Physical and Chemical Characteristics of Rappahannock County Soils

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PHYSICAL AND CHEMICAL CHARACTERISTICS OF RAPPAHANNOCK COUNTY SOILS*

Introduction

A soil survey of Rappahannock County, Virginia, made cooperatively by the Virginia Agricultural Experiment Station and the Soil Conservation Service was completed May 1958. To get the greatest value from this soil survey, studies were made of the physical and chemical properties of the soils.

The soil survey map shows the extent and location of the various kinds of soil in the county. The soil survey report classifies these kinds of soils or groups them according to use and management classes for specific purposes. These groupings are based upon interpretations of their morphological, genetic, and physico-chemical properties.

As a help in classifying the different soils and in making interpretations for use and management, laboratory studies were made during the progress of the soil survey, and on completion of the field mapping soil samples were collected for chemical and physical analyses. The data presented here supplement that included in the soil survey report and related publications.

Explanation of Chemical Data

When a proper balance of plant food and organic matter is maintained in the surface 6 or 7 inches of a well drained soil, optimum plant growth may be expected. Certain properties of the soil profile such as effective

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depth, structure, texture, and consistency are also quite important. These characteristics largely determine water storage and movement, and crop adaptation to the soil. The parent material, designated by the C horizon in Table 1 is in some cases quite important as a source of plant nutrients. Examples of this are found in some of the younger soils such as Brandywine, Louisburg, and Hazel.

In Table 1 the A_0 horizon is not true soil but consists of partly decomposed plant remains. The A horizon includes that portion of the soil which is plowed and, in Virginia, is that layer of the soil which is affected most by leaching and erosion. The B horizon represents layers of subsoil, the B_2 ordinarily being finer than the rest of the soil. Soil parent material is the C horizon, and where this is layered, C_1, C_2, etc., are used.

Degree of soil acidity is expressed by pH. The following descriptive designations have been applied to pH values:

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

Truog phosphorus which is dilute acid soluble phosphorus, is an estimate of the amount of phosphorus readily available to plants in acid soils. Generally, it is considered that 25 parts per million (50 lbs. per acre) is adequate for most crops grown in Virginia.

Calcium, magnesium, and potassium, which are exchangeable cations, are important plant nutrients. When these elements are in exchangeable form, they are available to plants to varying degrees. Potassium is generally more available and calcium less available than magnesium. As these bases are removed by plants, aluminum and hydrogen ions take their place. Because aluminum acts as an acid like hydrogen, the exchangeable hydrogen reported includes exchangeable aluminum. The percent base saturation is the proportion of the total cations that is made up of exchangeable calcium, magnesium, and potassium. For Virginia conditions a fertile soil usually has a high percent base saturation.

The sum of the exchangeable cations, including aluminum and hydrogen, is equal to the total cation exchange capacity of the soil. The value is usually high when there is higher clay or organic matter content in the soil. Certain types of clay yield a higher value than others, but with few exceptions, humus or organic matter give a higher value, pound for pound, than clay. The higher the cation exchange capacity, the greater the nutrient holding capacity of the soil. Soils with low cation exchange capacities release stored nutrients to plants relatively more easily at lower total nutrient content. It is much easier to raise the pH of a low exchange capacity soil.

The notation milli-equivalents per 100 grams of soil can be converted to pounds per acre of soil on the basis that an acre of soil 6 or 7 inches deep weighs approximately 2,000,000 pounds. One m.e./100 gms. is equal to 940 pounds of potash or 1,000 pounds of limestone ($CaCO_3$) or 840 pounds of magnesium carbonate.

In Virginia a condition of at least 50 percent base saturation is desired in the surface 6 to 7 inches. These bases should be present in a proportion of about ten times as much calcium and two times as much magnesium as potassium as long as there is a minimum of 0.3 m.e. of potassium. A soil with a total of 10 m.e. of exchangeable cations would have a good nutrient condition if there were 5 m.e. hydrogen, 4 m.e. calcium, 0.7 m.e. magnesium, and 0.3 m.e. potassium. If the soil has a high cation exchange capacity, it would be important to have much more calcium and slightly more potassium and magnesium. If the soil has a smaller cation exchange capacity, the calcium requirement is less, but the magnesium and, most important, the potassium level should be the same. Many cultivated soils in parts of Virginia contain a high proportion of magnesium as a result of the widespread use of dolomitic limestone. This may be unfavorable if the build-up of magnesium continues.

Table 1 gives chemical characteristics of the soil types mapped in the Soil Survey of Rappahannock County. Table 2 shows the results of the physical analyses of the same soils. These were made in the Soil Conservation Service Soil Survey Laboratories at Lincoln, Nebraska.

For adjective textural ratings of each profile in Table 2 refer to the chart in the Soil Survey Manual, Agricultural Handbook No. 18, USDA (Fig. 38) showing the percentages of clay, silt, and sand.

Table 3 gives the results of tests made by the Virginia Department of Highways. These mechanical analyses were run according to the standard procedure of the American Association of State Highway Official Designation T88, and the results differ somewhat from those reported in Table 2. In the A.A.S.H.O. procedure, the fine material is analyzed by the hydrometer and the various grain-size fractions are calculated on the basis of all the material including that which is coarser than 2 millimeters in diameter. The analysis in Table 3, therefore, is not suitable for use in designating soil textural classes. According to the Soil Conservation Service Soil Survey Laboratory procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions.

Table 4 gives the results of tests made by Soil Survey Laboratory, Beltsville, Maryland. The data includes moisture retention and bulk density values as well as hydraulic conductivity and in-place percolation rates of some of the scils of Rappahannock County. See appendix for Methods and Procedure.

Descriptions of soils occurring in Tables 1, 2, 3, and 4 may be found in the preliminary Soil Survey Report of Rappahannock County. They will also be available in the final soil survey report of the county when this is published.

Soils of Rappahannock County have a special significance in that they occur in the transition zone between the northern and southern Piedmont areas.

