	180	50	480	20	180	0	0

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-10	5.7	960	68	42	157	--	--
10-22	5.5	864	120	2	122	--	--
22-36	4.5	324	93	1	96	--	--
36-45	4.1	60	30	1	26	--	--
45-70	4.4	228	79	1	75	--	--

Photo 1. These native American Indians are walking across a parking area on Craven soils. About 600 Chickahominy Indians, an integral part of Charles City County, are current residents.



Dogue Series

The Dogue series consists of very deep, moderately well drained soils on stream terraces. They formed in clayey fluvial sediments. Slopes range from 0 to 10 percent.

Dogue silt loam, cultivated, 0 to 2 percent slopes; 0.6 mile south of the junction of Highways VA-618 and VA-5, 120 yards southwest of the junction of Highway VA-618 and farm lane, 20 yards west of farm lane; elevation 40 feet.

Ap--0 to 12 inches; grayish brown (10YR 5/2) silt loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; few fine roots; common fine tubular pores; slightly acid; abrupt smooth boundary.

Bt1--12 to 24 inches; yellowish brown (10YR 5/8) clay; common medium distinct light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common distinct clay films on faces of ped; few fine flakes of mica; very strongly acid; clear smooth boundary.

Bt2--24 to 36 inches; mottled yellowish brown (10YR 5/8), light yellowish brown (10YR 6/4), red (2.5YR 4/8), and light gray (N 6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common faint clay films on faces of ped; few fine flakes of mica; extremely acid; clear smooth boundary.

Bt3--36 to 52 inches; mottled red (2.5YR 4/8), yellowish brown (10YR 5/8), light yellowish brown (10YR 6/4), strong brown (7.5YR 5/6), and light gray (N 6) clay; moderate medium and fine subangular and angular blocky structure; firm, sticky, plastic; few fine roots; common fine tubular pores; common distinct clay films on faces of ped; few fine flakes of mica; extremely acid; clear smooth boundary.

BCg--52 to 72 inches; mottled light gray (N 6), strong brown (7.5YR 5/8), yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), and red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; friable, sticky, plastic; common fine flakes of mica; extremely acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-12	3	11	34	92	75	215	714	71
12-24	2	7	17	55	47	128	397	475
24-36	7	4	13	42	46	113	305	582
36-52	0	6	15	57	77	155	352	493
52-72	4	14	32	98	92	240	399	361

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-12	4.95	1.23	0.24	1.39	7.81	82.20
12-24	3.18	1.38	0.12	7.76	12.44	37.62
24-36	1.03	1.18	0.13	14.53	16.87	13.87
36-52	0.42	0.79	0.09	12.94	14.24	9.13
52-72	0.09	0.36	0.07	13.53	14.05	3.70
62	0.20	0.51	0.08	13.73	14.52	5.44

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-12	--	6.43	0.05	6.47	99.23
12-24	--	4.88	3.95	8.63	54.23
24-36	--	4.25	8.35	10.69	21.89
36-52	--	4.18	8.35	9.65	13.47
52-72	--	4.37	7.15	7.67	6.78
62	--	4.48	8.15	8.94	8.84

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-12	6.9	774	120	10	--	--	--
12-24	4.7	252	95	0	--	--	--
24-36	4.7	156	95	0	--	--	--
36-52	4.6	84	69	0	--	--	--
52-72	4.7	36	37	0	--	--	--

Dogue Series - Supplemental profile 1

Dogue loam, cultivated, 0 to 2 percent slopes; 0.6 mile southwest of the junction of Highways VA-5 and VA-632, 0.8 mile southeast of Sherwood Forest Plantation, 0.7 mile north of the mouth of Tyler Creek; elevation 35 feet.

Ap--0 to 9 inches; brown (10YR 4/3) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; few fine roots; common fine tubular pores; slightly acid; abrupt smooth boundary.

Bt1--9 to 23 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct light yellowish brown (10YR 6/4) and common medium prominent very dark grayish brown (10YR 3/2) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds; common fine flakes of mica; moderately acid; clear smooth boundary.

Bt2--23 to 35 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/8), pale brown (10YR 6/3), and strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and medium tubular pores; common faint clay films on faces of peds; common fine flakes of mica; very strongly acid; clear smooth boundary.

Bt3--35 to 51 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/8), light yellowish brown (10YR 6/4), strong brown (7.5YR 5/6), dark brown (7.5YR 3/2), and brown (7.5YR 4/4) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; common fine tubular pores; common distinct clay films on faces of peds; common fine flakes of mica; very strongly acid; clear smooth boundary.

BCg--51 to 64 inches; mottled light gray (10YR 6/1), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; common fine flakes of mica; very strongly acid; gradual smooth boundary.

Cg--64 to 72 inches; mottled light gray (10YR 6/1), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) loam; massive; friable, sticky, plastic; common fine flakes of mica; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-9	6	7	9	158	197	377	423	200
9-23	10	10	5	129	138	293	356	351
23-35	1	7	5	247	205	465	254	281
35-51	1	4	4	234	236	480	265	255
51-64	0	3	6	289	251	549	234	217
64-72	0	4	7	168	266	446	290	264

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-9	3.27	1.10	0.28	4.60	9.25	50.27
9-23	3.54	1.54	0.16	7.20	12.44	42.12
23-35	1.33	1.41	0.13	10.20	13.07	21.96
35-51	0.62	1.20	0.12	9.80	11.74	16.52
51-64	0.31	1.21	0.10	8.20	9.82	16.50
64-72	0.34	1.40	0.10	11.40	13.24	13.90
59	0.30	1.38	0.12	10.20	12.00	15.00

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-9	--	6.18	0.25	4.90	94.90
9-23	--	5.70	0.25	5.49	95.45
23-35	--	4.77	2.75	5.62	51.07
35-51	--	4.62	4.55	6.49	29.89
51-64	--	4.59	4.05	5.67	28.57
64-72	--	4.66	5.45	7.29	25.24
59	--	4.60	4.75	8.39	43.38

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
9-23	160	320	80	320	50	60	10	0

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-9	6.2	456	97	4	51	--	--
9-23	5.6	504	120	1	23	--	--
23-35	4.6	180	120	2	20	--	--
35-51	4.6	120	116	3	25	--	--
51-64	4.8	60	101	3	17	--	--
64-62	4.5	60	120	2	15	--	--

Dragston Series

The Dragston series consists of very deep, somewhat poorly drained soils on low stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 3 percent.

Dragston fine sandy loam, woodlands, 0 to 2 percent slopes; 0.2 mile southwest of borrow pit on Highway VA-618, 0.4 mile south-southwest of crossing of Virginia Power transmission line and Highway VA-618, 0.5 mile south-southwest of gauging station on Chickahominy River, 50 yards west of Highway VA-618; elevation 22 feet.

A--0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium and fine granular structure; friable, slightly sticky, nonplastic; many fine, medium, and coarse roots; common fine and medium tubular pores; very strongly acid; abrupt smooth boundary.

E1--4 to 8 inches; pale brown (10YR 6/3) fine sandy loam; common medium distinct light gray (10YR 6/1) mottles; weak medium and fine granular structure; friable, slightly sticky, slightly plastic; many fine, medium, and coarse roots; common fine and medium tubular pores; very strongly acid; abrupt smooth boundary.

E2--8 to 12 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; friable, slightly

sticky, slightly plastic; few fine roots; common medium and fine tubular pores; very strongly acid; clear smooth boundary.

Btg--12 to 25 inches; light gray (10YR 6/1) fine sandy loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky, slightly plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; very strongly acid; gradual smooth boundary.

BC--25 to 35 inches; mottled yellowish brown (10YR 5/6), brownish yellow (10YR 6/6), and light gray (10YR 6/1) loamy fine sand; massive; friable, slightly sticky, slightly plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; few fine flakes of mica; few faint clay films and clay bridges on sand grains; slightly acid; gradual smooth boundary.

Cg1--35 to 45 inches; light brownish gray (10YR 6/2) sand; common medium prominent yellowish brown (10YR 5/6) mottles; single grain; loose; common fine and very fine black mineral grains; slightly acid; clear smooth boundary.

C1--45 to 54 inches; dark yellowish brown (10YR 4/4) sand; common medium distinct brown (10YR 5/3) mottles; single grain; loose; many fine and very fine black mineral grains; neutral; clear smooth boundary.

C2--54 to 64 inches; mottled grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) sand; single grain; loose; slightly acid; clear smooth boundary.

C3--64 to 72 inches; dark yellowish brown (10YR 4/6) sandy loam; massive; friable, sticky, plastic; neutral; clear smooth boundary.

Cg2--72 to 75 inches; greenish gray (5BG 6/1) sandy clay loam; massive; friable, sticky, plastic; neutral.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg ⁻¹ of soil							
0-4	3	25	125	407	97	658	293	49
4-8	4	11	88	455	124	682	283	35
8-12	6	12	80	467	130	695	279	26
12-25	7	14	77	409	122	629	258	113
25-35	8	19	97	585	101	809	134	57
35-45	15	53	222	531	71	894	89	17
45-54	57	120	274	432	31	914	63	23
54-64	34	174	292	390	29	920	57	23
64-72	0	5	75	467	168	715	123	162
72-75	2	1	67	384	196	645	155	200

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.80	0.21	0.11	6.97	8.09	13.84
4-8	0.46	0.11	0.06	6.37	7.00	9.00
8-12	0.26	0.04	0.02	2.19	2.51	12.75
12-25	2.61	0.11	0.05	3.18	5.95	46.55
25-35	2.16	0.18	0.03	2.19	4.56	51.97
35-45	1.78	0.22	0.03	0.20	2.23	91.03
45-54	2.31	0.31	0.04	1.00	3.66	72.68
54-64	2.39	0.33	0.05	0	2.77	100.00
64-72	7.90	1.13	0.14	2.99	12.16	75.41
72-75	7.40	1.17	0.21	1.19	9.97	88.06
62	4.82	0.66	0.09	0.80	6.37	87.44

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.68	2.05	3.17	35.33
4-8	--	4.67	1.55	2.18	28.90
8-12	--	4.70	1.05	1.37	23.36
12-25	--	4.92	2.25	5.02	55.18
25-35	--	6.20	0.20	2.57	92.22
35-45	--	6.20	0.05	2.08	97.60
45-54	--	6.60	0.25	2.91	91.41
54-64	--	6.30	0.05	2.82	98.23
64-72	--	6.65	0.05	9.22	99.46
72-75	--	6.90	0.10	8.88	98.87
62	--	6.85	0.05	5.62	99.11

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
12-25	900	80	0	0	10	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.6	120	18	3	22	1.1	9.8
4-8	4.7	60	7	2	11	0.6	4.8
8-12	4.9	144	7	1	6	0.5	4.9
12-25	4.9	324	8	1	9	0.2	1.0
25-35	5.7	324	17	3	8	0.1	0.1
35-45	6.5	276	21	7	9	0.2	0.3
45-54	7.0	300	25	13	12	0.3	0.7
54-64	7.2	384	35	19	15	0.5	1.2
64-72	7.3	1056	93	56	29	1.0	3.2
72-75	7.5	1200	109	60	51	1.2	3.6

Dragston Series - Supplemental profile 1

Dragston fine sandy loam, woodlands, 0 to 2 percent slopes; 0.3 mile south-southwest of the junction of Highway VA-618 and Virginia Power transmission line, 170 yards southwest of borrowpit on Highway VA-618; elevation 22 feet.

A--0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; common fine roots; common fine and medium tubular pores; extremely acid; abrupt smooth boundary.

E--4 to 8 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; common fine roots; common fine and medium tubular pores; extremely acid; clear smooth boundary.

Btg1--8 to 16 inches; mottled very dark grayish brown (10YR 3/2), grayish brown (10YR 5/2), and yellowish brown (10YR 5/6) fine sandy loam; weak medium granular blocky structure; friable, nonsticky, nonplastic; few fine roots; common fine, medium, and coarse tubular pores; extremely acid; clear smooth boundary.

Cg1--16 to 26 inches; light gray (10YR 7/2) loamy fine sand; common coarse prominent yellowish brown (10YR 5/6) mottles; single grain; loose; very strongly acid; clear smooth boundary.

Cg2--26 to 50 inches; mottled light brownish gray (10YR 6/2) and very dark grayish brown (10YR 3/2) loamy sand; single grain; loose; strongly acid; gradual smooth boundary.

Cg3--50 to 70 inches; mottled light gray (10YR 6/1) and very dark grayish brown (10YR 3/2) sand; single grain; loose; common medium flakes of mica; moderately acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	4	19	168	406	123	720	201	79
4-8	1	17	139	469	136	763	155	82
8-16	3	20	152	450	146	771	158	71
16-26	5	27	182	449	162	825	144	31
26-50	8	26	217	456	158	864	105	31
50-70	13	54	315	459	97	939	40	21

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.70	0.19	0.12	7.60	8.61	11.73
4-8	0.31	0.09	0.05	4.40	4.85	9.28
8-16	0.24	0.06	0.04	2.00	2.34	14.53
16-26	0.15	0.05	0.03	3.00	3.23	7.12
26-50	0.25	0.06	0.03	0.60	0.94	36.17
50-70	0.60	0.08	0.03	0.40	1.11	63.96

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.01	2.45	3.46	29.19
4-8	--	4.18	1.75	2.20	20.45
8-16	--	4.34	1.65	1.99	17.09
16-26	--	4.68	0.95	1.18	19.49
26-50	--	5.12	0.55	0.89	38.20
50-70	--	5.78	0.25	0.96	73.96

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
inches	g kg ⁻¹ of sand					
8-26	905	80	0	0	0	15

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Emporia Series

The Emporia series consists of very deep, well drained soils on uplands. They formed in stratified loamy and clayey fluvial and marine sediments. Slopes range from 2 to 6 percent.

Emporia fine sandy loam, woodlands, 2 to 6 percent slopes; 0.7 mile south of the junction of Highways VA-620 and VA-609, 0.3 mile north of Virginia Power transmission line and East Run, 0.2 mile south-southwest of Highway VA-620, 330 yards east of Virginia Power transmission lines; elevation 83 feet.

A--0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; few fine roots; many fine and medium vesicular pores; very strongly acid; abrupt smooth boundary.

E--4 to 11 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; few fine roots; many fine and medium vesicular pores; very strongly acid; abrupt smooth boundary.

Bt1--11 to 22 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; few fine and medium tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2--22 to 31 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3--31 to 40 inches; yellowish brown (10YR 5/6) clay; common medium prominent yellowish red (5YR 5/6) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt4--40 to 52 inches; mottled yellowish red (5YR 5/6), strong brown (7.5YR 5/8), and light gray (10YR 6/1) clay; moderate coarse subangular blocky structure; firm, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC--52 to 60 inches; mottled red (2.5YR 5/6), yellowish brown (10YR 5/6), and light gray (10YR 6/1) sandy clay loam; friable, sticky, plastic; very strongly acid; clear smooth boundary.

C--60 to 72 inches; mottled yellowish red (5YR 5/6) and light gray (10YR 6/1) sandy loam; massive; sticky, plastic; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	5	21	116	336	108	586	339	75
4-11	5	19	103	316	127	569	345	86
11-22	2	13	78	203	93	390	348	262
22-31	2	9	62	187	85	345	276	379
31-40	2	9	53	151	80	295	219	486
40-52	4	9	52	183	103	351	177	472
52-60	5	23	159	324	103	615	81	304
60-72	16	106	397	199	37	755	51	194

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.26	0.09	0.06	6.37	6.78	6.05
4-11	0.23	0.07	0.03	1.79	2.12	15.57
11-22	1.84	0.21	0.06	8.16	10.27	20.55
22-31	1.44	0.40	0.08	9.95	11.87	16.18
31-40	0.60	0.63	0.10	12.74	14.07	9.45
40-52	0.48	0.54	0.09	15.92	17.03	6.52
52-60	0.13	0.27	0.06	9.75	10.21	4.51
60-72	0.04	0.14	0.04	7.36	7.58	2.90
61	0.04	0.16	0.04	6.57	6.81	3.52

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.55	1.85	2.26	18.14
4-11	--	5.03	1.25	1.58	20.89
11-22	--	5.08	2.25	4.36	48.39
22-31	--	4.92	4.85	6.77	28.36
31-40	--	4.87	7.75	9.08	14.65
40-52	--	4.83	9.15	10.26	10.82
52-60	--	4.79	7.45	7.91	5.82
60-72	--	4.79	5.35	5.57	3.95
61	--	4.88	5.75	5.99	4.01

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.2	84	19	2	23	--	--
4-11	5.2	72	12	2	11	--	--
11-22	5.2	264	27	0	11	--	--
22-31	5.2	192	55	0	14	--	--
31-40	5.3	96	57	0	15	--	--
40-52	5.2	72	44	0	14	--	--
52-60	5.1	36	26	0	9	--	--
60-72	5.0	24	18	0	8	--	--

Emporia Series - Supplemental profile 1

Emporia loamy sand, cultivated, 0 to 2 percent slopes, in an area of Emporia-Kempsville complex; 1.6 miles northwest of the junction of Highway VA-650 and Virginia Division of Forestry Fire Trail 1557, 0.6 mile north of the junction of Highways VA-604 and VA-605; elevation 132 feet.

A--0 to 9 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; friable, nonsticky, nonplastic; few fine roots; many fine and medium vesicular pores; moderately acid; abrupt smooth boundary.

E--9 to 15 inches; light yellowish brown (10YR 6/4) fine sandy loam; moderate, medium, platy structure; friable and brittle, nonsticky, nonplastic; few fine roots; many fine and medium vesicular pores; moderately acid; abrupt smooth boundary.

Bt1--15 to 35 inches; strong brown (7.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine and medium tubular pores; common distinct clay films on faces of pedes; strongly acid; gradual smooth boundary.

Bt2--35 to 47 inches; strong brown (7.5YR 5/8) sandy clay loam; common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; common distinct clay films on faces of pedes; strongly acid; gradual smooth boundary.

Bt3--47 to 56 inches; mottled strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; common distinct clay films on faces of pedes; very strongly acid; abrupt smooth boundary.

Bt4--56 to 70 inches; mottled yellowish red (5YR 5/8), strong brown (7.5YR 5/8), red (2.5YR 4/8), and light gray (10YR 6/1) sandy clay; weak medium subangular blocky structure; firm, sticky, plastic; few fine tubular pores; common distinct clay films on faces of pedes; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-9	9	42	227	426	94	798	159	43
9-15	3	39	222	375	92	731	200	69
15-35	1	36	194	403	102	736	107	157
35-47	3	40	189	357	90	679	82	239
47-56	5	38	203	335	73	654	67	279
56-70	1	11	76	309	135	532	107	361

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-9	1.39	0.27	0.08	0.40	2.14	81.31
9-15	0.46	0.20	0.06	0.20	0.92	78.26
15-35	1.33	0.40	0.13	5.00	6.86	27.11
35-47	1.60	0.53	0.13	2.60	4.86	46.50
47-56	1.46	0.70	0.09	5.80	8.05	27.95
56-70	0.32	0.90	0.14	8.20	9.56	14.23

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-9	--	5.96	0.05	1.79	97.21
9-15	--	5.70	0.15	0.87	82.76
15-35	--	5.38	0.45	2.31	80.52
35-47	--	5.11	1.15	3.41	66.28
47-56	--	4.75	1.65	3.90	57.69
56-70	--	4.57	4.05	5.41	25.14

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
15-35	935	20	5	0	40	0

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-9	6.3	336	35	11	25	1.5	6.9
9-15	5.9	132	25	3	22	0.3	3.0
15-35	5.4	348	67	1	47	0.3	1.5
35-47	4.9	324	60	1	25	0.2	0.3
47-56	4.7	300	68	1	20	0.2	0.2
56-70	4.6	108	84	1	28	0.2	0.2

Emporia Series - Supplemental profile 2

Emporia loam, woodlands, 2 to 6 percent slopes; 0.7 mile south of the junction of Highways VA-603 and VA-609, 0.5 mile north of the junction of Highways VA-602 and VA-609, 15 yards east of farm lane; elevation 135 feet.

Ap-0 to 4 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine roots; many fine and medium vesicular pores; extremely acid; abrupt smooth boundary.

- E--4 to 10 inches; pale brown (10YR 6/3) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; few fine and medium roots; many fine and medium vesicular pores; very strongly acid; abrupt smooth boundary.
- BA--10 to 14 inches; light yellowish brown (10YR 6/4) loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and medium tubular pores; very strongly acid; clear smooth boundary.
- Bt1--14 to 29 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.
- Bt2--29 to 44 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.
- Bt3--44 to 56 inches; yellowish brown (10YR 5/8) clay loam; many medium distinct strong brown (7.5YR 5/8) and many medium prominent yellowish red (5YR 5/8) and light gray (10YR 7/2) mottles; weak coarse subangular blocky structure; firm, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.
- Bt4--56 to 72 inches; mottled light gray (10YR 6/1), yellowish red (5YR 5/8), strong brown (7.5YR 5/8), yellowish brown (10YR 5/8), and red (2.5YR 4/8) clay; weak medium subangular blocky structure; firm, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg ⁻¹ of soil							
0-4	11	16	108	271	59	465	440	95
4-10	1	8	87	282	82	460	434	106
10-14	1	8	71	266	78	425	426	149
14-29	3	5	75	234	72	389	361	250
29-44	0	4	0	262	72	388	300	312
44-56	0	2	62	106	193	363	278	359
56-72	0	3	50	278	54	385	205	410

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.54	0.12	0.06	9.35	10.07	7.15
4-10	0.18	0.05	0.05	5.77	6.05	4.63
10-14	0.11	0.04	0.06	4.18	4.39	4.78
14-29	0.13	0.17	0.09	8.76	9.15	4.26
29-44	0.08	0.76	0.08	8.76	9.68	9.50
44-46	0.05	0.58	0.08	11.34	12.05	5.89
56-72	0.05	0.71	0.08	10.75	11.59	7.25
64	0.04	0.73	0.09	11.54	12.40	6.94

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.48	3.55	4.27	16.86
4-10	--	4.80	1.65	1.93	14.51
10-14	--	4.53	2.15	2.36	8.90
14-29	--	4.58	3.95	4.34	8.99
29-44	--	4.86	4.45	5.37	17.13
44-56	--	4.92	5.55	6.26	11.34
56-72	--	4.86	7.05	7.89	10.65
64	--	4.86	7.05	7.91	10.87

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
14-29	965	0	0	0	20	15

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
inches	ppm						
0-4	4.7	96	14	1	14	--	--
4-10	4.8	84	11	1	12	--	--
10-14	4.6	48	9	0	12	--	--
14-29	4.7	48	17	0	18	--	--
29-44	5.2	36	78	0	14	--	--
44-56	5.4	36	56	0	14	--	--
56-72	5.1	36	59	0	14	--	--

Izagora Series

The Izagora series consists of very deep, moderately well drained soils on stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 4 percent.

Izagora silt loam, cultivated, 0 to 2 percent slopes; 0.5 mile southwest of the junction of Highways VA-619 and VA-638, 1.2 miles east of Olds Point, 1.9 miles northwest of the mouth of Kittewan Creek; elevation 67 feet.

Ap--0 to 10 inches; grayish brown (10YR 5/2) silt loam; weak fine granular and subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; common fine tubular pores; slightly acid; clear smooth boundary.

AB--10 to 18 inches; pale brown (10YR 6/3) silt loam; weak fine granular and moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine tubular and few fine vesicular pores; slightly acid; clear smooth boundary.

Bt1--18 to 26 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and medium tubular pores; few faint clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2--26 to 35 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine tubular pores; common distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3--35 to 43 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and medium tubular pores; common faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt4--43 to 59 inches; mottled yellowish brown (10YR 5/6), light gray (10YR 6/1), strong brown (7.5YR 5/6), and yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; firm, sticky, plastic; few fine tubular pores; common thick discontinuous clay films along vertical faces of some peds; extremely acid; gradual smooth boundary.

BC--59 to 72 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), yellowish red (5YR 5/6), and light gray (10YR 6/1) clay; weak medium subangular blocky structure; firm, sticky, plastic; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-10	3	11	34	155	74	276	569	155
10-18	2	6	33	106	65	212	589	199
18-26	4	6	38	111	70	229	410	361
26-35	2	5	29	118	72	226	393	381
35-43	3	4	37	117	75	236	374	390
43-59	2	4	30	83	153	273	335	392
59-72	2	4	36	134	81	257	376	367

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-10	3.62	1.40	0.16	2.39	7.57	68.43
10-18	2.56	0.86	0.09	1.19	4.70	74.68
18-26	3.77	1.33	0.14	3.98	9.22	56.83
26-35	3.56	1.17	0.13	6.37	11.23	43.28
35-43	2.33	0.79	0.10	8.76	11.98	26.88
43-59	1.10	0.47	0.08	11.54	13.19	12.51
59-72	1.62	0.67	0.10	12.54	14.93	16.01
68	0.81	0.38	0.08	10.35	11.62	10.93

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
inches	g kg ⁻¹		cmol (+) kg ⁻¹		%
0-10	--	6.35	0.05	5.23	99.04
10-18	--	6.38	0.05	3.56	98.60
18-26	--	5.96	0.35	5.59	93.74
26-35	--	5.50	1.15	6.01	80.87
35-43	--	4.86	2.55	5.77	55.81
43-59	--	4.34	4.85	6.50	25.38
59-72	--	4.50	4.45	6.84	34.94
68	--	4.38	5.25	6.52	19.48

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
inches		ppm					
0-10	6.8	600	120	15	42	--	--
10-18	6.7	456	101	3	23	--	--
18-26	6.3	552	120	1	22	--	--
26-35	5.7	516	115	2	20	--	--
35-43	5.1	408	89	1	20	--	--
43-59	4.8	300	77	0	20	--	--
59-72	4.7	180	48	0	15	--	--

Kempsville Series

The Kempsville series consists of very deep, well drained soils on uplands. They formed in loamy fluvial and marine sediments. Slopes range from 2 to 6 percent.

Kempsville loamy sand, cultivated, 2 to 6 percent slopes; 1.9 miles south-southeast of the mouth of Tonyham Swamp, 1.4 miles southwest of Cypress Banks Landing, 1.6 miles southwest of Binns Bar, 1.2 miles north of Highway VA-615; elevation 106 feet.

Ap--0 to 8 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; few fine roots; common fine and few medium tubular pores; strongly acid; abrupt smooth boundary.

E--8 to 12 inches; pale brown (10YR 6/3) sandy loam; weak fine granular structure; very friable, slightly sticky, nonplastic; few fine roots; common fine and medium tubular pores; moderately acid; abrupt smooth boundary.

BE--12 to 19 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine

roots; few fine and coarse tubular pores; few faint clay films on faces of peds and clay bridges between sand grains; slightly acid; abrupt smooth boundary.

Bt1--19 to 31 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; many distinct clay films on faces of peds and clay bridges between sand grains; 5 percent rock fragments; slightly acid; gradual smooth boundary.

Bt2--31 to 40 inches; strong brown (7.5YR 5/6) sandy loam; common medium prominent pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine vesicular pores; many distinct clay bridges between sand grains; slightly acid; clear smooth boundary.

Bt3--40 to 45 inches; strong brown (7.5YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable, sticky, plastic; few fine and medium tubular pores; many distinct clay films on faces of peds and bridges between sand grains; slightly acid; clear smooth boundary.

Bt4--45 to 64 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct yellowish red (5YR 5/6) and few medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine and medium tubular pores; common distinct clay films on faces of peds; common clay bridges between sand grains; strongly acid; gradual smooth boundary.

BC--64 to 72 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium prominent yellowish brown (10YR 5/8) and yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable, sticky, plastic; few fine faint clay films on faces of peds; common clay bridges between sand grains; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg ⁻¹ of soil							
0-8	7	11	320	358	45	799	154	47
8-12	10	89	352	236	28	715	200	85
12-19	8	65	307	234	29	644	244	112
19-31	8	73	297	265	25	668	143	189
31-40	22	106	350	253	25	756	111	133
40-45	24	102	303	224	21	675	105	220
45-64	33	125	275	191	14	638	45	317
64-72	16	88	347	166	12	629	27	344

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-8	1.05	0.42	0.08	1.79	3.34	46.41
8-12	0.72	0.40	0.14	1.19	2.45	51.43
12-19	1.05	0.72	0.27	2.19	4.23	48.23
19-31	1.52	1.16	0.37	2.79	5.84	52.23
31-40	1.16	0.81	0.19	1.19	3.35	64.48
40-45	1.61	0.61	0.16	2.59	4.97	47.89
45-64	1.73	0.78	0.16	4.58	7.25	36.83
64-72	0.48	0.70	0.11	6.77	8.06	16.00
69	0.58	0.74	0.11	8.76	10.19	14.03

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-8	--	5.48	0.05	1.60	96.88
8-12	--	5.78	0.05	1.31	96.18
12-19	--	6.28	0.05	2.09	97.61
19-31	--	6.32	0.05	3.10	98.39
31-40	--	6.35	0.05	2.21	97.74
40-45	--	6.13	0.05	2.43	97.94
45-64	--	5.40	0.75	3.42	78.07
64-72	--	4.72	2.25	3.54	36.44
69	--	4.60	2.25	3.68	38.86

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-8	6.3	252	55	20	22	--	--
8-12	6.2	144	50	2	48	--	--
12-19	6.8	192	85	1	83	--	--
19-31	6.8	252	120	1	104	--	--
31-40	6.6	216	80	3	55	--	--
40-45	6.3	276	63	1	44	--	--
45-64	5.4	288	81	1	56	--	--
64-72	4.8	120	62	1	20	--	--

Kempsville Series - Supplemental profile 1

Kempsville sandy loam, cultivated, 2 to 6 percent slopes; 1.3 miles northwest of the junction of Highway VA-650 and Virginia Division of Forestry Fire Trail 1557, 0.6 mile northeast of the junction of Highways VA-604 and VA-605; elevation 120 feet.

Ap--0 to 11 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; few fine roots; common fine and few medium tubular pores; slightly acid; abrupt smooth boundary.

E--11 to 17 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; few fine roots; common fine and medium tubular pores; slightly acid; clear smooth boundary.

Bt1--17 to 27 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and coarse tubular pores; few faint clay films on faces of peds and clay bridges between sand grains; slightly acid; gradual smooth boundary.

Bt2--27 to 42 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and medium tubular pores; many distinct clay films on faces of peds and clay bridges between sand grains; 5 percent rock fragments; moderately acid; gradual smooth boundary.

2Bt3--42 to 56 inches; strong brown (7.5YR 4/6) sandy loam; common medium prominent light yellowish brown (10YR 6/4) and yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine tubular pores; many distinct clay bridges between sand grains; 20 percent rock fragments; moderately acid; gradual smooth boundary.

2Bt4--56 to 70 inches; red (2.5YR 4/6) sandy clay loam; weak fine subangular blocky structure; friable, sticky, plastic; few fine and medium tubular pores; many distinct clay films on faces of peds and bridges between sand grains; 20 percent rock fragments; moderately acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-11	17	89	208	249	46	609	306	85
11-17	21	102	224	225	49	620	284	96
17-27	16	90	199	213	55	573	280	147
27-42	24	100	203	239	54	621	206	173
42-56	56	140	229	223	57	716	161	123
56-70	52	127	191	151	39	560	130	310

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-11	1.52	0.42	0.29	0.20	2.43	91.77
11-17	0.91	0.30	0.16	0.20	1.57	87.26
17-27	1.02	0.75	0.16	1.60	3.53	54.67
27-42	1.77	0.88	0.13	3.00	5.78	48.10
42-56	1.23	0.52	0.06	1.80	3.61	50.14
56-70	2.75	0.56	0.09	4.80	8.20	41.46

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-11	--	6.30	0.05	2.28	97.81
11-17	--	6.23	0.05	1.41	96.48
17-27	--	6.13	0.05	1.98	97.47
27-42	--	5.95	0.05	2.83	98.23
42-56	--	5.90	0.05	1.86	97.31
56-70	--	5.62	0.25	3.65	93.15

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
17-42	940	20	0	0	0	40

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Kempsville Series - Supplemental profile 2

Kempsville sandy loam, cultivated, 2 to 6 percent slopes; 0.6 mile northeast of Roaches Corner, 0.2 mile southeast of Highway VA-155 and Collins Run, 250 yards east of Highway VA-155; (This soil was mapped as Suffolk sandy loam, but was included with soils of the Kempsville series because of small acreage in Charles City County); elevation 100 feet.

Ap--0 to 10 inches; brown (7.5YR 5/4) sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; few fine roots; common fine and few medium tubular pores; strongly acid; abrupt smooth boundary.

BA--10 to 16 inches; brown (7.5YR 4/4) sandy loam; weak fine subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds; moderately acid; clear smooth boundary.

Bt1--16 to 41 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and coarse tubular pores; common distinct clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2--41 to 55 inches; yellowish red (5YR 4/6) sandy loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and medium tubular pores; many distinct clay films on faces of peds; moderately acid; gradual smooth boundary.