TABLE 1

Horizon	Depth (in.)	pH	Truog P (ppm)	Organic Matter (%)	Mn[1] ppm	Exchangeable Cations[2] Ca	Mg	K	H	Total*	Base Saturation (%)
ALBEMARLE FINE SANDY LOAM (119)											
A_1	0-1	3.91	7.7	8.03	0.11	0.28	0.26	0.29	14.90	15.73	5.28
A_2	1-11	4.50	1.6	1.68	0.18	0.04	0.07	0.25	5.82	6.18	5.83
B_1	11-14	4.60	1.1	0.61	0.29	0.06	0.19	0.26	7.40	7.91	6.45
B_2	14-28	4.80	2.4	0.26	0.37	0.07	0.75	0.36	9.14	10.32	11.43
B_3	28-37	4.90	2.2	0.19	0.18	0.07	0.38	0.27	7.95	8.67	8.30
C_1	37-45	4.64	1.0	0.12	0.11	0.04	0.16	0.16	5.23	5.59	6.44
ALTAVISTA LOAM (63)											
A_p	0-8	5.28	5.8	2.15	3.11	2.54	1.02	0.11	9.11	12.78	28.72
B_1	8-13	4.82	11.0	0.52	0.11	2.79	1.05	0.10	8.24	12.18	32.35
B_{21}	13-18	4.82	11.0	0.50	0.18	3.23	1.44	0.12	9.14	13.93	34.39
B_{22}	18-30	4.92	9.4	0.32	0.18	2.81	1.99	0.16	10.44	15.40	32.21
C_1	30-36+	4.98	17.4	0.19	0.07	1.12	1.60	0.16	10.32	13.20	21.82
AUGUSTA SILT LOAM (64)											
A_p	0-11	5.53	5.5	2.12	2.19	2.60	1.35	0.32	6.73	11.00	38.82
B_1	11-15	4.72	2.4	0.88	0.48	1.71	0.71	0.08	7.89	10.39	24.06
B_2	15-26	4.76	4.9	0.81	0.18	2.45	1.10	0.10	11.69	15.34	23.79
B_3	26-39	4.96	5.4	0.66	0.07	1.82	1.35	0.12	13.16	16.45	20.00
C_1	39-54	4.72	8.6	0.23	0.04	1.05	1.34	0.14	10.41	12.94	19.55
BELVOIR LOAM (31)											
A_p	0-8	5.36	5.3	3.30	2.74	3.70	0.87	0.13	8.25	12.95	36.29
B_1	8-12	5.02	2.1	0.77	0.73	3.95	1.98	0.09	8.43	14.45	41.66
$B_{21}G$	12-23	5.38	2.9	0.48	0.91	5.86	5.18	0.13	6.81	17.98	62.12
$B_{22}G$	23-30	5.84	17.3	0.21	1.65	7.87	8.13	0.15	5.47	21.62	74.70
C_1	30-38	6.02	27.5	0.16	1.46	7.29	7.23	0.12	5.18	19.82	73.86
BRANDYWINE GRITTY LOAM (127)											
A_1	0-3	4.95	4.7	6.53	6.95	0.16	0.19	0.51	13.13	13.99	6.15
A_3	3-12	4.94	6.8	0.70	1.10	0.20	0.21	0.33	4.88	5.62	13.17
C_1	12-16+	5.14	3.3	0.30	1.28	0.39	0.78	0.32	4.45	5.94	25.08

Horizon	Depth (in.)	pH	Truog P (ppm)	Organic Matter (%)	Mn[1] ppm	Exchangeable Cations[2] Ca	Mg	K	H	Total*	Base Saturation (%)
BRANDYWINE LOAM (126)											
A_1	0-3	4.32	8.7	4.81	1.83	0.49	0.19	0.20	13.39	14.27	6.17
A_2	3-10	4.54	3.1	1.54	0.18	0.12	0.04	0.10	7.63	7.89	3.30
B_2	10-14	4.82	2.0	0.49	0.26	0.87	0.31	0.12	5.95	7.25	17.93
C_1	14-20	4.98	1.5	0.19	0.18	0.84	0.85	0.14	4.94	6.77	27.03
C_2	20-38	4.80	2.2	0.07	1.28	0.14	0.48	0.12	2.77	3.51	21.08
CHESTER LOAM (42)											
A_p	0-8	5.52	31.2	2.52	2.74	2.53	0.81	0.25	6.24	9.83	36.52
B_1	8-11	4.82	8.3	0.60	0.37	1.11	0.38	0.19	5.37	7.05	23.83
B_2	11-22	4.70	3.4	0.37	0.15	2.02	0.38	0.20	6.96	9.56	27.20
B_3	22-29	4.38	2.0	0.26	0.11	1.97	0.23	0.20	8.12	10.52	22.81
C_1	29-44	4.28	2.5	0.23	0.37	1.07	0.17	0.20	5.00	6.44	22.36
C_2	44-120	4.78	3.9	0.05	0.04	0.07	0.15	0.24	3.34	3.80	12.11
DYKE LOAM (96)											
A_p	0-8	6.08	170.7	3.55	8.41	9.26	1.27	1.65	8.21	20.39	59.74
B_1	8-18	6.32	23.6	0.83	2.38	6.74	1.10	0.75	5.31	13.90	61.80
B_{21}	18-29	6.78	14.5	0.31	0.37	7.33	1.27	0.48	5.02	14.10	64.40
B_{22}	29-40	6.96	15.9	0.21	0.18	7.40	1.15	0.49	4.82	13.86	65.22
B_3	40-72	4.72	13.5	0.12	0.18	0.95	1.32	0.22	9.92	12.41	20.06
C_1	72-93	4.68	11.8	0.10	0.18	1.43	1.27	0.24	10.24	13.18	22.31
C_2	93-147	4.54	4.8	0.14	0.18	1.83	1.90	0.38	12.24	16.35	25.14
EUBANKS AND LLOYD LOAMS (39)											
A_p	0-5	6.04	37.3	2.38	2.19	3.97	0.92	0.90	5.31	11.10	52.16
B_1	5-9	5.16	3.6	1.04	2.01	2.17	0.49	0.68	5.49	8.83	37.83
B_{21}	9-17	4.92	3.9	0.38	2.74	2.43	1.37	0.42	7.78	12.00	35.17
B_{22}	17-26	4.58	2.9	0.22	3.11	0.88	1.48	0.27	8.50	11.13	23.63
B_3	26-34	4.88	6.8	0.09	0.55	0.06	1.17	0.25	9.27	10.75	13.77
C_1	34-79	4.72	3.8	0.06	0.37	0.00	0.80	0.19	7.94	8.93	11.09
C_2	79-96	4.72	5.0	0.04	0.18	0.00	0.52	0.23	7.91	8.66	8.66
EUBANKS AND LLOYD STONY LOAMS (101)											
A_p	0-4	5.10	2.4	3.35	2.38	2.17	0.96	0.42	9.24	12.79	27.76
B_2	4-20	4.92	3.4	0.43	0.91	0.48	1.75	0.30	6.81	9.34	27.09
B_3	20-25	5.08	3.4	0.18	0.18	0.04	1.83	0.21	7.10	9.18	22.66
C_1	25-58	4.96	5.8	0.05	0.18	0.04	0.72	0.30	6.37	7.43	14.27