BC--55 to 70 inches; yellowish red (5YR 4/6) sandy loam; weak medium granular and subangular blocky structure; friable, slightly sticky, slightly plastic; common fine tubular pores; many distinct clay bridges between sand grains; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-10	12	114	321	225	43	715	174	111
10-16	7	89	263	200	44	603	216	181
16-41	14	114	260	162	35	585	172	243
41-55	28	115	296	219	53	711	91	198
55-70	29	118	310	231	47	735	101	164

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-10	0.98	0.33	0.21	1.60	3.12	48.72
10-16	1.35	0.66	0.16	2.60	4.77	45.49
16-41	2.41	1.17	0.17	2.00	5.75	65.22
41-55	1.37	0.84	0.09	2.20	4.50	51.11
55-70	0.55	1.01	0.08	2.60	4.24	38.68

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	5.32	0.35	1.87	81.28
10-16	--	5.66	0.25	2.42	89.26
16-41	--	6.04	0.15	3.90	96.15
41-55	--	5.56	0.25	2.55	90.20
55-70	--	5.30	0.40	2.04	80.39

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
16-41	975	15	0	0	0	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-10	5.4	228	47	7	72	--	--
10-16	5.3	228	55	3	48	--	--
16-41	5.7	384	119	2	40	--	--
41-55	5.5	216	85	3	17	--	--
55-70	5.1	96	113	3	18	--	--

Kempsville Series - Supplemental profile 3

Kempsville sandy loam, cultivated, 2 to 6 percent slopes; 1.1 miles northwest of the junction of Highway VA-650 and Virginia Division of Forestry Fire Trail-1557, 0.5 mile northeast of the junction of Highways VA-604 and VA-605; (This soil was mapped as Orangeburg sandy loam, but was included with soils of the Kempsville series because of small acreage in Charles City County); elevation 125 feet.

Ap--0 to 10 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; few fine roots; common fine and few medium tubular pores; neutral; abrupt smooth boundary.

Bt1--10 to 17 inches; dark yellowish brown (10YR 4/6) sandy loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine and medium tubular pores; few fine clay films on faces of peds and bridges between sand grains; neutral; clear smooth boundary.

Bt2--17 to 30 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and coarse tubular pores; many distinct clay films on faces of peds and bridges between sand grains; slightly acid; diffuse smooth boundary.

Bt3--30 to 48 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; common fine and medium tubular pores; many distinct clay films on faces of peds and bridges between sand grains; strongly acid; diffuse smooth boundary.

Bt4--48 to 70 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; common fine tubular pores; many distinct clay films on faces of peds and bridges between sand grains; 5 percent coarse fragments; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-10	32	129	249	213	77	701	228	71
10-17	33	110	207	191	64	606	295	99
17-30	38	106	161	174	69	547	241	212
30-48	77	123	147	149	45	541	166	293
48-70	78	118	155	140	42	533	117	350

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
inches	cmol (+) kg ⁻¹					%
0-10	1.64	0.40	0.20	1.20	3.44	65.12
10-17	1.38	0.47	0.16	2.60	4.61	43.60
17-30	2.04	1.19	0.21	5.20	8.64	39.81
30-48	1.90	0.80	0.08	8.20	10.98	25.32
48-70	0.90	0.46	0.09	9.40	10.85	13.36

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	6.68	0.05	2.25	97.78
10-17	--	6.76	0.05	2.06	97.57
17-30	--	6.45	0.05	3.49	98.57
30-48	--	5.11	1.25	4.03	68.98
48-70	--	4.56	2.85	4.30	68.97

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
10-30	955	25	0	0	0	20

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-10	7.0	480	66	16	61	--	--
10-17	6.8	372	71	4	61	--	--
17-30	6.3	444	120	2	55	--	--
30-48	4.9	408	95	1	18	--	--
48-70	4.5	180	51	1	17	--	--

Photo 2. The Sherwood Forest Plantation manor house, the longest frame house in the United States, is on Kempsville soils. Sherwood Forest is the home of William Henry Harrison and John Tyler, 9th and 10th Presidents of the United States.



Lawnes Series

The Lawnes series consists of very deep, very poorly drained soils in fresh to slightly brackish water in marshes, creeks, and rivers that are inundated daily by fresh water and by slightly brackish water during periods of drought. They formed in herbaceous organic materials over loamy fluvial sediments. Slopes are less than 1 percent.

Lawnes muck, frequently flooded, marsh, 0 to 1 percent slopes; Old Neck Marsh, 2.2 miles northeast of Highways VA-615 and VA-627, 2.8 miles east of the junction of Highways VA-624 and VA-615 at Holdcroft; elevation 1 foot.

A--0 to 13 inches; dark gray (10YR 4/1) muck; massive; sticky, slightly plastic; soil flows easily between fingers when squeezed and leaves a small residue and few fine fibrous roots; many fine live roots; n-value > 1; moderate sulfur odor; strongly acid; clear smooth boundary.

Cg1--13 to 26 inches; dark gray (10YR 4/1) loam; about 5 percent fibers rubbed; massive; slightly sticky, slightly plastic; flows easily between fingers when squeezed; common fine roots and fibers; n-value > 1; weak sulfur odor; common lenses and pockets of clay loam; strongly acid; diffuse smooth boundary.

Cg2--26 to 40 inches; very dark gray (10YR 3/1) loam; massive; sticky, slightly plastic; flows easily between fingers when squeezed leaving a small residue and few fine fibrous roots; common pockets of sapric and hemic material; n-value > 1; weak sulfur odor; strongly acid; diffuse smooth boundary.

Cg3--40 to 55 inches; very dark gray (10YR 3/1) loam; massive; slightly sticky, slightly plastic; flows easily between fingers when squeezed; few fine and medium roots; n-value > 1; weak sulfur odor; strongly acid; gradual smooth boundary.

Cg4--55 to 60 inches; very dark gray (10YR 3/1) sand; single grain; loose; n-value < 1; strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg ⁻¹ of soil							
10-40	5	35	110	192	50	392	462	146

Table G: Electrical conductivity (EC), water, mineral and organic matter, and sulfur

Depth	EC	Water	Mineral matter	Organic matter	Total S
<u>inches</u>	<u>dS m⁻¹</u>	<u>g kg⁻¹ of soil</u>			
0-13	0.74	4365	750	260	10.5
13-26	0.96	2874	883	148	5.0
26-40	0.84	4190	813	149	10.9

Table H. pH for moist soil as a function of time with moist incubation

Depth	Initial	8-days	15-days	22-days	30-days
<u>inches</u>	<u>pH</u>				
0-13	5.5	4.7	4.0	3.7	3.6
13-26	5.2	3.9	3.3	2.8	2.8
26-40	5.4	4.1	3.7	3.2	3.1

Table I. Water soluble cations; NH₄OAc, pH 7; cation-exchange capacity (CEC); and sodium adsorption ratio (SAR)

Depth	Cations				CEC	SAR
	Ca ²⁺	Mg ²⁺	K ⁺	Na ⁺		
<u>inches</u>	<u>cmol(+) liter⁻¹</u>				<u>*</u>	
0-13	1.1	1.6	0.1	3.2	62.2	2.8
13-26	1.5	2.5	0.1	3.5	48.6	2.5
26-40	1.3	2.5	0.1	3.8	46.0	2.8

*cmol (+) kg⁻¹ of soil

Table J. Percentage cationic composition of the saturation extract

Depth	Ca ²⁺	Mg ²⁺	K ⁺	Na ⁺
<u>inches</u>	<u>%</u>			
0-13	18.3	26.7	1.7	53.3
13-26	19.7	32.9	1.3	46.1
26-40	16.9	32.5	1.3	49.4

Lawnes Series - Supplemental profile 1

Lawnes silty clay loam, frequently flooded, marsh, 0 to 1 percent slopes; Herring Creek Marsh, 0.9 mile southeast of the junction of Highways VA-609 and VA-5, 2.3 miles east of the junction of Highways VA-5 and VA-658; elevation 1 foot.

A--0 to 13 inches; dark gray (5Y 4/1) silty clay loam; weak medium granular structure; slightly sticky, slightly plastic; few fine and medium roots; n-value > 1; moderate sulfur odor; strongly acid; clear smooth boundary.

Cg1--13 to 26 inches; gray (5Y 5/1) silty clay loam; massive; slightly sticky, slightly plastic; few fine and medium roots; n-value > 1; weak sulfur odor; strongly acid; diffuse smooth boundary.

Cg2--26 to 40 inches; dark gray (5Y 4/1) silty clay loam; massive; slightly sticky, slightly plastic; few fine and medium roots; n-value > 1; weak sulfur odor; very strongly acid; diffuse smooth boundary.

Cg3--40 to 60 inches; gray (5Y 5/1) silty clay loam; massive; slightly sticky, slightly plastic; few fine and medium roots; n-value > 1; weak sulfur odor; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-40	10	37	33	32	18	130	484	386

Table G: Electrical conductivity (EC), water, mineral and organic matter, and sulfur

Depth	EC	Water	Mineral matter	Organic matter	Total S
<u>inches</u>	<u>dS m⁻¹</u>	<u>g kg⁻¹ of soil</u>			
0-13	0.17	3201	840	171	5.5
13-26	0.20	7509	861	146	3.7
26-40	0.08	3559	846	120	2.7

Table H. pH for moist soil as a function of time with moist incubation

Depth	Initial	8-days	15-days	22-days	30-days
<u>inches</u>	<u>pH</u>				
0-13	5.3	4.4	4.1	3.7	3.5
13-26	5.1	5.0	4.8	4.5	4.2
26-40	5.0	4.5	4.6	4.3	4.1

Table I. Water soluble cations; NH_4OAc , pH 7; cation-exchange capacity (CEC); and sodium adsorption ratio (SAR)

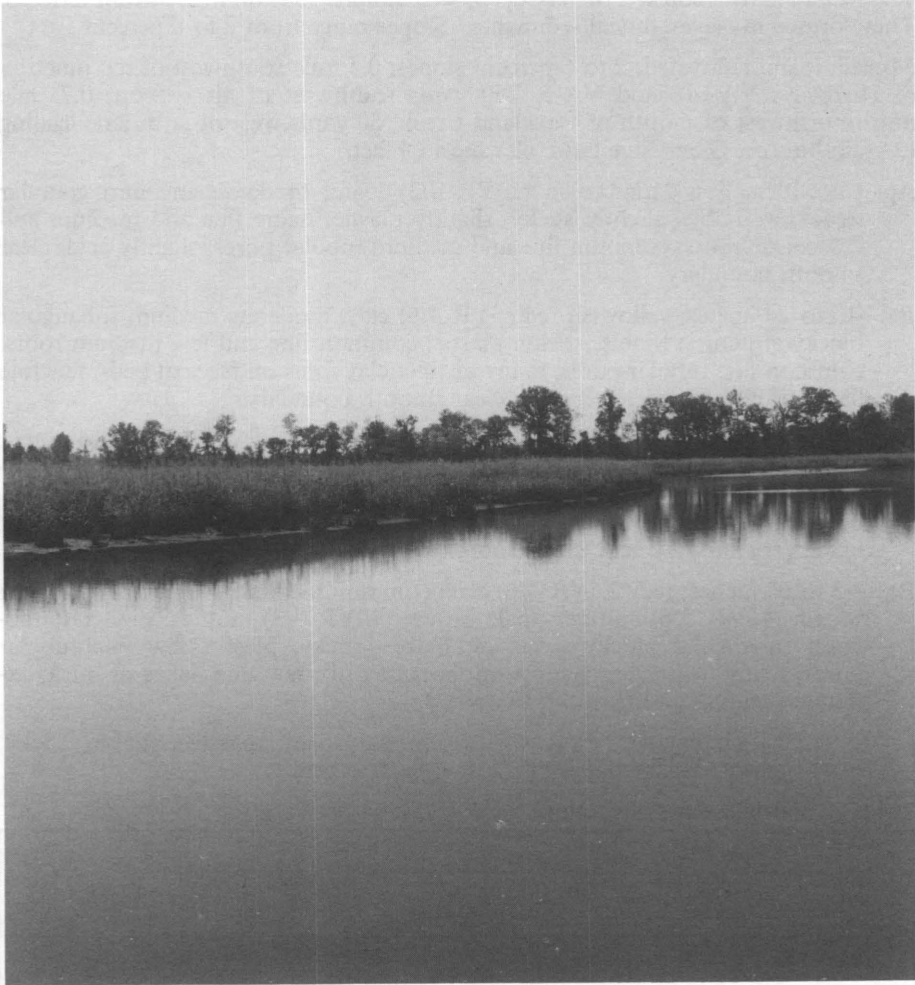
Depth	Cations				CEC	SAR
	Ca^{2+}	Mg^{2+}	K^+	Na^+		
<u>inches</u>	<u>$\text{cmol}(+) \text{ liter}^{-1}$</u>				<u>*</u>	
0-13	0.3	0.2	0.0	0.9	49.4	1.8
13-26	0.3	0.1	0.0	1.2	52.8	2.7
26-40	0.2	0.0	0.0	0.3	45.1	1.0

* $\text{cmol}(+) \text{ kg}^{-1}$ of soil

Table J. Percentage cationic composition of the saturation extract

Depth	Ca^{2+}	Mg^{2+}	K^+	Na^+
<u>inches</u>	<u>%</u>			
0-13	21.4	14.3	0.0	64.3
13-26	18.8	6.3	0.0	75.0
26-40	40.0	0.0	0.0	60.0

Photo 3. Lawnes soils along Herring Creek have luxuriant growth of wild rice and other marsh vegetation.



Masada Series

The Masada series consists of very deep, well drained soils on high stream terraces. They formed in clayey fluvial sediments. Slopes range from 2 to 6 percent.

Masada loam, cultivated, 2 to 6 percent slopes; 0.5 mile southwest of the junction of Highways VA-618 and VA-5, 250 yards southwest of air beacon, 0.7 mile north-northwest of mouth of Buckland Creek, 50 yards west of farm lane leading to grain bins on Glen Cove farm; elevation 65 feet.

Ap--0 to 10 inches; dark brown (10YR 4/3) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; many fine and medium and few coarse roots; common fine and medium tubular pores; slightly acid; clear smooth boundary.

Bt1--10 to 24 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and few medium roots; common fine tubular pores; many distinct clay films on faces of peds; few fine flakes of mica; moderately acid; clear smooth boundary.

Bt2--24 to 45 inches; yellowish red (5YR 4/6) clay; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular and angular blocky structure; friable, sticky, plastic; few medium roots; few fine tubular pores; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

Bt3--45 to 62 inches; red (2.5YR 4/6) clay; common medium prominent yellowish brown (10YR 5/6) and very pale brown (10YR 7/3) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; few fine flakes of mica; extremely acid; gradual smooth boundary.

C--62 to 70 inches; red (2.5YR 4/6) sandy clay loam; massive; friable, sticky, plastic; common fine flakes of mica; extremely acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-10	6	30	75	227	126	465	468	67
10-24	13	15	36	102	60	226	326	448
24-45	22	30	50	104	61	266	255	479
45-62	4	14	28	142	113	301	294	405
62-70	1	3	32	326	114	476	168	356

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-10	3.11	0.63	0.20	2.60	6.54	60.24
10-24	4.42	1.40	0.19	6.60	12.61	47.66
24-45	1.34	1.26	0.17	13.40	16.17	17.13
45-62	0.29	0.88	0.15	15.60	16.92	7.80
62-70	0.19	0.74	0.12	8.60	9.65	10.88

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	6.39	0.05	3.99	98.75
10-24	--	5.73	0.45	6.45	93.03
24-45	--	4.80	5.25	8.02	34.54
45-62	--	4.42	6.55	7.87	16.77
62-70	--	4.50	5.15	6.20	16.94

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
10-40	230	120	50	480	20	80	Tr	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-10	6.6	600	84	14	77	--	--
10-24	5.6	672	120	2	23	--	--
24-45	4.6	252	120	1	33	--	--
45-62	4.4	72	83	1	28	--	--
62-70	4.4	48	67	1	22	--	--

Masada Series - Supplemental profile 1

Masada loam, cultivated, 2 to 6 percent slopes; 1.6 miles south-southwest of the junction of Highways VA-5 and VA-619, 1.0 mile southwest of junction of Highways VA-619 and VA-658, 30 yards north of Highway VA-619; elevation 80 feet.

Ap--0 to 10 inches; dark brown (7.5YR 3/4) loam; weak medium granular structure; friable, slightly sticky, slightly plastic; many fine and medium and few coarse roots; common fine and medium tubular pores; moderately acid; abrupt smooth boundary.