Horizon	Depth (in.)	pH	Truog P (ppm)	Organic Matter (%)	Mn[1] ppm	Exchangeable Cations[2] Ca	Mg	K	H	Total*	Base Saturation (%)
						HALEWOOD STONY FINE SANDY LOAM (112)					
A_p	0-6	4.56	2.4	2.93	0.37	0.27	0.15	0.19	9.06	9.67	6.31
B_1	6-9	4.60	1.9	1.10	0.18	0.61	0.34	0.17	6.37	7.49	14.95
B_2	9-24	4.98	1.4	0.29	0.37	0.87	1.00	0.21	6.49	8.57	24.27
B_3	24-30	4.86	1.9	0.12	0.18	0.16	0.80	0.29	6.23	7.48	16.71
C_1	30-64	5.00	3.1	0.06	1.28	0.07	0.44	0.19	4.92	5.62	12.46
						HAZEL LOAM (27)					
A_1	0-2	5.00	9.5	5.22	3.84	3.17	0.86	0.48	12.00	16.51	27.32
A_2	2-7	5.12	7.4	2.03	0.91	1.31	0.39	0.26	7.98	9.94	19.72
C_1	7-46	5.12	9.7	0.29	0.73	0.87	0.60	0.27	4.59	6.33	27.49
C_2	46-58	5.10	9.5	0.12	0.73	0.43	0.46	0.32	3.63	4.84	25.00
						HIWASSEE LOAM (94)					
A_p	0-5	5.68	5.0	4.64	0.73	4.22	0.91	0.55	8.56	14.24	39.89
A_3	5-8	5.08	3.7	2.97	0.73	1.14	0.46	0.32	8.99	10.91	17.60
B_{21}	8-15	4.88	4.3	1.32	0.18	1.55	0.96	0.53	9.57	12.61	24.11
B_{22}	15-67	4.98	8.6	0.42	0.37	0.08	1.14	0.47	12.47	14.16	11.94
B_3	67-114	4.90	11.0	0.12	0.18	0.00	0.35	0.20	9.40	9.95	5.53
D	114-132	4.98	11.1	0.03	1.28	0.00	0.22	0.44	7.08	7.74	8.53
						LOUISBURG SANDY LOAM (26)					
A_1	0-10	4.60	1.6	1.46	0.18	0.00	0.06	0.21	4.88	5.15	5.24
A_3	10-15	4.62	2.0	0.60	0.18	0.03	0.24	0.28	5.34	5.89	9.34
C_1	15-24	4.78	1.4	0.11	0.18	0.04	0.32	0.20	3.48	4.04	13.86
						MEADOWVILLE LOAM (51)					
A_{p1}	0-11	6.96	6.4	2.39	1.10	7.04	0.49	0.08	4.63	12.24	62.17
A_3	11-21	6.38	3.4	1.40	0.91	4.28	0.23	0.08	6.78	11.37	40.37
B_2	21-28	6.16	3.4	0.43	0.91	2.95	0.23	0.09	4.49	7.76	42.14
B_3	28-36	5.52	1.6	0.15	0.37	1.79	0.61	0.08	3.76	6.24	39.74
C_1	36-41+	5.28	1.6	0.15	0.91	1.47	1.09	0.14	4.34	7.04	38.35
						MYERSVILLE STONY SILT LOAM (136)					
A_{p1}	0-5	4.56	7.9	8.60	13.82	0.30	0.52	0.75	24.05	25.62	6.13
B_1	5-11	4.62	3.2	3.94	5.12	0.08	0.26	0.40	18.66	19.40	3.81
B_2	11-26	4.66	1.9	1.83	9.87	0.12	0.34	0.33	17.07	17.86	4.42
C_1	26-46	4.92	3.4	0.27	12.25	0.81	0.87	0.32	17.91	19.91	10.05

Horizon	Depth (in.)	pH	Truog P (ppm)	Organic Matter (%)	Mn[1] ppm	Exchangeable Cations[2] Ca	Mg	K	H	Total*	Base Saturation (%)
PORTERS STONY LOAM (109)											
A_0	2-0	4.12	42.0	43.26	30.00	15.43	3.99	1.59	72.69	93.70	22.42
A_1	0-2	4.38	11.7	18.11	16.09	5.06	1.16	0.89	31.33	38.44	18.50
A_2	2-9	4.90	5.5	2.73	0.37	0.38	0.27	0.47	10.45	11.57	9.68
B_2	9-21	4.96	3.7	0.90	0.37	0.48	0.51	0.39	8.17	9.55	14.45
C_1	21-42	4.88	3.4	0.68	0.37	0.25	1.99	0.51	8.89	11.64	23.63
ROANOKE SILT LOAM (58)											
A_p	0-10	5.20	6.0	2.24	8.41	3.18	1.29	0.08	11.18	15.73	28.93
B_1	10-13	5.02	15.9	0.50	1.28	1.02	0.50	0.05	5.24	6.81	23.05
$B_{21}G$	13-18	4.70	2.2	0.21	0.73	3.24	1.79	0.11	8.60	13.74	37.41
$B_{22}G$	18-30	4.72	2.9	0.35	0.37	4.29	2.57	0.15	10.48	17.49	40.08
C_1	30-36+	4.88	9.6	0.15	0.91	2.88	2.05	0.08	6.52	11.53	43.45
STONY LOCAL ALLUVIAL LAND (106)											
A	0-13	5.06	3.9	2.84	5.85	2.16	0.45	0.18	10.25	13.04	21.40
B_2	13-27	5.32	11.6	0.70	3.84	1.71	0.27	0.10	6.34	8.42	24.70
C_1	27-35	5.42	16.6	0.32	2.74	2.15	0.90	0.14	4.78	7.97	40.03
UNISON LOAM (65)											
A_p	0-8	6.00	27.3	2.31	1.65	4.20	0.83	0.21	6.23	11.47	45.68
B_1	8-18	5.30	15.1	0.40	1.46	2.76	1.19	0.13	6.40	10.48	38.93
B_2	18-35	4.82	10.6	0.21	0.91	1.48	1.89	0.17	9.12	12.66	27.96
B_3	35-43	4.78	11.9	0.12	0.73	0.40	1.37	0.17	10.31	12.25	15.84
C_1	43-49+	4.82	9.5	0.22	0.55	0.45	1.39	0.20	11.56	13.60	15.00
UNISON LOAM (92)											
A_p	0-8	5.28	3.6	1.84	1.65	1.77	0.28	0.14	4.89	7.08	30.93
A_3	8-10	4.84	1.0	0.89	1.28	0.92	0.21	0.09	4.05	5.27	23.15
B_{21}	10-18	4.68	1.6	0.32	1.10	1.32	0.46	0.13	4.52	6.43	29.70
B_{22}	18-26	4.82	1.9	0.15	0.37	1.48	0.64	0.12	4.75	6.99	32.05
B_3G	26-37	4.72	2.9	0.08	0.18	0.41	0.78	0.19	8.54	9.92	13.91
C_1	37-67	4.50	3.4	0.08	0.37	0.16	0.51	0.13	9.01	9.81	8.15
WICKHAM LOAM (89)											
A_p	0-10	5.72	17.4	1.86	1.83	4.60	1.00	0.19	7.38	13.17	43.96
B_2	10-38	4.82	22.7	0.24	1.83	1.85	1.74	0.22	10.02	13.83	27.55
B_3	38-52	4.78	15.3	0.15	0.55	0.32	1.42	0.27	10.14	12.15	16.54
C_1	52-70	4.74	9.1	0.16	0.55	0.13	0.83	0.20	8.72	9.88	11.74