Bt1--10 to 20 inches; reddish brown (5YR 4/4) clay loam; weak medium subangular blocky structure; friable, sticky, slightly plastic; common fine and few medium roots; common fine tubular pores; many distinct clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt2--20 to 40 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; moderately acid; diffuse smooth boundary.

Bt3--40 to 60 inches; red (2.5YR 4/6) clay; common fine prominent very dark grayish brown (10YR 3/2) mineral stains; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; very strongly acid; diffuse smooth boundary.

Bt4--60 to 70 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; many distinct clay films on faces of peds; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-10	3	18	97	153	60	332	450	218
10-20	4	11	79	119	62	275	377	348
20-40	5	14	68	121	55	264	311	425
40-60	3	10	69	125	68	275	252	473
60-70	2	10	76	137	57	282	231	487

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-10	2.63	0.94	0.60	5.00	9.17	45.47
10-20	2.95	1.63	0.25	6.00	10.83	44.60
20-40	3.57	1.43	0.16	6.40	11.56	44.64
40-60	1.15	1.47	0.18	8.80	11.60	24.14
60-70	0.16	1.63	0.22	8.80	10.81	18.59

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	5.82	0.10	4.27	97.66
10-20	--	6.30	0.05	4.88	98.96
20-40	--	5.98	0.10	5.26	98.10
40-60	--	4.78	2.15	4.95	56.57
60-70	--	4.62	2.95	4.96	40.52

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
10-40	915	55	5	0	0	25

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-10	5.6	504	99	10	150	2.5	16.3
10-20	6.4	552	120	6	36	0.4	9.9
20-40	5.5	540	120	4	18	0.2	5.7
40-60	4.8	216	120	5	26	0.3	8.6
60-70	4.7	48	120	7	36	0.3	7.3

Mattan Series

The Mattan series consists of very deep, very poorly drained soils along fresh water creeks and rivers in backwater swamps that are ponded and/or flooded daily. These waters become brackish along the streams during long drought periods. They are formed in organic materials over loamy fluvial sediments. Slopes are less than 1 percent.

Mattan mucky sandy loam, frequently flooded, swamps, 0 to 1 percent slopes; 1.4 miles south of Walker's Dam, 1.2 miles northeast on private road and Highway VA-615, 0.2 mile west of the Chickahominy River; elevation 2 feet.

A--0 to 12 inches; gray (5Y 5/1) mucky sandy loam; single grain; loose, nonsticky, nonplastic; very strongly acid; abrupt smooth boundary.

Oa--12 to 39 inches; very dark grayish brown (10YR 3/2) muck (sapric material); 10 percent fibers rubbed; massive; many fine roots; flows easily between the fingers when squeezed; no sulfur odor; extremely acid; gradual smooth boundary.

Cg1--39 to 60 inches; very dark brown (10YR 2/2) mucky fine sandy loam (sapric material); 10 percent fibers rubbed; massive; many fine roots; flows easily between the fingers when squeezed; no sulfur odor; extremely acid; gradual smooth boundary.

Cg2--60 to 70 inches; gray (10YR 5/1) loamy sand; massive; sticky, nonplastic; fluid fine sands.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-12	1	9	68	709	70	858	133	9
12-39	18	30	106	480	52	686	136	178
39-60	9	17	95	571	52	744	183	73

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-12	0.73	0.40	0.05	3.78	4.96	23.79
12-39	2.39	1.46	0.08	23.88	27.81	14.13
39-60	2.12	1.36	0.12	16.72	20.32	17.72

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-12	--	4.83	1.25	2.43	48.56
12-39	--	4.22	2.60	6.53	60.18
39-60	--	4.25	2.45	6.05	59.50

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-12	4.7	144	41	9	17	0.6	16.1
12-39	3.7	240	77	4	9	1.9	9.7
39-60	3.8	240	86	3	22	1.9	30.3

Munden Series

The Munden series consists of very deep, moderately well drained soils on stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 2 percent.

Munden loamy sand, woodlands, 0 to 2 percent slopes; 1.0 miles west-southwest of Walker's Dam, 170 yards southeast of Binns Bar on the Chickahominy River, 1.7 miles north-northeast of Highway VA-615 on a private road to Walker's Dam, 70 yards north of farm lane; elevation 25 feet.

Ap--0 to 6 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; common fine and medium and few coarse roots; common fine medium and coarse tubular pores; very strongly acid; clear smooth boundary.

E--6 to 14 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine and medium granular structure; very friable, nonsticky, nonplastic; few fine and medium roots; common fine, medium, and coarse tubular pores; very strongly acid; clear smooth boundary.

Bt1--14 to 27 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine and medium subangular blocky structure; very friable, slightly sticky, slightly plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; few faint clay films on faces of peds; common bridges between sand grains; few fine flakes of mica; very strongly acid; clear smooth boundary.

Bt2--27 to 38 inches; light olive brown (2.5Y 5/6) fine sandy loam; common medium prominent light gray (10YR 7/1) mottles; weak coarse and medium subangular blocky structure; very friable, sticky, plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; few faint clay films on faces of peds; common bridges between sand grains; few fine flakes of mica; very strongly acid; clear smooth boundary.

CB--38 to 50 inches; light yellowish brown (2.5Y 6/4) loamy sand; single grain; loose; few fine flakes of mica; very strongly acid; clear smooth boundary.

Cg1--50 to 61 inches; light gray (10YR 7/1) sand; single grain; loose; common fine mica flakes; strongly acid; clear smooth boundary.

C--61 to 70 inches; mottled yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), and light gray (10YR 7/1) sand; single grain; loose; common fine flakes of mica; very strongly acid; clear wavy boundary.

2Cg2--70 to 74 inches; light gray (10YR 7/1) loamy coarse sand; common medium distinct light yellowish brown (10YR 6/4) mottles; single grain; loose; common fine flakes of mica.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-6	2	10	108	452	154	726	197	77
6-14	2	5	54	429	213	703	172	125
14-27	0	5	46	396	199	646	219	135
27-38	1	1	25	427	229	684	143	173
38-50	0	1	31	681	150	863	70	67
50-61	0	3	218	727	28	976	4	20
61-70	5	39	433	452	13	943	11	46

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-6	0.11	0.05	0.05	7.80	8.01	2.62
6-14	0.00	0.01	0.03	5.40	5.44	0.74
14-27	0.02	0.03	0.03	4.00	4.08	1.96
27-38	0.18	0.10	0.05	4.80	5.13	6.43
38-50	0.10	0.05	0.03	0.00	0.18	100.00
50-61	0.01	0.01	0.01	1.00	1.03	2.91
61-70	0.04	0.04	0.02	2.00	2.10	4.76
64	0.05	0.02	0.01	1.20	1.28	6.25

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-6	--	4.50	2.05	2.26	9.29
6-14	--	4.68	1.45	1.49	2.68
14-27	--	4.60	2.05	2.13	3.76
27-38	--	4.67	4.25	4.58	7.20
38-50	--	4.74	1.65	1.83	9.80
50-61	--	5.10	0.35	0.38	7.89
61-70	--	4.86	1.15	1.25	8.00
64	--	5.12	0.50	0.63	12.70

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
14-38	860	115	5	5	5	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
27-38	4.6	60	13	6	17	0.2	0.4
38-50	4.7	36	7	6	9	0.3	0.3
50-61	4.8	24	3	3	4	0.1	0.3
61-70	4.7	24	5	6	8	0.2	0.4

Nahunta Series

The Nahunta series consists of very deep, somewhat poorly drained soils on low-lying uplands. They formed in loamy fluvial and marine sediments. Slopes range from 0 to 3 percent.

Nahunta silt loam, woodlands, 0 to 3 percent slopes; 130 yards north of the junction of Highways VA-620 and VA-609, 100 yards northwest of Highway VA-609; elevation 110 feet.

A--0 to 4 inches; dark olive gray (5Y 3/2) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; common fine tubular pores; extremely acid; abrupt smooth boundary.

E--4 to 12 inches; grayish brown (10YR 5/2) silt loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium granular structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and very fine tubular pores; extremely acid; gradual smooth boundary.

Bt--12 to 18 inches; light yellowish brown (2.5Y 6/4) silt loam; few fine prominent grayish brown (10YR 5/2) and common fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and very fine tubular pores; few thin discontinuous clay films on faces of peds; extremely acid; clear smooth boundary.

Btg1--18 to 35 inches; mottled light gray (10YR 6/1) and yellowish brown (10YR 5/8) silt loam; moderate medium subangular blocky structure; friable, sticky,

plastic; few fine roots; few fine tubular pores; common thin continuous clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2--35 to 42 inches; mottled light gray (10YR 6/1) and yellowish brown (10YR 5/8) silt loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few very fine tubular pores; thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

BCg--42 to 48 inches; mottled light gray (10YR 6/1), yellowish brown (10YR 5/8), light brownish gray (2.5Y 6/2), and red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few very fine tubular pores; thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

C--48 to 72 inches; mottled red (2.5YR 4/8), light gray (10YR 6/1), light yellowish brown (2.5Y 6/4), and yellowish brown (10YR 5/8) clay loam; massive; friable, sticky, plastic; few fine roots; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	14	37	61	95	64	272	621	107
4-12	6	13	33	113	105	270	623	107
12-18	1	7	21	91	106	226	599	175
18-35	2	4	20	73	87	186	591	223
35-42	0	4	19	85	96	104	578	218
42-48	2	5	21	81	100	210	545	245
48-72	0	5	20	80	104	210	537	253

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.14	0.14	0.10	13.93	14.31	2.66
4-12	0.04	0.04	0.04	6.57	6.69	1.79
12-18	0.03	0.04	0.02	4.98	5.07	1.78
18-35	0.04	0.11	0.03	7.56	7.74	2.33
35-42	0.02	0.09	0.02	6.57	6.70	1.94
42-48	0.03	0.07	0.03	8.76	8.89	1.46
48-72	0.05	0.05	0.03	9.95	10.08	1.29
62	0.04	0.05	0.03	9.35	9.47	1.27

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	3.90	4.65	5.03	7.55
4-12	--	4.47	2.55	2.67	4.49
12-18	--	4.47	3.35	3.44	2.62
18-35	--	4.70	4.55	4.73	3.81
35-42	--	4.73	4.85	4.98	2.61
42-48	--	4.67	4.85	4.98	2.61
48-72	--	4.58	5.95	6.08	2.14
62	--	4.58	5.85	5.97	2.01

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
12-35	980	0	0	0	15	5

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.1	48	13	1	25	--	--
4-12	4.5	36	8	1	9	--	--
12-18	4.6	36	9	0	6	--	--
18-35	4.8	36	14	0	6	--	--
35-42	4.9	36	13	0	6	--	--
42-48	4.7	24	11	0	4	--	--
48-72	4.7	36	9	0	4	--	--

Nahunta Series - Supplemental profile 1

Nahunta loam, woodlands, 0 to 2 percent slopes; 150 yards north of the junction of Highways VA-5 and VA-609, 50 yards west of Highway VA-609; elevation 63 feet.

- A--0 to 4 inches; grayish brown (2.5Y 5/2) loam; moderate fine and medium granular structure; friable, slightly sticky, slightly plastic; common fine and medium and few coarse roots; common fine tubular pores; extremely acid; abrupt smooth boundary.
- BA--4 to 8 inches; mottled light brownish gray (2.5Y 6/2) and grayish brown (2.5Y 5/2) loam; weak medium granular and weak medium subangular blocky structure; friable, sticky, slightly plastic; common fine roots; common fine and very fine tubular pores; very strongly acid; clear smooth boundary.
- Bt--8 to 18 inches; light olive brown (2.5Y 5/4) loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and very fine tubular pores; few thin discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.
- Btg--18 to 29 inches; light brownish gray (2.5Y 6/2) clay loam; common coarse prominent yellowish brown (10YR 5/8) and common coarse distinct light gray (5Y 6/1) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine tubular pores; common thin continuous clay films on faces of peds; very strongly acid; gradual smooth boundary.
- BCg--29 to 55 inches; light gray (5Y 7/1) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; few very fine tubular pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.
- Cg--55 to 70 inches; light gray (5Y 6/1) sandy clay loam; few medium prominent yellowish brown (10YR 5/6) mottles; massive; friable, sticky, plastic; few fine and medium roots; extremely acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-4	3	6	62	306	105	482	425	93
4-8	3	7	45	292	156	504	397	99
8-18	0	4	26	231	131	392	450	158
18-29	0	4	28	209	119	360	310	330
29-55	1	2	41	282	169	495	217	288
55-70	0	2	36	319	163	520	152	328

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.51	0.11	0.06	7.16	7.84	8.67
4-8	0.28	0.07	0.06	5.57	5.98	6.86
8-18	1.32	0.33	0.13	8.96	10.74	16.57
18-29	0.99	0.65	0.10	11.94	13.68	12.72
29-55	0.12	0.23	0.08	11.54	11.97	3.59
55-70	0.05	0.12	0.08	12.14	12.39	2.02
58	0.06	0.17	0.09	13.53	13.85	2.31

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.20	1.79	2.47	27.53
4-8	--	4.52	1.41	1.82	22.53
8-18	--	4.72	2.91	4.69	37.95
18-29	--	4.50	5.77	7.51	23.17
29-55	--	4.56	6.35	6.78	6.34
55-70	--	4.44	7.03	7.28	3.43
58	--	4.48	8.10	8.42	3.80

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
8-18	920	45	5	0	20	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	5.0	120	19	1	23	--	--
4-8	5.0	120	19	0	22	--	--
8-18	5.1	420	47	0	29	--	--
18-29	4.9	144	43	0	18	--	--
29-55	4.9	48	31	0	15	--	--
55-70	4.7	36	15	0	14	--	--

Nansemond Series

The Nansemond series consists of very deep, moderately well drained soils on footslopes. They formed in loamy sediments. Slopes range from 0 to 4 percent.

Nansemond loamy sand, cultivated, 2 to 6 percent slopes; 0.2 mile northeast of junction of Highways VA-155 and VA-614; elevation 35 feet.

Ap--0 to 9 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; few fine roots; moderately acid; clear smooth boundary.

E1--9 to 15 inches; grayish brown (10YR 5/2) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; few fine roots; moderately acid; abrupt smooth boundary.

E2--15 to 19 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; few fine roots; strongly acid; clear smooth boundary.

Bt1--19 to 30 inches; light yellowish brown (10YR 6/4) gravelly fine sandy loam; common medium prominent yellowish brown (10YR 6/8) mottles; moderate medium granular structure; very friable, nonsticky, nonplastic; few fine roots; 20 percent gravel; very strongly acid; gradual smooth boundary.

Bt2--30 to 43 inches; yellowish brown (10YR 5/8) gravelly fine sandy loam; common medium prominent light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; 20 percent gravel; very strongly acid; gradual wavy boundary.

C1--43 to 60 inches; mottled yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) gravelly loamy sand; single grain; loose; 20 percent gravel; very strongly acid; gradual wavy boundary.

C2--60 to 70 inches; yellowish brown (10YR 5/8) sandy loam; massive; friable, slightly sticky, nonplastic; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-9	20	73	257	462	22	834	111	55
9-15	30	81	230	474	27	843	112	45
15-19	21	81	298	457	29	887	89	24
19-30	83	111	234	416	23	867	101	32
30-43	151	106	205	362	16	840	46	114
43-60	80	179	355	287	15	917	30	53
60-70	67	268	448	147	8	938	17	45

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-9	1.44	0.27	0.10	3.18	4.99	36.27
9-15	0.59	0.13	0.05	3.38	4.15	18.55
15-19	0.19	0.07	0.03	2.59	2.88	10.07
19-30	0.15	0.07	0.03	2.99	3.24	7.72
30-43	0.49	0.33	0.08	3.78	4.68	19.23
43-60	0.26	0.17	0.05	3.38	3.86	12.44
60-70	0.12	0.09	0.02	3.38	3.61	6.37
60	0.16	0.11	0.03	3.78	4.08	7.35

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-9	--	5.80	0.05	1.86	97.31
9-15	--	5.85	0.05	0.82	93.90
15-19	--	5.27	0.15	0.44	65.91
19-30	--	4.72	0.44	0.69	36.23
30-43	--	4.82	1.70	2.60	34.62
43-60	--	4.75	1.12	1.60	30.00
60-70	--	4.60	0.63	0.86	26.74
60	--	4.68	0.53	0.83	36.14

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
30-43	960	10	0	0	15	5

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-9	6.5	324	37	4	22	--	--
9-15	6.2	120	20	12	11	--	--
15-19	5.5	48	9	7	8	--	--
19-30	5.3	60	15	5	11	--	--
30-43	5.3	120	45	3	20	--	--
43-60	5.3	84	27	3	14	--	--
60-70	5.2	48	15	1	8	--	--

Nawney Series

The Nawney series consists of very deep, very poorly drained soils on narrow to broad floodplains and basins. They formed in loamy fluvial sediments. Slopes range from 0 to 2 percent.

Nawney silt loam, woodlands, 0 to 2 percent slopes, ponded; 250 yards west of the junction of Highway VA-609 and abandoned part of Highway VA-600, 225 yards east of abandoned Highway VA-600 and C & O Railroad, 350 yards south of Chickahominy River; elevation 35 feet.

A--0 to 14 inches; dark gray (10YR 4/1) silt loam; moderate medium granular structure; friable, sticky, plastic; many fine, medium, and coarse roots; few fine flakes of mica; very strongly acid; clear smooth boundary.

Cg1--14 to 28 inches; dark gray (5Y 4/1) loam; massive; friable, sticky, plastic; common fine and medium roots; few fine flakes of mica; very strongly acid; clear smooth boundary.

Cg2--28 to 55 inches; greenish gray (5G 5/1) sandy clay loam; many coarse prominent yellowish red (5YR 4/6) mottles; massive; friable, sticky, plastic; common fine and medium roots; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Cg3--55 to 72 inches; bluish gray (5B 6/1) fine sandy loam; massive; friable, sticky, plastic; few fine, medium, and coarse roots; few fine flakes of mica; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-14	2	18	91	222	83	416	329	255
14-28	13	11	108	323	121	577	234	189
28-55	2	4	48	360	141	555	137	308
55-72	2	4	90	450	171	718	98	184

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-14	4.53	1.23	0.34	14.40	20.50	29.76
14-28	3.30	0.83	0.10	8.40	12.63	33.49
28-55	6.04	2.30	0.22	8.00	16.56	51.69
55-72	3.99	1.73	0.25	7.20	13.17	45.33
60	4.13	1.77	0.25	2.00	8.15	75.46

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
0-14	--	4.95	1.15	7.25	84.14
14-28	--	4.87	1.75	5.98	70.74
28-55	--	4.66	4.65	13.21	64.80
55-72	--	4.85	1.05	7.02	85.04
60	--	4.80	1.05	7.20	85.42

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
inches	g kg ⁻¹ of sand					
14-28	890	60	0	5	30	15

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Nevarc Series

The Nevarc series consists of very deep, moderately well drained soils on sideslopes. They formed in clayey fluvial and marine sediments. Slopes range from 10 to 60 percent.

Nevarc sandy loam, in a unit of Nevarc-Remlik complex, woodlands, 25 to 60 percent slopes; 2.9 miles southeast of the junction of Highways VA-623 and VA-621, 150 yards northwest of north boat landing in the Chickahominy Wildlife Management Area; elevation 80 feet.

A--0 to 5 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine, common medium, and few coarse roots; common fine and medium tubular pores; extremely acid; abrupt smooth boundary.

E--5 to 11 inches; pale brown (10YR 6/3) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; common fine and medium and few coarse roots; common fine and medium pores; extremely acid; abrupt smooth boundary.

Bt1--11 to 26 inches; yellowish brown (10YR 5/4) clay; strong fine and medium subangular and angular blocky structure; firm, sticky, plastic; common fine and medium and few coarse roots; common fine tubular pores; many distinct clay films on faces of peds; extremely acid; gradual smooth boundary.

Bt2--26 to 42 inches; yellowish brown (10YR 5/4) clay; common medium prominent yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) and common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC--42 to 54 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds; extremely acid; gradual smooth boundary.

C--54 to 72 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; friable, slightly sticky, slightly plastic; few fine tubular pores; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-5	15	23	97	340	58	533	268	199
5-11	15	20	70	279	50	434	351	215
11-26	5	10	38	169	44	266	244	490
26-42	4	6	29	280	89	408	161	431
42-54	0	3	6	469	199	677	81	242
54-72	0	0	1	537	264	802	47	151

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-5	1.03	0.59	0.30	18.31	20.23	9.49
5-11	0.28	0.25	0.21	14.73	15.47	4.78
11-26	0.18	0.88	0.35	20.30	21.71	6.49
26-42	0.08	1.26	0.25	19.70	21.29	7.47
42-54	0.04	0.78	0.17	11.94	12.93	7.66
54-72	0.02	0.60	0.11	8.56	9.29	7.86
61	0.01	0.56	0.11	7.36	8.04	8.46

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-5	--	4.09	5.75	7.67	25.03
5-11	--	4.30	6.85	7.59	9.75
11-26	--	4.40	12.25	13.66	10.32
26-42	--	4.50	10.55	12.14	13.10
42-54	--	4.40	7.25	8.24	12.01
54-72	--	4.50	5.15	5.88	12.41
61	--	4.52	4.35	5.03	13.52

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-5	4.2	156	44	10	66	--	--
5-11	4.5	72	24	29	64	--	--
11-26	4.6	48	73	42	63	--	--
26-42	4.8	36	111	17	44	--	--
42-54	4.7	24	77	4	34	--	--
54-72	4.7	24	60	15	31	--	--

Photo 4. Roadbase materials for VA-106 near Roxbury were borrowed from Nevarc-Remlik gravelly soils.



Newflat Series

The Newflat series consists of very deep, somewhat poorly drained soils on stream terraces and flats along the Chickahominy and James Rivers. They formed in fluvial sediments. Slopes range from 0 to 2 percent.

Newflat silt loam, woodlands, 0 to 2 percent slopes; 0.7 mile east-southeast of the junction of Highways VA-621 and VA-623 on Highway VA-621, 0.9 mile south-east of junction of Highways VA-623 and VA-627, 1.8 miles southwest of mouth of Parsons Creek; elevation 35 feet.

A--0 to 2 inches; gray (10YR 5/1) silt loam; weak fine and medium granular structure; friable, slightly sticky, slightly plastic; many fine, medium, and coarse roots; very strongly acid; abrupt smooth boundary.

E--2 to 6 inches; pale brown (10YR 6/3) silt loam; common medium distinct light gray (10YR 6/1) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

Bt--6 to 14 inches; brown (10YR 5/3) silty clay; common medium faint grayish brown (10YR 5/2) mottles; strong fine angular blocky structure; firm, sticky, plastic; many fine and medium and few coarse roots; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

Btg1--14 to 24 inches; light gray (5Y 6/1) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; massive; firm, sticky, plastic; common fine and medium roots; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Btg2--24 to 64 inches; gray (5Y 5/1) silty clay; common medium prominent strong brown (7.5YR 4/6) mottles; massive; firm, very sticky, very plastic; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-6	1	4	4	14	24	48	762	190
6-14	20	24	25	33	36	139	467	394
14-24	1	1	3	10	14	30	463	507
24-64	0	1	3	7	19	30	410	560

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-6	0.15	0.14	0.10	2.60	2.99	13.04
6-14	0.36	0.46	0.10	14.60	15.52	5.93
14-24	0.42	1.00	0.15	21.80	23.37	6.72
24-64	0.29	3.20	0.27	23.00	26.76	14.05
56	0.34	4.30	0.35	24.20	29.19	17.09

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-6	29	4.69	4.55	4.94	7.89
6-14	12	4.67	9.05	9.97	9.23
14-24	8	4.63	16.15	17.72	8.86
24-64	6	4.85	15.35	19.11	19.68
56	--	4.78	16.25	21.24	23.49

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
6-24	860	90	5	10	25	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-6	4.2	60	15	5	28	0.7	16.1
6-14	4.6	96	54	1	25	0.7	5.1
14-24	4.4	72	99	0	36	0.9	2.1
24-64	4.6	60	120	1	56	2.7	1.0

Nimmo Series

The Nimmo series consists of very deep, poorly drained soils on low-lying flats and natural drains. They formed in loamy fluvial sediments overlying sandy sediments. Slopes range from 0 to 2 percent.

Nimmo sandy loam, woodlands, 0 to 2 percent slopes; 30 yards south of the junction of Highways VA-600 and VA-106, 225 yards south-southwest of C & O Railroad; elevation 38 feet.

A--0 to 4 inches; black (5Y 2/1) sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; common fine and medium and few coarse tubular pores; very strongly acid; abrupt smooth boundary.

E1--4 to 10 inches; dark gray (5Y 4/1) sandy loam; common fine prominent yellowish brown (10YR 5/8) mottles; weak fine granular structure; very friable, slightly sticky, slightly plastic; common fine roots; common fine, medium, and coarse tubular pores; very strongly acid; abrupt smooth boundary.

E2--10 to 14 inches; dark gray (10YR 4/1) loamy sand; weak fine granular structure; very friable, slightly sticky, slightly plastic; few fine, medium, and coarse roots; common fine, medium, and coarse tubular pores; very strongly acid; abrupt smooth boundary.

Btg--14 to 32 inches; gray (10YR 5/1) fine sandy loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine, medium, and coarse tubular pores; few faint clay films on faces of peds and clay bridges between sand grains; few fine black mineral grains; few feldspar grains; very strongly acid; gradual smooth boundary.

Cg1--32 to 40 inches; light gray (10YR 6/1) sand; common fine prominent yellowish brown (10YR 5/8) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and coarse roots; few fine, medium, and coarse tubular pores; many faint clay films and bridges between sand grains; common faint clay films on faces of peds; few sand-sized feldspar grains; discontinuous sandy clay loam layers; very strongly acid; clear smooth boundary.

Cg2--40 to 48 inches; light gray (10YR 6/1) coarse sand; massive; very friable, slightly sticky, slightly plastic; few fine black mineral grains; 2 percent rounded quartz gravel; strongly acid; clear smooth boundary.

Cg3--48 to 64 inches; gray (10YR 5/1) coarse sand; single grain; loose; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	34	85	185	199	81	584	279	137
4-12	28	83	178	291	132	712	204	84
12-18	18	78	180	312	98	686	256	58
18-29	39	127	226	270	125	788	145	67
29-40	41	152	232	293	102	820	97	83
40-48	107	330	292	168	23	920	33	47
48-64	76	359	323	169	12	939	14	47

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	2.34	1.84	0.19	14.93	19.30	22.64
4-12	0.22	0.12	0.06	5.57	5.97	6.70
12-18	0.59	0.10	0.04	5.17	5.90	12.37
18-29	0.42	0.08	0.02	1.00	1.52	34.21
29-40	1.69	0.24	0.05	0.60	2.58	76.74
40-48	1.47	0.20	0.04	0.80	2.51	68.13
48-64	1.46	0.21	0.05	0.20	1.92	89.58
64	1.04	0.15	0.03	4.78	6.00	20.33

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.66	1.45	5.82	75.09
4-12	--	4.54	2.00	2.40	16.67
12-18	--	4.54	2.45	3.18	22.96
18-29	--	4.78	1.25	1.77	29.38
29-40	--	5.04	0.85	2.83	69.96
40-48	--	5.31	0.60	2.31	74.03
48-64	--	5.34	0.30	2.02	85.35
64	--	4.97	0.35	1.57	77.71

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
18-29	910	55	5	0	20	10

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.5	108	42	2	18	0.7	2.1
4-12	4.7	60	7	4	12	0.3	4.6
12-18	4.6	96	8	2	8	0.2	5.1
18-29	4.6	84	8	2	6	0.2	2.9
29-40	5.2	276	21	2	11	0.1	2.7
40-48	5.4	192	15	3	11	0.1	2.0
48-64	5.3	144	12	2	8	0.3	1.6

Pamunkey Series

The Pamunkey series consists of very deep, well drained soils on stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 10 percent.

Pamunkey loam, cultivated, 2 to 6 percent slopes; 2.3 miles southeast of the end of Highway VA-640, 1.0 mile south of Highway VA-5, 70 yards east of barn on Westover Plantation; elevation 27 feet.

Ap--0 to 10 inches; dark brown (10YR 4/3) loam; weak fine and medium granular structure; very friable, slightly sticky, slightly plastic; many fine roots; common fine and medium tubular pores; clear smooth boundary.

Bt1--10 to 16 inches; dark yellowish brown (10YR 4/4) loam; common fine prominent very dark grayish brown (10YR 3/2) mineral stains; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; common fine flakes of mica; common distinct clay films on faces of peds and bridges between sand grains; moderately acid; clear smooth boundary.

Bt2--16 to 40 inches; dark brown (7.5YR 4/4) clay loam; common fine prominent very dark grayish brown (10YR 3/2) mineral stains; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds; common fine flakes of mica; clear smooth boundary.

Bt3--40 to 60 inches; brown (7.5YR 5/4) clay loam; common fine prominent very dark grayish brown (10YR 3/2) mineral stains; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine roots; common fine and medium tubular pores; common fine and medium flakes of mica; common distinct clay films on faces of peds; moderately acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
10-30	1	10	28	181	114	334	344	322

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
10-30	3.89	1.93	0.19	3.96	9.97	60.28
60	2.48	3.40	0.21	3.96	10.05	60.60

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
10-30	2.8	5.96	0.15	6.16	98.86
60	1.1	6.04	0.05	6.14	99.19

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
10-30	820	95	10	15	0	60

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Pamunkey Series - Supplemental profile 1

Pamunkey loam, cultivated, 2 to 6 percent slopes; 1.2 miles southeast of Shirley Plantation, 0.8 mile east-northeast of upland and marsh boundary on Eppes Island; elevation 12 feet.

Ap--0 to 8 inches; dark brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; many fine roots; common fine and medium tubular pores; clear smooth boundary.

Bt--8 to 34 inches; strong brown (7.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; common fine flakes of mica; common distinct clay films on faces of peds and bridges between sand grains; moderately acid; clear smooth boundary.

BC--34 to 44 inches; strong brown (7.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common fine flakes of mica; clear smooth boundary.

C--44 to 64 inches; strong brown (7.5YR 5/6) loamy sand; common fine prominent very dark grayish brown (10YR 3/2) mineral stains; single grain; loose; common fine and medium tubular pores; common fine and medium flakes of mica; moderately acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
8-28	1	14	56	313	157	541	249	210

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
8-28	3.04	1.60	0.50	1.78	6.92	74.28
58	1.75	0.83	0.35	1.98	4.91	59.67

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
8-28	2	6.04	0.05	5.19	99.04
58	1	5.93	0.05	2.98	98.32

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
8-28	840	55	0	55	0	50

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Pamunkey Series - Supplemental profile 2

Pamunkey loam, cultivated, 2 to 6 percent slopes; 1.6 miles west-southwest of During Point, 0.9 mile northwest of Dancing Point; elevation 15 feet.

Ap--0 to 10 inches; dark brown (10YR 3/3) loam; weak fine granular structure; friable, slightly sticky, plastic; many fine roots; common fine and medium tubular pores; abrupt smooth boundary.

Bt1--10 to 40 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable, sticky, slightly plastic; common fine roots; common fine and medium tubular pores; common fine flakes of mica; common distinct clay films on faces of peds and bridges between sand grains; slightly acid; clear smooth boundary.

Bt2--40 to 50 inches; dark yellowish brown (10YR 4/6) sandy clay loam; common fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common fine flakes of mica; clear smooth boundary.

BC--50 to 60 inches; dark yellowish brown (10YR 4/6) fine sandy loam; common fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, sticky, slightly plastic; common fine and medium tubular pores; common fine and medium flakes of mica; strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
10-30	0	4	5	45	79	135	508	357

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
10-30	5.24	2.50	0.20	3.37	11.31	70.20
60	2.06	2.40	0.14	3.56	8.16	56.37

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
10-30	4	6.40	0.10	8.40	98.76
60	1	5.30	0.55	5.15	89.32

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
10-30	770	115	0	80	0	35

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Pamunkey Series - Supplemental profile 3

Pamunkey loam, woodland, 2 to 6 percent slopes; 1.1 miles northwest of Westover Mansion, 0.8 mile northeast of Harrison Landing on Westover Plantation; elevation 42 feet.

A--0 to 4 inches; dark brown (10YR 3/3) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; common fine and medium tubular pores; clear smooth boundary.

BA--4 to 6 inches; strong brown (7.5YR 4/6) loam; few fine distinct very dark gray (10YR 3/1) mineral stains; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; common fine flakes of mica; clear smooth boundary.

Bt1--6 to 22 inches; strong brown (7.5YR 4/6) silty clay; few fine distinct very dark gray (10YR 3/1) mineral stains; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; common fine flakes of mica; common distinct clay films on faces of peds and bridges between sand grains; extremely acid; clear smooth boundary.

Bt2--22 to 35 inches; strong brown (7.5YR 5/6) clay loam; few fine distinct very dark gray (10YR 3/1) mineral stains and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common fine flakes of mica; gradual smooth boundary.