Horizon	Depth (in.)	pH	Truog P (ppm)	Organic Matter (%)	Mn[1] ppm	Exchangeable Cations[2] Ca	Mg	K	H	Total*	Base Saturation (%)
						WORSHAM SILT LOAM (8)					
A_p	0-4	4.80	3.4	3.10	14.63	1.10	0.44	0.25	9.41	11.20	15.98
A_2	4-8	4.96	2.4	1.64	8.05	0.58	0.24	0.08	8.54	9.44	9.53
B_1G	8-13	4.90	1.4	0.63	2.01	0.68	0.44	0.06	8.40	9.58	12.32
B_2G	13-27	4.68	7.1	0.41	0.37	1.79	2.73	0.16	14.48	19.16	24.43
B_3G	27-36	4.50	1.0	0.16	0.55	1.61	2.79	0.11	9.09	13.60	33.16
C_1	36-42+	4.76	2.7	0.09	0.55	0.80	1.50	0.05	2.75	5.10	46.08

1/ - The exchangeable manganese is reported in parts per million and is not included in the total and percent base saturation columns.

2/ - Milli-equivalents per 100 grams of soil.

* - Summation of exchangeable cations.

TABLE 2

Horizon	Depth	Size Class and Diameter of Particles (in mm.)							Other Classes (in mm.)	
		Very coarse sand, 2-1	Coarse sand, 1-0.5	Medium sand, 0.5-0.25	Fine sand, 0.25-0.1	Very fine sand, 0.1-0.05	Silt, 0.05-0.002	Clay, <0.002	0.02-0.002	0.2-0.02
	Inches	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
					ALBEMARLE FINE SANDY LOAM					
A_1	0-1	7.8	13.3	7.6	14.0	9.3	38.1	9.9	26.1	28.3
A_2	1-11	7.6	11.8	6.9	13.1	8.3	38.8	13.5	26.5	27.2
B_1	11-14	8.5	10.9	5.4	9.8	6.6	34.3	24.5	24.4	21.6
B_2	14-28	6.2	9.4	4.3	7.8	6.2	27.4	38.7	16.6	21.2
B_3	28-37	3.6	9.4	6.1	10.3	7.5	31.1	32.0	18.5	25.3
C_1	37-45	3.0	9.9	7.8	14.4	10.2	39.1	15.6	21.8	34.8
					ALTAVISTA LOAM					
A_p	0-8	2.6	8.4	5.6	8.7	5.0	42.8	26.9	32.2	19.7
B_1	8-13	2.1	6.4	4.7	8.0	4.6	35.3	38.9	26.5	17.3
B_{21}	13-18	1.4	5.3	4.5	7.9	4.6	30.6	45.7	22.6	16.4
B_{22}	18-30	1.2	4.8	4.3	7.6	4.6	25.8	51.7	18.2	15.9
C_1	30-36	7.5a	10.6a	7.2a	12.4a	8.3a	22.4	31.6	14.8	22.4
					AUGUSTA SILT LOAM					
A_p	0-11	3.0c	9.5c	6.3c	9.5c	5.9c	45.8	20.0	34.0	22.2
B_1	11-15	3.3c	7.5c	5.5c	8.5c	5.2c	39.8	30.2	30.0	19.1
B_2	15-26	2.5c	4.8c	4.1c	8.0c	5.1c	26.9	48.6	19.5	16.5
B_3	26-39	1.8a	4.1a	3.6a	8.5a	9.6b	28.3	44.1	17.9	24.8
C_1	39-54	6.4a	10.0a	6.3a	10.3a	6.1a	18.9	42.0	12.9	17.2
					BELVOIR LOAM					
A_p	0-8	4.7a	10.4a	6.3c	5.5c	10.7c	46.1	16.3	34.5	22.8
B_1	8-12	2.4c	5.5c	3.8c	4.4c	9.1c	45.3	29.5	33.1	22.3
B_{21g}	12-23	3.5a	5.1a	3.0c	4.6c	7.4c	37.6	38.8	27.3	19.6
B_{22g}	23-30	5.0c	8.0c	5.1c	7.7c	10.5c	35.9	27.8	24.2	25.4
C_1	30-38	8.1c	13.1c	7.6c	8.1c	12.5c	29.4	21.2	19.5	24.3
					BRANDYWINE GRITTY LOAM					
A_1	0-3	11.0b	17.8b	10.4b	17.9a	10.2a	23.6	9.1	14.5	28.2
A_3	3-12	11.5a	15.6a	9.9a	18.1c	11.2c	24.1	9.6	13.7	30.9
C_1	12-16	16.4a	18.9a	9.1a	16.0c	9.9c	19.5	10.2	10.9	26.8

Horizon	Depth	Size Class and Diameter of Particles (in mm.)							Other Classes (in mm.)	
		Very coarse sand, 2-1	Coarse sand, 1-0.5	Medium sand, 0.5-0.25	Fine sand, 0.25-0.1	Very fine sand, 0.1-0.05	Silt, 0.05-0.002	Clay, <0.002	0.02-0.002	0.2-0.02
	Inches	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
				BRANDYWINE LOAM						
A_1	0-3	5.0b	11.9b	9.3b	15.2a	10.8c	38.0	9.8	21.2	34.8
A_2	3-10	3.7b	10.7b	8.9b	15.1a	10.3c	40.6	10.7	23.9	34.2
B_2	10-14	3.8b	10.3b	8.0b	12.6a	8.4c	39.8	17.1	25.0	29.0
C_1	14-20	5.9c	19.5c	11.7c	13.3c	8.1c	24.7	16.8	14.6	23.9
C_2	20-38	8.3c	23.6c	13.3c	16.1c	10.9c	21.6	5.7	11.0	28.7
				CHESTER LOAM						
A_p	0-8	7.6e	14.3e	7.0e	9.6e	6.2e	41.6	13.7	28.3	24.1
B_1	8-11	5.8e	10.7e	5.7e	8.2e	5.8e	42.9	20.9	31.5	21.3
B_2	11-22	4.8e	8.3e	4.5e	7.0e	4.8e	42.2	28.4	30.9	19.5
B_3	22-29	4.7	9.5	3.9	5.4	3.8	50.3	22.4	37.9	18.8
C_1	29-44	10.6	14.7	6.3	8.3	5.5	42.5	12.1	30.7	21.3
C_2	44-120	10.0	16.3	8.0	10.3	8.3	42.4	4.7	26.9	28.7
				DYKE LOAM						
A_p	0-8	2.8	7.4	5.5	9.3	4.4	40.5	30.1	31.4	17.8
B_1	8-18	2.0	5.0	4.2	7.1	3.4	34.1	44.2	27.0	13.9
B_{21}	18-29	1.3	5.0	4.3	6.7	4.2	21.0	57.5	15.5	12.5
B_{22}	29-40	1.9	5.7	4.3	6.5	3.9	17.5	60.2	13.1	11.0
B_3	40-72	3.4c	7.2c	5.4c	9.0c	4.6c	19.8	50.6	14.0	14.7
C_1	72-93	2.6a	7.6a	5.8a	10.1a	6.5a	22.8	44.6	16.0	18.4
C_2	93-147	0.5a	2.0a	2.4a	7.3a	5.4a	37.7	44.7	31.5	15.7
				EUBANKS AND LLOYD LOAMS						
A_p	0-5	1.2	6.6	6.3	10.8	6.5	45.9	22.7	32.8	24.6
B_1	5-9	0.6	5.0	5.6	8.6	5.3	45.8	29.1	34.1	20.9
B_{21}	9-17	0.8	4.4	4.2	6.9	4.2	33.3	46.2	24.7	16.0
B_{22}	17-26	0.5	4.1	4.3	7.3	4.2	30.1	49.5	22.0	15.8
B_3	26-34	2.7	8.0	5.2	7.3	4.2	21.5	51.1	15.6	13.6
C_1	34-79	3.7a	11.3a	6.3a	6.8a	4.5a	25.9	41.5	18.9	14.2
C_2	79-96	2.8a	7.7a	5.5a	9.4a	7.1a	44.5	23.0	32.0	24.1

Horizon	Depth	Size Class and Diameter of Particles (in mm.)							Other Classes (in mm.)	
		Very coarse sand, 2-1	Coarse sand, 1-0.5	Medium sand, 0.5-0.25	Fine sand, 0.25-0.1	Very fine sand, 0.1-0.05	Silt, 0.05-0.002	Clay, <0.002	0.02-0.002	0.2-0.02
	Inches	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
				EUBANKS AND LLOYD STONY LOAMS						
A_p	0-4	9.1c	9.7c	5.3c	8.7c	5.5c	34.5	27.2	27.8	16.6
B_2	4-20	6.7d	8.5d	3.6d	6.2d	5.1d	29.8	40.1	23.4	14.9
B_3	20-25	7.4d	7.5d	2.9d	4.8d	4.4d	34.8	38.2	28.4	13.5
C_1	25-58	5.1d	8.2d	4.9d	10.4d	8.9d	40.2	22.3	30.8	24.2
				HALEWOOD STONY FINE SANDY LOAM						
A_p	0-6	9.5d	12.8d	7.9d	14.0d	8.8d	34.4	12.6	25.5	24.3
B_1	6-9	6.5d	9.9d	6.4d	11.9d	7.2d	38.1	20.0	29.2	22.2
B_2	9-24	4.8d	9.0d	6.3d	11.6d	7.8d	34.1	26.4	25.8	22.2
B_3	24-30	5.7d	11.1d	7.0d	14.4d	9.6d	29.5	22.7	21.3	25.7
C_1	30-64	8.2d	15.9d	10.7d	19.6d	10.8d	22.6	12.2	13.2	30.3
				HAZEL LOAM						
A_1	0-2	0.4b	0.5b	0.7b	8.1a	25.4a	56.4	8.5	59.5	28.8
A_2	2-7	0.1b	0.4b	0.6b	7.8a	27.9a	56.0	7.2	26.2	64.3
C_1	7-46	0.3b	0.6b	0.8b	8.4a	26.5a	53.8	9.6	21.3	65.8
C_2	46-58	<0.1	0.2b	0.5b	15.7a	40.7a	36.2	6.7	10.6	79.8
				HIWASSEE LOAM						
A_p	0-5	3.7	8.2c	5.1c	10.2c	9.7c	40.0	23.1	27.2	28.5
A_3	5-8	1.9	4.8c	3.9c	8.5c	9.3c	48.1	23.5	34.1	27.8
B_{21}	8-15	1.0	2.7c	2.4c	5.5c	5.4c	35.9	47.1	26.1	18.3
B_{22}	15-67	0.8e	2.1e	1.6e	3.0e	3.9e	18.5	70.1	12.6	11.4
B_3	67-114	0.8e	2.4e	1.9b	6.5b	10.6b	29.6	48.2	20.0	24.6
D	114-132	3.4e	6.0e	3.8b	11.8b	18.5b	38.2	18.3	22.7	41.7
				LOUISBURG SANDY LOAM						
A_1	0-10	6.7	12.5	8.3	15.2	13.0	32.6	11.7	22.5	29.7
A_3	10-15	6.6	12.9	7.4	14.0	7.9	30.4	20.8	20.3	25.1
C_1	15-24	11.3	19.4	9.2	11.9	10.8	26.0	11.4	14.5	27.2