Bt3--35 to 45 inches; strong brown (7.5YR 5/6) clay loam; common fine distinct very dark gray (10YR 3/1) mineral stains and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common fine flakes of mica; clear smooth boundary.

BC--45 to 60 inches; strong brown (7.5YR 5/6) silty clay loam; common medium prominent very dark gray (10YR 3/1) mineral stains and light gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable, sticky, plastic; common fine and medium tubular pores; common fine and medium flakes of mica; extremely acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
6-26	0	2	5	40	94	141	445	414

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
6-26	1.64	2.30	0.39	7.84	12.17	35.58
56	0.26	2.80	0.45	11.37	14.88	23.59

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
6-26	--	4.00	2.15	6.48	66.32
56	--	3.90	5.35	8.86	39.62

Pamunkey Series - Supplemental profile 4

Pamunkey loam, cultivated, 2 to 6 percent slopes; 1.2 miles west-northwest of the junction of Highways VA-5, VA-106, and VA-156, 0.4 mile west-southwest of the junction of Highways VA-5, VA-156, and VA-608, 70 yards north of fence row on Shirley Plantation; elevation 48 feet.

Ap--0 to 10 inches; dark brown (10YR 4/3) loam; weak fine and medium granular structure; very friable, slightly sticky, slightly plastic; many fine roots; common fine and medium tubular pores; clear smooth boundary.

Bt--10 to 35 inches; strong brown (7.5YR 4/6) clay loam; few fine prominent very dark grayish brown (10YR 3/2) mineral stains; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; common fine flakes of mica; common distinct clay films on faces of peds and bridges between sand grains; slightly acid; clear smooth boundary.

BC--35 to 45 inches; strong brown (7.5YR 5/6) sandy clay loam; few fine prominent very dark grayish brown (10YR 3/2) mineral stains and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds; common fine flakes of mica; clear smooth boundary.

C--45 to 65 inches; strong brown (7.5YR 5/6) sandy loam; massive; friable, slightly sticky, slightly plastic; common fine and medium flakes of mica; neutral.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
10-30	0	2	22	220	150	394	335	271

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
10-30	5.34	1.45	0.18	2.38	9.35	74.55
60	4.26	0.24	0.09	0.99	5.58	82.26

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
10-30	1	6.50	0.15	7.12	97.89
60	0	6.94	0.05	4.64	98.92

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
10-30	785	100	20	35	0	60

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Photo 5. Shirley, settled in 1613, is the oldest plantation in Virginia. The plantation's longevity results from the Pamunkey soils favorable properties for plant growth.



Photo 6. The manor house at Westover, built by Colonel William Byrd in 1730 on Pamunkey soils, is the nation's premier example of Georgian architecture.



Peawick Series

The Peawick series consists of very deep, moderately well drained soils on stream terraces. They formed in clayey fluvial sediments. Slopes range from 0 to 6 percent.

Peawick silt loam, woodlands, 0 to 2 percent slopes; 1.2 miles south of the junction of Highways VA-5 and VA-623 on Highway VA-623, 1.1 miles northeast of the junction of Highways VA-613 and VA-623, 0.3 mile southwest of Highway VA-623 and Tomahund Creek; elevation 33 feet.

A--0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium and fine granular structure; friable, sticky, plastic; many medium and fine and few coarse roots; extremely acid; abrupt smooth boundary.

E--2 to 5 inches; light yellowish brown (10YR 6/4) silt loam; moderate medium granular structure; friable, sticky, plastic; many fine and medium and few coarse roots; extremely acid; clear smooth boundary.

Bt1--5 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium and fine angular and subangular blocky structure; firm, sticky, plastic; common fine and medium roots; common fine tubular pores; common distinct clay films on faces of peds; common fine flakes of mica; extremely acid; clear smooth boundary.

Bt2--24 to 36 inches; yellowish brown (10YR 5/8) silty clay; common fine distinct strong brown (7.5YR 5/8) and common fine prominent light gray (10YR 6/1) mottles; strong medium and fine angular and subangular blocky structure; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; common fine flakes of mica; extremely acid; clear smooth boundary.

Btg1--36 to 58 inches; mottled light gray (10YR 6/1) and yellowish brown (10YR 5/8) clay; strong coarse and medium angular blocky structure; firm, sticky, plastic; few fine roots; many prominent clay films on faces of peds; common fine flakes of mica; extremely acid; gradual smooth boundary.

Btg2--58 to 64 inches; light gray (10YR 6/1) clay; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic parting to strong coarse and medium angular blocky structure; very firm, very sticky, very plastic; few fine roots; many prominent clay films on faces of peds; few fine flakes of mica; extremely acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
5-25	1	1	3	7	16	28	484	488

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
5-25	0.48	0.80	0.48	14.65	16.41	10.73
55	0.34	1.88	0.28	24.75	27.25	9.17

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
5-25	--	4.50	10.45	12.21	14.41
55	--	4.16	18.85	21.35	11.71

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
5-25	100	350	0	270	40	120	Tr	0

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Peawick Series - Supplemental profile 1

Peawick silt loam, woodlands, 0 to 2 percent slopes; 100 yards east of St. John Baptist Church across Highway VA-106; elevation 86 feet.

AE--0 to 6 inches; grayish brown (10YR 5/2) silt loam; moderate medium and fine granular structure; friable, slightly sticky, slightly plastic; many medium and fine roots; clear smooth boundary.

Bt1--6 to 26 inches; mottled yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) clay; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and medium roots; common fine tubular pores; common distinct clay films on faces of peds; common fine flakes of mica; extremely acid; clear smooth boundary.

Bt2--26 to 40 inches; mottled yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) moderate medium angular and subangular blocky structure; firm, sticky, plastic; common fine and medium roots; common fine tubular pores;

common distinct clay films on faces of peds; common fine flakes of mica; extremely acid; clear smooth boundary.

Bt3--40 to 60 inches; mottled yellowish brown (10YR 5/8), yellowish red (5YR 5/8), red (2.5YR 4/8), and light gray (10YR 6/1) clay; strong medium and fine angular and subangular blocky structure; firm, sticky, plastic; many distinct clay films on faces of peds; common fine flakes of mica; extremely acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
6-26	0	12	34	51	42	139	457	404

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
6-26	0.23	0.20	0.10	12.47	13.00	4.08
56	2.10	3.00	0.14	10.49	15.73	33.31

Table C: Chemical properties

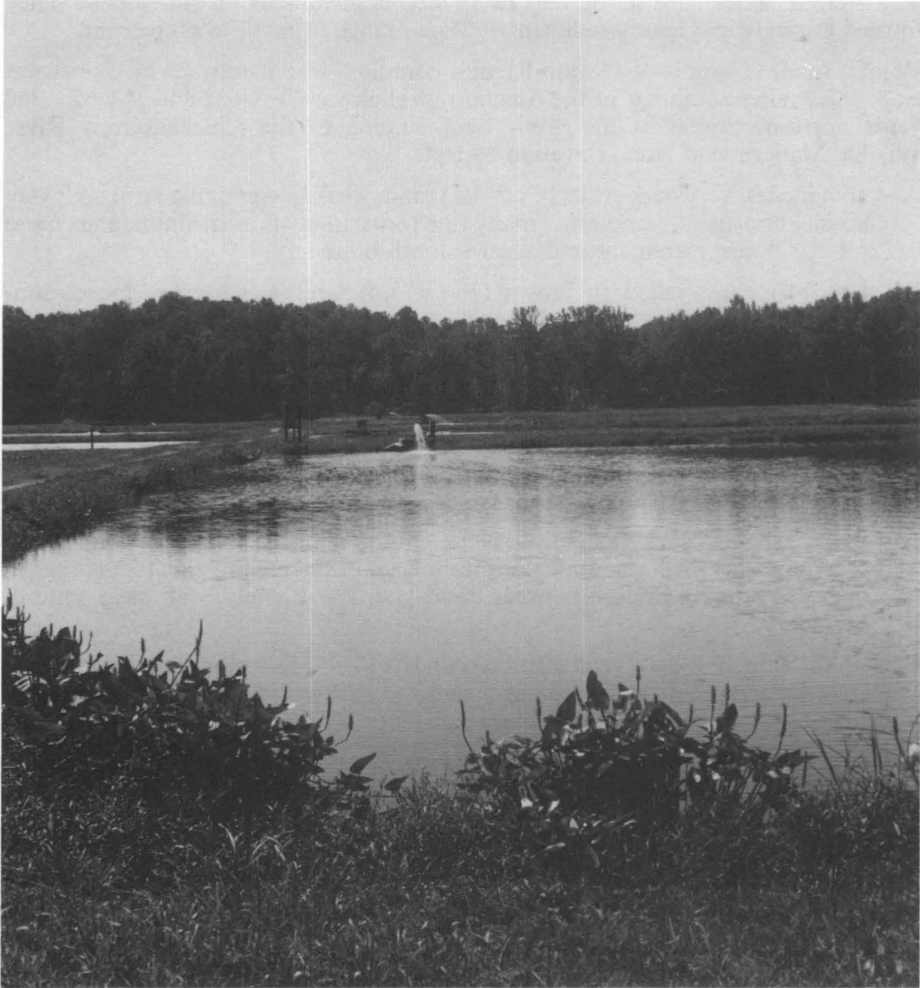
Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
6-26	3	4.40	8.15	8.68	6.11
56	2	4.80	3.45	8.69	60.30

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
6-26	170	190	80	400	30	Tr	50	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Photo 7. Harrison Lake National Fish Hatchery ponds are on Peawick soils.



Remlik Series

The Remlik series consists of very deep, well drained soils on sideslopes. They formed in sandy and loamy sediments. Slopes range from 10 to 60 percent.

Remlik sand, in a unit of Nevarc-Remlik complex, woodlands, 25 to 60 percent slopes; 2.9 miles southeast of the junction of Highways VA-621 and VA-623, 350 yards north-northwest of the north boat landing in the Chickahominy River Wildlife Management Area; elevation 60 feet.

A--0 to 4 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; many fine, medium, and coarse tubular pores; extremely acid; clear smooth boundary.

E1--4 to 14 inches; yellowish brown (10YR 5/4) sand; single grain; loose, nonsticky, nonplastic; common fine roots; common fine and few medium tubular pores; very strongly acid; clear smooth boundary.

E2--14 to 29 inches; light yellowish brown (10YR 6/4) sand; single grain; loose, nonsticky, nonplastic; common fine and few medium roots; common fine and medium tubular pores; very strongly acid; clear smooth boundary.

Bt--29 to 44 inches; brownish yellow (10YR 6/6) fine sandy loam; weak fine and medium subangular blocky and moderate medium granular structure; very friable, slightly sticky, slightly plastic; common fine and few medium roots; common fine, medium, and coarse tubular pores; few faint clay films on faces of peds and clay bridges between sand grains; extremely acid; clear smooth boundary.

BC--44 to 50 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; very strongly acid; clear smooth boundary.

C--50 to 72 inches; olive yellow (2.5Y 6/6) fine sandy loam; massive; friable, slightly sticky, slightly plastic; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-4	18	53	180	482	138	871	91	38
4-14	10	43	153	517	163	886	77	37
14-29	7	34	120	544	198	904	53	43
29-44	1	3	16	422	310	753	64	183
44-50	0	1	4	423	355	783	63	154
50-72	0	1	2	414	378	792	62	146

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.26	0.22	0.09	9.75	10.32	5.52
4-14	0.06	0.07	0.05	5.57	5.75	3.13
14-29	0.02	0.03	0.03	4.78	4.86	1.65
29-44	0.08	0.44	0.11	6.97	7.60	8.29
44-50	0.12	0.82	0.13	7.36	8.43	12.69
50-72	0.09	1.26	0.16	5.77	7.28	20.74
60	0.10	1.32	0.17	5.77	7.36	21.60

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.26	1.75	2.32	24.57
4-14	--	4.64	1.55	1.73	10.40
14-29	--	4.60	1.65	1.73	4.62
29-44	--	4.37	4.95	5.58	11.29
44-50	--	4.56	4.15	5.22	20.50
50-72	--	4.63	3.75	5.26	28.71
60	--	4.54	3.95	5.54	28.70

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.3	84	26	9	37	--	--
4-14	4.5	24	5	15	15	--	--
14-29	4.6	24	3	17	9	--	--
29-44	4.7	36	72	14	26	--	--
44-50	4.8	36	105	9	34	--	--
50-72	4.9	36	114	9	40	--	--

Roanoke Series

The Roanoke series consists of very deep, poorly drained soils on low and intermediate river terraces along the Chickahominy and James Rivers. They formed in clayey fluvial sediments. Slopes range from 0 to 2 percent.

Roanoke silt loam, woodlands, 0 to 2 percent slopes; 1.0 mile north of Benjamin Harrison Bridge, 50 yards northwest of Highways VA-156 and VA-106; elevation 40 feet.

Ag--0 to 5 inches; gray (10YR 5/1) silt loam; weak fine subangular blocky and moderate fine granular structure; friable, sticky, plastic; many fine, medium, and coarse roots; common fine and medium tubular pores; very strongly acid; clear smooth boundary.

Btg1--5 to 25 inches; light gray (N 6/) silty clay loam; common medium prominent yellowish brown (10YR 5/8) and light olive brown (2.5Y 5/6) mottles; weak coarse prismatic parting to strong coarse angular and subangular blocky structure; firm, sticky, plastic; many fine and medium roots; continuous prominent clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual smooth boundary.

Btg2--25 to 40 inches; dark gray (N 4/) clay; common medium prominent yellowish brown (10YR 5/8) and light olive brown (2.5Y 5/6) mottles; weak coarse prismatic parting to strong coarse subangular and angular blocky structure; firm, sticky, plastic; many fine and medium roots; continuous prominent clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual smooth boundary.

BCg--40 to 55 inches; gray (N 5/) clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic parting to strong coarse subangular and angular blocky structure; firm, sticky, plastic; few fine roots; continuous prominent clay films on faces of peds; many fine flakes of mica; strongly acid; gradual wavy boundary.

Cg--55 to 75 inches; light gray (5Y 6/1) stratified sandy loam and sandy clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; friable, sticky, plastic; common fine flakes of mica; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-5	4	17	31	72	65	189	514	297
5-25	1	4	18	79	93	195	468	337
25-40	1	2	15	63	83	164	394	442
40-50	1	2	24	80	137	244	426	330
50-55	1	3	50	170	164	388	386	226
55-75	0	3	69	334	164	570	257	173

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-5	1.65	0.61	0.35	19.10	21.71	12.02
5-25	0.04	0.86	0.08	14.13	15.11	6.47
25-40	0.03	1.44	0.10	17.51	19.08	8.23
40-50	0.03	1.49	0.09	11.94	13.55	11.88
50-55	0.03	1.25	0.06	6.77	8.11	16.52
55-75	0.04	1.05	0.05	4.78	5.92	19.26

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-5	68	4.92	4.05	6.66	39.19
5-25	2	4.78	8.85	9.83	9.97
25-40	1	5.02	11.85	13.42	11.70
40-50	1	5.22	8.05	9.66	16.67
50-55	0	5.32	5.05	6.39	20.97
55-75	1	5.38	3.60	4.74	24.05

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-5	4.6	120	29	2	40	1.1	16.1
5-25	4.6	24	78	0	9	0.7	0.7
25-40	5.0	12	119	0	8	1.5	0.2
40-50	5.1	24	113	0	6	1.9	0.4
50-55	5.2	12	81	0	6	1.5	0.2

Roanoke Series - Supplemental profile 1

Roanoke silt loam, woodlands, 0 to 2 percent slopes; 0.2 mile south of the junction of Highways VA-613 and VA-623, 50 yards east of Highway VA-613; elevation 15 feet.

AE--0 to 12 inches; grayish brown (2.5Y 5/2) silt loam; weak fine granular structure; friable, slightly sticky, nonplastic; many fine, medium, and coarse roots; common fine and medium tubular pores; clear smooth boundary.

Btg1--12 to 40 inches; gray (10YR 5/1) silty clay; common fine prominent yellowish brown (10YR 5/8); weak coarse prismatic parting to strong coarse angular and subangular blocky structure; firm, sticky, plastic; many fine and medium roots; continuous prominent clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual smooth boundary.