Horizon	Depth	Size Class and Diameter of Particles (in mm.)							Other Classes (in mm.)	
		Very coarse sand, 2-1	Coarse sand, 1-0.5	Medium sand, 0.5-0.25	Fine sand, 0.25-0.1	Very fine sand, 0.1-0.05	Silt, 0.05-0.002	Clay, <0.002	0.02-0.002	0.2-0.02
	Inches	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
					MEADOWVILLE LOAM					
A_{p1}	0-11	4.0	11.6	9.1	10.0	3.8	40.0	21.5	32.9	15.0
A_3	11-21	3.4	9.7	6.2	7.0	3.4	42.7	27.6	35.5	13.6
B_2	21-28	5.4	11.9	7.4	8.2	3.3	39.4	24.4	31.6	14.5
B_3	28-36	6.5	15.7	10.9	10.1	5.9	26.8	24.1	21.5	14.4
C_1	36-41	12.8	17.7	8.9	8.6	4.2	25.6	22.2	20.5	12.8
					MYERSVILLE STONY SILT LOAM					
A_{p1}	0-5	3.1b	4.5b	2.4b	4.2b	4.2b	46.5	35.1	36.3	16.6
B_1	5-11	1.7b	3.5b	2.1b	3.7b	3.9b	47.3	37.8	37.5	15.6
B_2	11-26	2.1b	3.4b	2.1b	4.0b	5.2b	47.6	35.6	35.8	19.3
C_1	26-46	0.6b	2.3b	1.5b	4.7b	9.5b	58.5	22.9	42.5	28.7
					PORTERS STONY LOAM					
A_1	0-2	8.4	17.1	9.4	9.4	11.1	33.8	10.8	25.8	21.2
A_2	2-9	7.8	13.8	9.4	10.3	11.3	32.6	14.8	25.4	21.1
B_2	9-21	10.9	15.3	8.2	7.3	9.9	28.6	19.8	22.7	16.9
C_1	21-42	6.9d	15.0d	9.7d	15.0d	7.6d	24.0	21.8	16.8	22.0
					ROANOKE SILT LOAM					
A_p	0-10	2.2b	4.1b	2.8a	8.9a	7.8c	45.7	28.5	34.8	24.1
B_1	10-13	7.0c	13.6c	8.6c	10.2c	4.9c	36.2	19.5	27.9	17.6
B_{21g}	13-18	2.8e	9.1e	7.0e	10.4e	4.8e	27.6	38.3	21.3	15.8
B_{22g}	18-30	1.2e	5.2e	5.9e	11.8e	5.7e	28.0	42.2	21.1	18.4
C_1	30-36	4.4e	12.6e	13.3e	22.4e	7.9e	15.7	23.7	10.2	23.4
					STONY LOCAL ALLUVIAL LAND					
A	0-13	3.6c	10.3c	9.2c	10.3c	11.2c	37.0	18.4	28.0	22.3
B_2	13-27	4.3c	15.0c	13.0c	16.1c	8.8c	26.9	15.9	20.6	20.5
C_1	27-35	6.0c	15.5c	13.7c	20.4c	7.2c	23.4	13.8	17.7	21.9
					UNISON LOAM					
A_p	0-8	2.4	8.2	6.6	10.6	5.3	42.5	24.4	32.7	20.2
B_1	8-18	2.1	7.1	5.3	8.2	4.2	38.9	34.2	30.6	16.3
B_2	18-35	2.0	6.6	5.3	8.5	4.3	27.8	45.5	21.1	15.0
B_3	35-43	1.6	6.4	4.9	8.0	4.3	26.7	48.1	20.5	14.5
C_1	43-49+	2.1	5.7	4.1	7.2	4.6	25.0	51.3	18.8	14.5

Horizon	Depth	Size Class and Diameter of Particles (in mm.)							Other Classes (in mm.)	
		Very coarse sand, 2-1	Coarse sand, 1-0.5	Medium sand, 0.5-0.25	Fine sand, 0.25-0.1	Very fine sand, 0.1-0.05	Silt, 0.05-0.002	Clay, 0.002	0.02-0.002	0.2-0.02
	Inches	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
					UNISON LOAM					
A_p	0-8	3.2	10.0	8.2	13.9	7.7	44.5	12.5	29.6	29.2
A_3	8-10	3.1	9.7	7.7	13.2	7.3	45.6	13.4	31.6	27.5
B_{21}	10-18	2.6	8.0	6.9	11.4	6.3	42.2	22.6	29.9	24.1
B_{22}	18-26	1.9	7.9	7.0	11.9	6.3	39.3	25.7	27.9	23.5
B_{3g}	26-37	2.1	6.3	5.8	9.7	5.7	34.0	36.4	23.0	21.6
C_1	37-67	3.2	9.0	7.3	11.4	6.3	29.0	33.8	19.0	21.7
					WICKHAM LOAM					
A_p	0-10	2.2	5.8	5.0	7.5	5.6	41.5	32.4	31.1	19.1
B_2	10-38	3.5	7.2	5.0	6.3	5.8	27.6	44.6	20.4	15.0
B_3	38-52	4.1	7.5	5.4	6.3	6.6	24.2	45.9	17.3	15.4
C_1	52-70	4.4	9.2	6.4	9.9	7.0	24.1	39.0	17.4	17.9
					WORSHAM SILT LOAM					
A_p	0-4	3.7f	7.4f	5.0g	7.1g	3.8g	53.0	20.0	41.4	18.7
A_2	4-8	3.6f	7.9f	4.7g	3.7g	6.5g	52.9	20.7	42.7	16.9
B_{1g}	8-13	4.0h	5.5h	3.2g	3.0g	4.5g	50.6	29.2	40.8	14.9
B_{2g}	13-27	0.7	2.6	2.1	1.8	3.8	34.8	54.2	27.9	10.9
B_{3g}	27-36	13.1	22.0	12.7	17.9	6.6	15.1	12.6	9.8	20.0
C_1	36-42	2.6	7.9	5.7	8.9	4.8	35.6	34.5	27.5	17.1

a. Common (Fe-Mn) concr.
b. Many (Fe-Mn) concr.
c. Few (Fe-Mn) concr.
d. Trace (Fe-Mn) concr.; trace mica.
e. Trace (Fe-Mn) concr.
f. Common (Fe) concr.
g. Few (Fe) concr.
h. Many (Fe) concr.

TABLE 3 ENGINEERING CHARACTERISTICS

Horizon	Depth	Percentage Passing Sieve Size[1] In Inches: 2.0	1.5	1.0	.75	.375	In Millimeters: 4.7	2.0	.42	.25	.074	Percentage Smaller Than[1] In Millimeters: .05	.02	.005	.002	L.L.[2]	P.I.[3]	Maximum Dry Density (Pounds per Cubic Foot)	Optimum H_2C (Per-cent)	Classification Unified[5]	A.A.S.H.O.[4]
BRANDYWINE LOAM																					
A_1	3-10	—	100	93	88	82	77	74	61	53	41	33	24	12	6	29	NP[6]	109	14	SM	A-4(1)
C_2	20-38	—	—	—	—	—	—	100	57	42	27	22	15	8	6	26	NP[6]	116	12	SM	A-2-4(0)
CHESTER LOAM																					
A_{2p}	0-8	--	—	100	97	96	95	95	75	66	55	39	25	11	6	34	6	106	17	ML	A-4(4)
B_2	11-22	—	—	—	—	—	—	100	83	78	71	65	58	39	29	45	14	105	19	ML	A-7-5(10)
C_2	44-120	—	—	—	—	—	—	100	74	66	55	49	29	11	6	34	NP[6]	109	16	ML	A-4(4)
CLIFTON STONY SILT LOAM																					
A_{1p}	0-5	82*	61	57	56	49	45	43	35	34	30	23	17	9	6	51	6	81	34	GM	A-5(1)
B_2	11-26	—	—	—	—	—	—	82	75	72	67	54	49	27	16	46	11	93	27	ML	A-7-5(10)
C_1	26-46	—	—	—	—	—	—	82	79	78	75	64	51	30	16	47	6	91	27	ML	A-5(9)
DYKE LOAM																					
A_p	0-8	—	—	—	—	—	—	100	89	82	72	66	53	33	22	42	16	103	18	ML-CL	A-7-6(10)
B_{21}	18-29	—	—	—	—	—	—	100	93	88	79	78	72	65	59	55	26	101	22	MH-CH	A-7-6(17)
C_2	93-144+	—	—	—	—	—	—	100	98	95	88	79	75	60	50	74	34	90	30	MH	A-7-5(20)
EUBANKS LOAM																					
A_p	0-5	--	—	—	—	—	—	100	92	85	73	68	55	32	20	31	7	110	16	ML-CL	A-4(8)
B_{22}	17-26	—	—	—	—	—	—	100	95	89	80	79	73	58	50	52	18	102	22	MH	A-7-5(14)
C_2	79-96	—	—	—	—	—	—	100	86	77	63	59	46	26	20	37	NP[6]	104	19	ML	A-4(6)
HIWASSEE LOAM																					
A_p	0-5	—	—	—	—	—	—	100	85	78	66	45	27	12	7	37	4	101	20	ML	A-4(6)
B_{22}	15-67	—	—	—	—	—	—	100	97	95	90	88	83	76	72	57	13	91	29	MH	A-7-5(13)
WICKHAM LOAM																					
A_p	0-10	—	—	—	—	—	—	100	91	79	72	71	57	33	19	34	12	109	16	ML-CL	A-6(9)
B_2	10-38	—	—	—	—	—	—	100	91	85	76	75	69	53	45	48	18	102	20	ML	A-7-5(13)
C_1	52-70	—	—	—	—	—	—	100	86	78	65	61	53	47	35	44	12	105	19	ML	A-7-5(7)

1. Based on total material. Laboratory test data corrected for amount discarded in field sampling.
2. Liquid limit
3. Plasticity index
4. Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes. A.A.S.H.O. Designation M 145-49
5. Based on the Unified Soil Classification System, Technical Memorandum No. 3-357. Volume 1, Waterways Experiment Station, Corps of Engineers, March 1953.
6. NP = Nonplastic

* For this sample, fragments larger than 3" discarded in field (estimated 18% for the three horizons)

TABLE 4

Bulk Density and Moisture Retention Values, Conductivity and In-Place Perk Rates
Rappahannock County, Virginia

Clifton Stony Silt Loam

Horizon Depth	1/10 Bar Core	1/10 Bar Frag.	1/3 Bar Core	1/3 Bar Frag.	15 Bar Core	15 Bar Frag.	Bulk Density	In Place Perk Inches per Hour	Hydraulic Conductivity - Inches per Hour
Ap, 0-5	35.0	37.9	31.8	33.0		5.7	0.96		
B1, 5-11	39.9	37.2	37.3	33.7		8.5	1.10	8.2	
B2, 11-26	36.9	36.00	34.6	32.5		14.1	1.10	15.4	
C1, 26-46	35.7	46.2	34.4	36.5		13.2	1.30	0.4	
Eubanks Loam									
Ap, 0-5	22.7	32.7	20.8	23.1		9.7	1.49	5.6	
B1, 5-9	21.9	31.4	20.4	23.7		9.3	1.49		
B21, 9-17	25.7	35.1	24.9	28.0		6.0	1.47	6.7	
B22, 17-26	26.4	31.6	25.2	31.1		16.8	1.45	1.8	
B3, 26-34	25.6	35.3	23.9	30.8		23.2	1.53	0.6	
C1, 34-79	33.1	41.9	31.8	36.3		22.3	1.35	1.1	
Chester Loam									
Ap, 0-8	24.4	27.2	22.5	22.8		6.8	1.35	1.7	
B1, 8-11	26.4	30.8	24.6	26.3		8.6	1.45		
B2, 11-22	27.1	35.2	24.6	30.8		12.6	1.44	0.9	
B3, 22-29	30.6	40.5	28.7	37.5		13.2	1.33	0.3	
C1, 29-44	26.6	36.1	25.3	30.4		8.2	1.48	0.6	
Brandywine Loam									
A1, 0-3	24.9	28.52	18.81	23.3	12.6	8.25	1.18		32.9
A2, 3-10									
B2, 10-14	22.8	26.8	20.5	24.6	14.8	10.5	1.48		1.1
C1, 14-20	19.9	21.6	18.0	17.7	10.6	6.8	1.56		0.7
C2, 20+	15.7	16.6	11.5	12.5	3.71	2.4	1.54		17.4

Bulk Density and Moisture Retention Values, Conductivity and In-Place Perk Rates
Rappahannock County, Virginia

Hayesville Loam

Horizon Depth	1/10 Bar Core	1/10 Bar Frag.	1/3 Bar Core	1/3 Bar Frag.	15 Bar Core	15 Bar Frag.	Bulk Density	In Place Perk Inches per Hour	Hydraulic Conductivity - Inches per Hour
Ap, 0-4	29.9	32.4	28.5	28.6	23.5	11.7	1.19	21.6	218.7
B2, 4-20	24.2	32.0	22.8	26.1	18.0	15.4	1.42	2.9	5.0
B3, 20-25	26.4	30.1	24.0	23.4	19.3	17.3	1.32	1.7	3.1
C1, 25-58	31.4	33.6	28.9	24.4	17.0	13.5	1.32	0.2	1.4