Btg2--40 to 64 inches; gray (N 5) silty clay; weak coarse prismatic parting to strong coarse angular and subangular blocky structure; firm, sticky, plastic; common fine and medium roots; continuous prominent clay films on faces of peds; common fine flakes of mica; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
inches	g kg ⁻¹ of soil							
12-32	2	2	4	21	25	54	413	533

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
inches	cmol (+) kg ⁻¹					%
12-32	2.20	1.58	0.14	18.02	21.94	17.87
62	6.50	9.40	0.18	2.38	18.46	87.11

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
inches	g kg ⁻¹		cmol (+) kg ⁻¹		%
12-32	10	4.62	10.65	14.57	26.90
62	3	6.70	0.10	16.18	99.38

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
inches	g kg ⁻¹ of clay							
12-32	280	180	60	240	30	50	0	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Seabrook Series

The Seabrook series consists of very deep, moderately well drained soils on low stream terraces. They formed in sandy fluvial sediments. Slopes range from 0 to 4 percent.

Seabrook loamy sand, cultivated, 0 to 2 percent slopes; 0.3 mile east-northeast of junction of Highways VA-600 and VA-622, 0.4 mile west-northwest of Highway VA-600 and C & O Railroad crossing, 175 yards south of C & O Railroad along farm lane; elevation 44 feet.

Ap--0 to 9 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine and medium roots; many fine tubular pores; moderately acid; gradual smooth boundary.

C1--9 to 20 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; loose; common fine and medium roots; many fine tubular pores; moderately acid; clear smooth boundary.

C2--20 to 26 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; common medium roots; common fine tubular pores; very strongly acid; clear smooth boundary.

C3--26 to 40 inches; yellowish brown (10YR 5/4) loamy sand; common medium prominent strong brown (7.5YR 5/6) and common medium prominent light gray (10YR 7/2) mottles; single grain; loose; few fine and medium roots; few fine tubular pores; few fine flakes of mica; very strongly acid; clear smooth boundary.

C4--40 to 53 inches; mottled yellowish brown (10YR 5/4) and light gray (10YR 7/2) loamy sand; single grain; loose; few fine flakes of mica; very strongly acid; clear wavy boundary.

Cg--53 to 60 inches; light gray (10YR 7/1) loamy sand; common coarse prominent yellowish brown (10YR 5/4) mottles; single grain; loose; few fine flakes of mica; approximately 5 percent rock fragments of rounded quartz gravel; very strongly acid; abrupt wavy boundary.

C5--60 to 80 inches; mottled reddish brown (5YR 4/4) and strong brown (7.5YR 5/8) gravelly sand; single grain; loose; few fine flakes of mica; approximately 25 percent of rounded quartz gravel; strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-9	11	70	287	391	104	862	60	78
9-20	4	25	173	534	133	869	96	35
20-26	0	14	185	539	140	878	69	53
26-40	4	13	139	559	165	881	48	71
40-53	8	65	202	465	137	877	50	73
53-60	30	225	458	206	32	952	16	32
60-70	169	292	344	139	16	960	8	32

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-9	2.23	0.60	0.12	1.60	4.55	64.84
9-20	0.85	0.25	0.07	0.20	1.37	85.40
20-26	0.45	0.13	0.06	2.00	2.64	24.24
26-40	0.61	0.19	0.09	1.40	2.29	38.86
40-53	0.57	0.23	0.09	0.80	1.69	52.66
53-60	0.38	0.11	0.05	2.00	2.54	21.26
60-70	0.30	0.08	0.03	1.40	1.81	22.65

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-9	--	5.74	0.25	3.20	92.19
9-20	--	5.86	0.05	1.22	95.90
20-26	--	4.86	0.75	1.39	46.04
26-40	--	4.86	1.35	2.24	39.73
40-53	--	4.80	2.65	3.54	25.14
53-60	--	4.98	0.75	1.29	41.86
60-70	--	5.30	0.45	0.86	47.67

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
inches	g kg ⁻¹ of sand					
20-26	900	60	5	0	0	35

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Slagle Series

The Slagle series consists of very deep, moderately well drained soils on uplands. They formed in loamy fluvial sediments. Slopes range from 0 to 6 percent.

Slagle fine sandy loam, in an area of Slagle-Emporia complex, cultivated, 0 to 2 percent slopes; 0.4 mile north of the junction of Highways VA-604 and VA-605, 1.4 miles northwest of the junction of Highway VA-659 and Virginia Division of Forestry fire trail 1557, 70 yards south of a 90-degree curve to the west on Highway VA-604; elevation 127 feet.

Ap--0 to 10 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine roots; common fine and medium tubular pores; moderately acid; abrupt smooth boundary.

Bt1--10 to 25 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common medium and fine tubular pores; few distinct clay films on faces of peds and bridges on sand grains; strongly acid; gradual smooth boundary.

Bt2--25 to 44 inches; mottled yellowish brown (10YR 5/8), strong brown (7.5YR 5/6), and grayish brown (10YR 5/2) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and medium tubular pores; many distinct clay films on faces of peds and bridges between sand grains; very strongly acid; gradual smooth boundary.

Bt3--44 to 63 inches; mottled yellowish red (5YR 5/8), light brownish gray (10YR 6/2), yellowish brown (10YR 5/8), and light gray (10YR 6/1) sandy clay loam; weak coarse, medium, and fine subangular and angular blocky structure; firm, sticky, plastic; few fine roots; few fine and medium tubular pores; common distinct clay films on faces of peds; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-10	26	71	158	246	98	599	290	111
10-25	20	54	111	189	93	467	267	266
25-44	22	54	108	179	77	440	257	303
44-63	21	54	95	174	89	434	162	404

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-10	1.62	0.47	0.30	1.20	3.59	66.57
10-25	1.84	0.89	0.21	5.00	7.94	37.03
25-44	1.18	0.86	0.14	7.40	9.58	22.76
44-63	0.65	0.71	0.11	8.00	9.47	15.52

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	6.00	0.05	2.37	97.89
10-25	--	5.20	0.45	3.39	86.73
25-44	--	4.82	2.55	4.73	46.09
44-63	--	4.50	4.05	5.52	26.63

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
10-25	955	20	0	0	0	25

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-10	6.0	384	59	11	69	--	--
10-25	5.0	384	107	2	39	--	--
25-44	4.7	240	90	2	28	--	--
44-63	4.5	156	79	1	23	--	--

Tetotum Series

The Tetotum series consists of very deep, moderately well drained soils on stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 6 percent.

Tetotum silt loam, cultivated, 2 to 6 percent slopes; 0.7 mile southwest of the junction of Highways VA-613 and VA-623, 0.3 mile north-northeast of James River, 100 yards northwest of Highway VA-613; elevation 22 feet.

Ap--0 to 10 inches; yellowish brown (10YR 5/4) silt loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium and few large tubular pores; moderately acid; abrupt smooth boundary.

BA--10 to 18 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, sticky, slightly plastic; few and common fine tubular pores; common distinct clay films on faces of peds; moderately acid; abrupt smooth boundary.

Bt1--18 to 26 inches; dark yellowish brown (10YR 4/6) silt loam; common fine distinct brownish yellow (10YR 6/6) mottles and common fine prominent very dark brown (10YR 2/2) mineral stains; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; common very fine flakes of mica; moderately acid; clear smooth boundary.

Bt2--26 to 40 inches; dark yellowish brown (10YR 4/6) silty clay loam; common medium prominent light brownish gray (10YR 6/2) mottles and very dark brown (10YR 2/2) mineral stains; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; common very fine flakes of mica; moderately acid; gradual smooth boundary.

Bt3--40 to 54 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles and very dark brown (10YR 2/2) mineral stains; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; few distinct clay films on faces of peds; common very fine flakes of mica; very strongly acid; gradual smooth boundary.

Bt4--54 to 64 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct brownish yellow (10YR 6/6) mottles and very dark brown (10YR 2/2) mineral stains; weak medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; few distinct clay films on faces of ped; common very fine flakes of mica; very strongly acid; gradual smooth boundary.

BC--64 to 72 inches; dark yellowish brown (10YR 4/6) loam; common medium prominent light gray (10YR 6/1) mottles and very dark brown (10YR 2/2) mineral stains; weak coarse subangular blocky structure; friable, sticky, plastic; few fine tubular pores; few distinct clay films on faces of ped; common very fine flakes of mica; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-10	8	9	13	52	76	157	638	205
10-18	12	13	11	41	81	158	618	224
18-26	4	7	8	33	67	119	652	229
26-40	4	10	10	32	69	125	554	321
40-54	0	10	18	52	86	165	527	308
54-64	0	6	11	57	134	208	473	319
64-72	1	3	5	5.5	123	187	552	261

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
inches	cmol (+) kg ⁻¹					%
0-10	3.95	1.16	0.48	6.37	11.96	46.74
10-18	2.92	1.11	0.18	4.98	9.19	45.81
18-26	4.19	1.90	0.15	6.57	12.81	48.71
26-40	3.21	2.50	0.14	7.56	13.41	43.62
40-54	1.83	2.40	0.12	8.56	12.91	33.69
54-64	1.43	2.40	0.12	9.75	13.70	28.83
64-72	1.57	2.60	0.11	10.75	15.03	28.48
68	1.60	2.60	0.10	10.15	14.45	29.76

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	5.80	0.05	5.64	99.11
10-18	--	5.96	0.05	4.26	98.83
18-26	--	5.93	0.05	6.29	99.21
26-40	--	5.60	0.35	6.20	94.35
40-54	--	4.90	1.35	5.70	76.32
54-64	--	4.80	1.95	5.90	66.95
64-72	--	5.05	2.05	6.33	67.61
68	--	5.00	3.25	7.55	56.95

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
26-40	180	310	250	240	20	0	0	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-10	6.2	552	97	17	157	1.2	12.5
10-18	6.4	408	102	2	34	0.3	3.7
18-26	6.2	516	120	2	26	0.2	3.6
26-40	5.7	372	120	3	22	0.2	3.4
40-54	5.2	264	120	6	22	0.3	5.4
54-64	5.0	168	120	6	18	0.5	3.6
64-72	5.0	216	120	5	20	0.6	2.4

Tetotum Series - Supplemental profile 1

Tetotum loam, woodlands, 0 to 2 percent slopes; 0.7 mile south of the junction of Highways VA-5 and VA-659, 0.6 mile east-northeast of Harrison Point; elevation 38 feet.

- Ap--0 to 10 inches; dark brown (10YR 4/3) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium and few large tubular pores; abrupt smooth boundary.
- Bt1--10 to 26 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few and common fine tubular pores; common distinct clay films on faces of peds; common fine flakes of mica; strongly acid; clear smooth boundary.
- Bt2--26 to 45 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent grayish brown (10YR 5/2) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; common fine flakes of mica; clear smooth boundary.
- Bt3--45 to 50 inches; mottled yellowish brown (10YR 5/6), grayish brown (10YR 5/2), strong brown (7.5YR 5/8), and very dark grayish brown (10YR 3/2) silty clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; common very fine flakes of mica; gradual smooth boundary.
- BCg--50 to 62 inches; mottled light gray (10YR 6/1), yellowish brown (10YR 5/6), very dark grayish brown (10YR 3/2), and strong brown (7.5YR 5/6) silty clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few distinct clay films on faces of peds; common very fine flakes of mica; strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
10-30	0	0	1	7	43	51	589	360

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
10-30	2.70	3.60	0.21	5.94	12.45	52.29
60	0.42	3.80	0.15	9.11	13.48	32.42

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
10-30	3	5.30	1.05	7.56	86.10
60	1	5.18	3.55	7.92	55.18

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
10-30	170	280	100	300	30	5	Tr	0

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Tetotum Series - Supplemental profile 2

Tetotum loam, cultivated, 0 to 2 percent slopes; 1.1 miles east-northeast of Harrison Point, 0.8 mile west-northwest of Westover Mansion on Westover Plantation; elevation 25 feet.

Ap--0 to 10 inches; dark brown (10YR 4/3) loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium and few large tubular pores; abrupt smooth boundary.

Bt1--10 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few and common fine tubular pores; common distinct clay films on faces of peds; common very fine flakes of mica; strongly acid; clear smooth boundary.

Bt2--22 to 34 inches; mottled yellowish brown (10YR 5/4), dark brown (7.5YR 3/4), and light gray (10YR 6/1) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; common very fine flakes of mica; clear smooth boundary.

Bt3--34 to 70 inches; mottled yellowish brown (10YR 5/4), dark brown (7.5YR 3/4), light gray (10YR 6/1), and very dark grayish brown (10YR 3/2) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many distinct clay films on faces of peds; common very fine flakes of mica; very strongly acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
10-30	1	3	7	35	54	100	517	383

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
10-30	3.62	2.30	0.14	6.34	12.40	48.87
60	0.42	3.60	0.09	7.13	11.24	36.57

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
	<u>g kg⁻¹</u>				
10-30	4	5.30	1.25	7.31	82.90
60	1	4.72	3.75	7.87	52.29

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
10-30	110	330	0	330	70	80	Tr	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Photo 8. Sand and gravel borrowed from substrata of Pamunkey, Tetotum, and Roanoke soils along the James River are excellent construction materials.



Tomotley Series

The Tomotley series consists of very deep, poorly drained soils on low flats and old stream channels. They formed in loamy fluvial sediments. Slopes range from 0 to 2 percent.

Tomotley fine sandy loam, woodlands, 0 to 2 percent slopes; 1.6 miles east of the junction of Highways VA-614 and VA-155, 0.5 mile northeast of the junction of Highway VA-614 and Virginia Division of Forestry Fire Trail 1501; elevation 40 feet.

Ag--0 to 4 inches; dark gray (5Y 4/1) fine sandy loam; moderate medium granular structure; very friable, slightly sticky, slightly plastic; many fine and medium and common coarse roots; common fine and medium tubular pores; extremely acid; abrupt smooth boundary.

Eg--4 to 8 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; weak fine granular structure; friable, sticky, slightly plastic; common fine and medium and few coarse roots; common fine and medium and few coarse tubular pores; very strongly acid; abrupt smooth boundary.

Btg1--8 to 15 inches; gray (5Y 5/1) fine sandy loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and few medium roots; common fine and medium tubular pores; many distinct clay films and bridges on sand grains; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2--15 to 38 inches; dark gray (5Y 4/1) sandy clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; many distinct clay films and bridges on sand grains; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg3--38 to 58 inches; gray (5Y 5/1) sandy clay loam; common medium prominent light olive brown (2.5Y 5/6) mottles; weak medium granular structure; friable, sticky, plastic; few fine roots; very strongly acid; gradual smooth boundary.

BCg--58 to 65 inches; light gray (N 6) fine sandy loam; common medium prominent light olive brown (2.5Y 5/6) mottles; massive; friable, sticky, slightly plastic; very strongly acid; clear smooth boundary.

Cg--65 to 75 inches; gray (5Y 5/1) loamy sand; massive; friable, sticky, slightly plastic; extremely acid.

Table A: Particle-size distribution

Depth	Sand						Silt	Clay
	VC	C	M	F	VF	Total		
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	10	14	246	412	19	701	283	16
4-8	2	10	17	536	29	747	192	61
8-15	3	9	153	421	20	606	230	164
15-38	3	7	105	346	19	480	186	334
38-58	2	7	102	383	19	514	183	303
58-65	3	7	148	607	16	782	45	173
65-75	1	8	166	686	15	876	3	121

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.17	0.10	0.06	6.37	6.70	4.93
4-8	0.10	0.05	0.03	2.59	2.77	6.50
8-15	0.45	0.12	0.05	7.76	8.38	7.40
15-38	0.54	0.21	0.09	10.75	11.59	7.25
38-58	0.29	0.19	0.09	11.94	12.51	4.56
58-65	0.17	0.12	0.07	8.16	8.52	4.23
65-75	0.11	0.08	0.04	6.57	6.80	3.38
58	0.14	0.10	0.06	7.36	7.66	3.92

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.14	1.85	2.18	15.14
4-8	--	4.50	1.25	1.43	12.59
8-15	--	4.72	3.05	3.67	16.89
15-38	--	4.75	7.00	7.84	10.71
38-58	--	4.64	7.90	8.47	6.73
58-65	--	4.52	5.50	5.86	6.14
65-75	--	4.36	3.95	4.18	5.50
58	--	4.44	4.65	4.95	6.06

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
15-38	170	190	0	450	30	250	0	Tr

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>	<u>ppm</u>						
0-4	4.2	48	14	2	20	0.7	1.2
4-8	4.5	36	7	1	20	0.4	0.7
8-15	4.8	60	12	1	14	0.9	0.9
15-38	4.8	96	19	0	14	--	--
38-58	4.6	60	15	0	15	--	--
58-65	4.5	36	9	0	12	0.2	0.2
65-75	4.5	24	6	3	9	0.1	0.2

Tomotley Series - Supplemental profile 1

Tomotley loam, woodlands, 0 to 2 percent slopes; 2.3 miles east-northeast of the junction of Highways VA-600 and VA-603, 0.8 mile west-northwest of the junction of Highway VA-106 and C&O Railroad, 80 yards north of Highway VA-600, 50 yards west of farm lane; elevation 47 feet.