Wickham Loam

Ap, 0-10	23.1	23.5	20.1	19.0	12.9	10.9	1.21	4.6	47.9
B2, 10-38	29.0	32.8	27.9	26.6	24.5	15.8	1.37	5.4	0.04
B3, 38-52	29.1	29.5	27.4	23.6	20.8	14.8	1.28	3.4	0.9
C1, 52-70	24.8	26.15	24.2	21.8	18.5	14.9	1.46		5.5

Braddock Loam

Ap, 0-12	20.8	26.7	17.6	20.7	7.7	5.9	1.29		65.8
Ap, 0-12	22.2	26.7	19.2	18.6	7.5	5.9	1.41	1.6	26.7
Bm, 12+	15.2	22.0	14.1	19.5	9.8	7.5	1.69	0.32	12.9

Hazel Loam

Ap, 0-	27.6	37.2	22.1	23.2	10.6	6.8	1.40		36.8

Trego Silt Loam

Ap, 0-8	30.2	30.1	25.8	23.1	14.3	7.0	1.34	0.5	7.0
B1, 8-12	23.4	29.8	20.9	23.4	13.1	7.6	1.34	0.4	155.4

Bulk Density and Moisture Retention Values, Conductivity and In-Place Perk Rates
Rappahannock County, Virginia

Hiwassee Loam

Horizon Depth	1/10 Bar Core	1/10 Bar Frag.	1/3 Bar Core	1/3 Bar Frag.	15 Bar Core	15 Bar Frag.	Bulk Density	In Place Perk Inches per Hour	Hydraulic Conductivity - Inches per Hour
Ap, 0-5	27.8	28.5	23.6	22.10		11.4	1.25	9.0	
A3, 5-8	29.1	32.3	25.3	25.1		16.8	1.26		
B21,8-15	29.1	35.5	26.7	29.5		17.6	1.24	2.5	
B22,15-67	35.8	43.1	33.4	37.4		17.5	1.23	0.3	
B3, 67-114	37.4	52.6	36.3	44.0		22.2	1.28		

Dyke Loam

Ap, 0-8	24.0	24.2	22.7	22.8	15.6	11.46	1.26	15.0	16.4
B1, 8-18	26.6	22.8	24.7	20.5	18.6	13.6	1.35		8.8
B21,18-29	29.6	33.7	28.1	28.9	21.6	17.2	1.41	4.1	12.6
B22,29-40	30.1	35.5	28.2	29.7	22.6	20.6	1.32	1.7	0.1
B3, 40+	30.0	35.2	28.6	30.2	25.8	21.2	1.45	1.1	0.05

Tusquittee Loam

Ap, 0-13	26.7	27.62	21.6	23.3	18.3	7.6	1.26		9.52

Halewood Fine Sandy Loam

Ap, 0-6	27.2	27.94	22.2	21.9	11.9	7.0	1.22	6.2	24.2
B1, 6-9	22.7	26.5	20.6	22.8	13.4	9.2	1.32		6.7
B2, 9-24	25.0	29.8	23.2	26.3	16.1	12.8	1.39	4.3	3.3
B3, 24-30	26.7	31.8	24.8	27.3	15.4	11.7	1.40	0.4	0.8
C1, 30-39+	30.5	35.3	28.3	28.7	14.5	10.7	1.33	2.5	48.6

Bulk Density and Moisture Retention Values, Conductivity and In-Place Perk Rates
Rappahannock County, Virginia

Thurmont Loam

Horizon Depth	1/10 Bar		1/3 Bar		15 Bar		Bulk Density	In Place Perk Inches per Hour	Hydraulic Conductivity - Inches
	Core	Frag.	Core	Frag.	Core	Frag.			
Ap, 0-8	23.6	24.1	17.9	17.0	5.7	4.6	1.17	16.7	24.7
A3, 8-10	19.2	23.1	16.1	17.0	7.0	4.3	1.47		11.7
B1, 10-18	18.4	24.5	16.8	17.3	8.5	6.8	1.54	5.7	49.6
B3, 18-26	19.9	27.6	18.6	20.3	12.1	9.0	1.61	0.4	3.8
B3, 26-37	22.9	25.6	21.3	21.7	14.1	13.0	1.52	0.4	7.4
C1, 37+	24.4	27.8	23.3	23.0	15.3	14.8	1.53	0.2	14.3

Appendix

Bulk Density and Moisture Retention Values, Hydraulic Conductivity and In-place Percolation Rates for Some Rappahannock County, Virginia, Soils

Methods and Procedure

Three 1 x 2 inch undisturbed soil cores were taken of each sampled horizon, a cheese cloth covering was attached to the bottom of two of the three cores and these covered cores were used to determine bulk density, hydraulic conductivity and 1/10 and 1/3 bar soil moisture retention values. The remaining 1 x 2 inch soil cores were used in the determination of 15 bar undisturbed and fragmented soil moisture retention values.

Bulk Density, 1/10 and 1/3 bar values and Hydraulic Conductivity Rates

The soil cores were allowed to saturate with water and were placed in a pressure cooker pressure apparatus and allowed to come to equilibrium with 1/10 and 1/3 bar pressures. Undisturbed soil moisture retention values were calculated from data obtained at each pressure.

Bulk density values were calculated from oven dry weights of soil cores determined at this point.

The soil cores were allowed to resaturate with water, 1 x 2 inch rings were attached to the top, and about a one inch head of water was maintained on the cores with the use of inverted 200 ml. Volumetric flasks. The percolates were weighed and hydraulic conductivity rates were calculated.

The soil cores were fragmented, passed through a 2 mm sieve and fragmented soil moisture retention values were obtained by allowing saturated samples from each core to reach equilibrium with 1/10 and 1/3 bar pressures.

15 Bar Values

Two slices, about 1 cm. thick were taken from the remaining 1 x 2 inch soil cores using 1 cm by 2 inch metal rings affixed with a cheese cloth covering on one end. The 1 cm. slices were allowed to saturate with water, were placed in a pressure membrane apparatus and allowed to reach equilibrium with 15 atmospheres of pressure. Undisturbed soil moisture retention values were calculated from data obtained at this equilibrium point.

The soil slices were fragmented, passed through a 2 mm sieve and fragmented soil moisture tension values were obtained by allowing saturated samples from each 1 cm. slice to reach equilibrium with 15 atmospheres of pressure.

In Place Percolation Rates

In place percolation rates were determined by using the method suggested by Slater1/ and modified by Davidson2/.

1. Slater, C. S. and Eley, G. W., Use of single ring infiltrometers for determining irrigation application rates. Soil Sci. Soc. Amer. Proc. (In Press)

2. Davidson, S. E., Soil Scientist, U.S.D.A., Soil Conserv. Service, Beltsville, Maryland.