A--0 to 6 inches; dark grayish brown (2.5Y 4/2) loam; common medium prominent dark yellowish brown (10YR 3/4) mottles; weak medium granular structure; friable, slightly sticky, slightly plastic; many fine and few medium roots; common fine and medium tubular pores; extremely acid; abrupt smooth boundary.

BAG--6 to 14 inches; gray (10YR 5/1) loam; common medium prominent dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium and few coarse tubular pores; very strongly acid; clear smooth boundary.

Btg1--14 to 24 inches; dark gray (5Y 4/1) loam; few medium prominent dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; many distinct clay films and bridges on sand grains; very strongly acid; clear smooth boundary.

Btg2--24 to 31 inches; gray (5Y 5/1) fine sandy loam; few fine prominent dark brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; friable,

sticky, plastic; few fine roots; common fine and medium tubular pores; many distinct clay films and bridges on sand grains; common distinct clay films on faces of peds; very strongly acid; abrupt smooth boundary.

Ab--31 to 36 inches; very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; friable, sticky, plastic; few fine roots; strongly acid; clear smooth boundary.

Btgb1--36 to 44 inches; gray (5Y 5/1) fine sandy loam; weak coarse subangular blocky structure; friable, sticky, plastic; few fine roots; strongly acid; clear smooth boundary.

Btgb2--44 to 74 inches; gray (N 5) clay loam; massive; friable, sticky, plastic; few fine and coarse roots; few highly weathered feldspar crystals; slightly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-6	34	36	88	109	14	281	487	232
6-14	16	72	139	88	5	320	434	246
14-24	26	34	78	122	21	282	496	222
24-31	14	50	126	285	52	527	348	125
31-36	11	53	201	303	52	620	270	110
36-44	14	43	173	338	66	634	249	117
44-74	15	27	87	272	70	478	283	239

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-6	2.39	0.33	0.16	18.80	21.68	13.28
6-14	2.73	0.37	0.10	17.00	20.20	15.84
14-24	2.48	0.31	0.07	11.20	14.06	20.34
24-31	2.02	0.27	0.04	4.00	6.33	36.81
31-36	2.72	0.37	0.03	4.00	7.12	43.82
36-44	3.03	0.52	0.03	3.60	7.18	49.86
44-74	7.22	2.11	0.14	0.80	10.27	92.21
56	8.20	2.17	0.11	2.00	12.48	83.97

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-6	55	4.38	2.55	5.43	53.04
6-14	52	4.65	1.95	5.15	62.14
14-24	52	4.76	1.45	4.31	66.36
24-31	21	5.04	0.45	2.78	83.81
31-36	34	5.23	0.25	3.37	92.58
36-44	--	5.52	0.15	3.73	95.98
44-74	--	6.48	0.05	9.52	99.47
56	--	--	0.05	10.53	99.52

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
14-31	950	25	0	0	5	20

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-6	4.3	336	26	21	36	6.1	8.9
6-14	4.8	540	43	13	31	6.1	13.7
14-24	4.7	612	48	15	29	4.4	16.1
24-31	4.7	384	31	16	14	0.7	11.8
31-36	5.0	552	43	11	12	0.5	8.1

Turbeville Series

The Turbeville series consists of very deep, well drained soils on medium to narrow rises on high river terraces. They formed in fluvial sediments. Slopes range from 2 to 6 percent.

Turbeville loam, woodlands, 2 to 6 percent slopes; 350 yards north of the junction of Highways VA-607 and VA-609, 150 yards west of Highway VA-609; elevation 125 feet.

A--0 to 4 inches; dark brown (7.5YR 4/4) loam; moderate medium and fine granular structure; friable, slightly sticky, slightly plastic; common fine and medium roots; few medium tubular pores; very strongly acid; clear smooth boundary.

BA--4 to 8 inches; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; common fine and medium and few coarse tubular pores; few distinct clay films on faces of peds and many distinct clay films and clay bridges on sand grains; very strongly acid; clear smooth boundary.

Bt1--8 to 15 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2--15 to 25 inches; dark reddish brown (2.5YR 3/4) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; few fine tubular pores; common distinct clay films on faces of peds and many distinct clay films and bridges on sand grains; strongly acid; gradual smooth boundary.

Bt3--25 to 50 inches; dark red (10R 3/6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds and many distinct clay films and bridges on sand grains; less than 1 percent quartz fragments less than 0.5 inch in diameter; strongly acid; gradual smooth boundary.

Bt4--50 to 72 inches; dark red (10R 3/6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; less than 1 percent quartz fragments less than 0.5 inch in diameter; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
0-4	5	51	138	140	55	388	513	99
4-8	15	53	104	151	56	379	405	216
8-15	10	45	88	124	52	319	329	352
15-25	11	42	96	109	51	309	296	395
25-50	8	41	89	103	54	293	211	496
50-72	11	34	86	109	52	292	184	524

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	1.28	0.45	0.19	9.15	11.07	17.34
4-8	0.80	0.44	0.16	5.77	7.17	19.53
8-15	1.48	0.89	0.21	8.16	10.74	24.02
15-25	2.42	1.25	0.20	9.75	13.62	28.41
25-50	1.10	1.44	0.30	8.96	11.80	24.07
50-72	0.12	0.59	0.46	9.35	10.52	11.12
58	0.07	0.54	0.45	10.35	11.41	9.29

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	37	4.92	1.35	3.27	58.72
4-8	13	5.05	1.10	2.50	56.00
8-15	7	5.11	1.65	2.82	41.49
15-25	5	5.22	1.30	5.17	74.85
25-50	2	5.14	2.55	5.39	52.69
50-72	1	5.38	4.00	5.17	22.63
58	1	5.34	4.00	5.06	20.95

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.9	72	30	1	26	0.5	6.2
4-8	5.1	120	41	0	37	0.2	6.7
8-15	5.0	180	59	0	40	0.1	6.2
15-25	5.1	324	63	0	29	0.1	5.2
25-50	5.7	312	116	1	45	0.1	1.8
50-72	5.2	72	77	1	91	0.1	0.8

Turbeville Series - Supplemental profile 1

Turbeville loam, cultivated, 2 to 6 percent slopes; 0.8 mile south of the junction of Highways VA-5 and VA-618, 0.5 mile northwest of Wilcox Wharf, 270 yards north of the James River near Virginia Power pole #64856 on River's Edge Farm; elevation 70 feet.

Ap--0 to 10 inches; dark brown (7.5YR 4/4) loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; common fine roots; few medium tubular pores; strongly acid; abrupt smooth boundary.

Bt1--10 to 16 inches; yellowish red (5YR 4/6) loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and medium and few coarse tubular pores; common faint clay films on faces of peds and many distinct clay films and clay bridges on sand grains; common fine flakes of mica; strongly acid; clear smooth boundary.

Bt2--16 to 35 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine and medium tubular pores; common prominent clay films on faces of peds; common fine flakes of mica; moderately acid; gradual smooth boundary.

Bt3--35 to 56 inches; dark red (2.5YR 3/6) silt loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many prominent clay films on faces of peds and many distinct clay films and bridges on sand grains; common fine flakes of mica; very strongly acid; diffuse smooth boundary.

Bt4--56 to 70 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine tubular pores; many prominent clay films on faces of peds and many distinct clay films and bridges on sand grains; common fine flakes of mica; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-10	1	10	49	209	94	363	383	254
10-16	3	27	104	250	110	494	350	156
16-35	3	7	43	189	90	332	299	369
35-56	1	2	12	77	41	134	692	174
56-70	2	3	25	196	89	315	248	437

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-10	2.28	0.60	0.49	4.60	7.97	42.28
10-16	1.75	0.40	0.52	2.60	5.27	50.66
16-35	3.60	0.80	0.29	4.20	8.89	52.76
35-56	0.87	1.57	0.20	8.00	10.64	24.81
56-70	0.43	1.82	0.24	9.40	11.89	20.94

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-10	--	5.35	0.15	3.52	95.74
10-16	--	5.20	0.25	2.92	91.44
16-35	--	5.78	0.05	4.74	98.95
35-56	--	4.58	3.05	5.69	46.40
56-70	--	4.64	3.65	6.14	40.55

Table D: Clay mineralogy

Depth	HIV*	Mica	Verm*	Kaolinite	Quartz	Mont*	Gibbsite	Misc*
<u>inches</u>	<u>g kg⁻¹ of clay</u>							
10-16	380	200	0	310	20	50	10	30

*HIV = hydroxy interlayered vermiculite; Verm = vermiculite; Mont = montmorillonite; Misc = miscellaneous; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-10	5.3	324	45	24	157	--	--
10-16	5.4	384	68	3	157	--	--
16-35	5.7	636	78	2	70	--	--
35-56	5.7	228	120	3	39	--	--
56-70	4.6	96	120	3	44	--	--

Uchee Series

The Uchee series consists of very deep, well drained soils on upland rises and sideslopes. They formed in loamy fluvial and marine sediments. Slopes range from 2 to 10 percent.

Uchee loamy sand, in a unit of Craven-Uchee complex, woodlands, 6 to 10 percent slopes; 1.0 mile west of the junction of Highways VA-618 and VA-602 and 200 yards south of Highway VA-602; elevation 115 feet.

A--0 to 4 inches; dark gray (10YR 4/1) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; few fine and common roots; common fine and medium and few large tubular pores; extremely acid; abrupt smooth boundary.

E--4 to 26 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; very friable, nonsticky, nonplastic; few fine roots; common fine and medium and few large tubular pores; very strongly acid; gradual smooth boundary.

BE--26 to 30 inches; light yellowish brown (10YR 6/4) sandy loam; common medium prominent brownish yellow (10YR 6/8) mottles; weak fine granular structure; friable, slightly sticky, slightly plastic; few fine and medium roots; common fine and medium and few large tubular pores; many distinct clay films and bridges on sand grains; very strongly acid; clear smooth boundary.

Bt--30 to 50 inches; brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and medium tubular pores; very strongly acid; clear smooth boundary.

C--50 to 60 inches; yellowish brown (10YR 5/8) clay loam; common medium prominent yellowish red (5YR 5/6), strong brown (7.5YR 5/6), and light gray (10YR 6/1) mottles; massive; compact in place; friable, sticky, plastic; few fine roots; few fine tubular pores; very strongly acid.

Uchee Series - Supplemental profile 1

Uchee loamy sand, woodlands, 2 to 6 percent slopes; 1.4 miles northeast of the junction of Highways VA-650 and VA-655, 0.5 mile northwest of the junction of

Highways VA-609 and VA-650, 0.4 mile north-northeast of the junction of Highway VA-650 and Virginia Power transmission tower; elevation 141 feet.

A--0 to 4 inches; grayish brown (10YR 5/2) loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; common fine and medium and few large tubular pores; extremely acid; abrupt smooth boundary.

E--4 to 23 inches; light yellowish brown (10YR 6/4) fine sandy loam; single grain; loose; nonsticky, nonplastic; common fine and few medium roots; common fine and medium and few large tubular pores; very strongly acid; clear smooth boundary.

BE--23 to 29 inches; light yellowish brown (10YR 6/4) fine sandy loam; moderate medium granular structure; friable, sticky, slightly plastic; few fine roots; common fine and medium and few large tubular pores; few distinct clay films and bridges on sand grains; very strongly acid; abrupt smooth boundary.

Bt1--29 to 34 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and medium tubular pores; common distinct clay films and bridges on sand grains; very strongly acid; clear smooth boundary.

Bt2--34 to 51 inches; yellowish brown (10YR 5/8) clay loam; many common prominent yellowish red (5YR 5/8) and light gray (10YR 6/1) and many common distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine and medium tubular pores; common distinct clay films and bridges on sand grains; very strongly acid; gradual smooth boundary.

Bt3--51 to 72 inches; mottled yellowish red (5YR 4/6), strong brown (7.5YR 5/8), yellowish brown (10YR 5/6), and light gray (10YR 6/1) clay; weak medium subangular blocky structure; firm, sticky, plastic; few fine roots; few fine tubular pores; many distinct clay films and bridges on sand grains; very strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
inches	g kg ⁻¹ of soil							
0-4	14	32	183	459	73	761	179	60
4-23	1	2	84	481	115	683	244	73
23-29	1	3	51	456	108	619	224	157
29-34	1	1	55	393	106	556	180	264
34-51	0	0	19	301	117	437	213	350
51-72	0	1	9	280	89	379	169	452

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
0-4	0.76	0.24	0.08	8.36	9.44	11.44
4-23	0.05	0.04	0.04	1.19	1.32	9.85
23-29	0.29	0.20	0.06	1.39	1.94	28.35
29-34	0.55	0.67	0.08	3.38	4.68	27.78
34-51	0.19	0.54	0.10	6.77	7.60	10.92
51-72	0.05	0.45	0.09	10.35	10.94	5.39
60	0.03	0.51	0.10	9.75	10.39	6.16

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>		<u>cmol (+) kg⁻¹</u>		<u>%</u>
0-4	--	4.29	1.65	2.73	39.56
4-23	--	4.00	0.85	0.98	13.27
23-29	--	4.83	1.45	2.00	27.50
29-34	--	4.94	2.25	3.55	36.62
34-51	--	4.93	3.85	4.68	17.74
51-72	--	4.90	6.05	6.64	8.89
60	--	4.92	7.05	7.69	8.32

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
29-51	975	0	0	0	20	5

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Table F: Chemical properties

Depth	pH	Ca	Mg	P	K	Zn	Mn
<u>inches</u>		<u>ppm</u>					
0-4	4.7	60	17	1	15	--	--
4-23	5.0	36	8	0	9	--	--
23-29	4.9	48	20	0	12	--	--
29-34	5.3	108	72	0	15	--	--
34-51	5.4	60	54	0	20	--	--
51-72	5.3	24	38	0	12	--	--

Wickham Series

The Wickham series consists of very deep, well drained soils on high stream terraces. They formed in loamy fluvial sediments. Slopes range from 0 to 6 percent.

Wickham fine sandy loam, cultivated, 2 to 6 percent slopes; 0.3 mile east of the junction of Highways VA-5 and VA-618, 0.5 mile west of Highway VA-5 and Gunns Run, 70 yards south of Highway VA-5; elevation 65 feet.

Ap--0 to 12 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium granular structure; very friable, slightly sticky, nonplastic; strongly acid; abrupt smooth boundary.

Bt1--12 to 50 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common medium tubular pores; few prominent clay films on faces of peds; few fine flakes of mica; moderately acid; gradual smooth boundary.

Bt2--50 to 62 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few prominent clay films on faces of peds; few fine flakes of mica; strongly acid.

Table A: Particle-size distribution

Depth	Sand					Total	Silt	Clay
	VC	C	M	F	VF			
<u>inches</u>	<u>g kg⁻¹ of soil</u>							
12-32	6	43	175	236	49	509	161	330

Table B: Chemical properties

Depth	Exchangeable cations				CEC	BS
	Ca	Mg	K	H		
<u>inches</u>	<u>cmol (+) kg⁻¹</u>					<u>%</u>
12-32	3.71	1.06	0.23	4.95	9.95	50.25
62	1.17	1.20	0.11	5.94	8.42	29.45

Table C: Chemical properties

Depth	Organic matter	pH	Al	ECEC	EBS
<u>inches</u>	<u>g kg⁻¹</u>			<u>cmol (+) kg⁻¹</u>	<u>%</u>
12-32	3	5.90	0.10	5.10	98.04
62	1	4.47	1.45	3.93	63.10

Table E: Sand mineralogy

Depth	Quartz	Feldspar	Plagioclase	Mica	Opaque minerals*	Heavy minerals*
<u>inches</u>	<u>g kg⁻¹ of sand</u>					
12-32	790	110	10	20	0	70

*Opaque minerals are ilmenite, magnetite, hematite, etc.; Heavy minerals are translucent zircon, tourmaline, rutile, epidote, hornblende, etc.; Tr = Trace.

Virginia's Agricultural Experiment Stations

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| <p>1—Blacksburg
Virginia Tech, Main Station
Dairy, Poultry, and all other topics</p> <p>2—Steeles Tavern
Shenandoah Valley Agricultural Experiment Station
Beef, Forages, Fruit, Insect and Pest Control, Sheep</p> <p>3—Orange
Northern Piedmont Agricultural Experiment Station
Alfalfa, Corn, Crops, Small Grains</p> <p>4—Winchester
Winchester Agricultural Experiment Station
Fruit, Insect and Pest Control</p> <p>5—Middleburg
Middleburg Agricultural Experiment Station
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